



Plumbing MSDS

ARPI'S PLUMBING DEPARTMENT MSDS

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SECTION 1 - Product Information

Product Identifier: 7008 Brite Galvanize Coating 65% Zinc Rich (formerly AerVOE 142)

Product Use: Galvanizing Paint

Manufacturer's Name: AerVOE Industries Inc.

Address: 1100 Mark Circle, Gardnerville, NV 89410

Emergency Phone: 1-800-424-9300

Preparation Date: June 2, 2013

SECTION 2 - Hazardous Ingredients

Hazardous Ingredients	Weight %	CAS Number	LD ₅₀ of Ingredient (species & route)	LC ₅₀ of Ingredient (species)
Acetone	15 - 40	67-64-1	5800 mg / kg (Rat-Oral)	21000 ppm / 8 hr (Rat)
Propane	10 - 30	74-98-6	N / AV	N / AV
Zinc	10 - 30	7440-66-6	N / AV	N / AV
n-Butyl Acetate	10 - 30	123-86-4	N / AV	N / AV
n-Butane	3 - 7	106-97-8	N / AV	N / AV
Aliphatic Petroleum Distillates	1 - 5	64742-89-8	N / AV	N / AV
Isobutane	1 - 5	75-28-5	N / AV	57 pph / 15 min (Rat)

SECTION 3 - Physical Data

Physical State: Aerosol

Boiling Point: N / AP

Vapor Pressure (psig): 45 to 55

Specific Gravity: 0.8

Freezing Point: N / AV

Odor and Appearance: Hydrocarbon odor / Metallic gray liquid

Evaporation Rate: Faster than n-Butyl Acetate

Vapor Density (air = 1): Heavier than air

SECTION 4 - Fire and Explosion Data

Flammability: Yes - Flammable aerosol under conditions of sparks, flame, or excessive heat.

Means of Extinction: *Extinguishing Media* - Carbon dioxide, dry chemical, water spray. *Firefighting Procedures* - Treat as cylinders of compressed gas. Closed containers may rupture due to pressure build up from extreme temperature. Use water spray to cool containers to prevent pressure build up. Self-contained breathing apparatus should be used if product is involved in fire.

Flashpoint: < 0° F (-18° C) **Method Used:** Estimated **Flammable Limits - LFL:** .9% **UFL:** 12.8%

Autoignition Temperature: N / AV **Hazardous Combustion Products:** Carbon Monoxide, Carbon Dioxide.

Explosion Data - Sensitivity to Mechanical Impact: No **Explosion Data - Sensitivity to Static Discharge:** No

SECTION 5 - Reactivity Data

Chemical Stability: Stable

Reactivity & Conditions: None

Incompatibility with Other Substances: Strong oxidizing agents

Hazardous Decomposition Products: None

SECTION 6 - Toxicological Properties

Primary Routes of Entry: Skin Contact, Eye Contact, Inhalation

Effects of Acute Exposure to Product:

Skin Contact - Irritation.

Eye Contact - Irritation.

Inhalation - Irritation. May cause dizziness, light-headedness and / or headaches.

Effects of Chronic Exposure to Product: Dermatitis.

Exposure Limits (TLV):

Acetone 500 ppm TWA and 750 ppm STEL - ACGIH 2005

Propane 2500 ppm TWA - ACGIH 2005

Zinc N / AV - ACGIH 2001

n-Butyl Acetate 150 ppm TWA and 200 ppm STEL - ACGIH 2005

n-Butane 800 ppm TWA - ACGIH 2005

Aliphatic Petroleum Distillates N / AV - ACGIH 2005

Isobutane N / AV - ACGIH 2005

Irritancy: Skin, eyes, and respiratory tract.

Sensitization: N / AV

Carcinogenicity: The ingredients are not listed as a human carcinogen by IARC, ACGIH, NTP, or OSHA.

Reproductive Toxicity: N / AV **Teratogenicity:** N / AV **Mutagenicity:** N / AV **Synergistic Products:** N / AV

SECTION 7 - Preventive Measures

Personal Protective Equipment (PPE): Gloves - Yes Respirator - Yes Eye - Yes Footwear - No Clothing - No Other - No

Skin Protection - Chemical resistant gloves such as Neoprene or Nitrile rubber.

Respiratory Protection - In areas with poor ventilation, use a NIOSH approved Organic Vapor Cartridge Respirator.

For concentrations above the TLV (as defined in Section 6), use a positive air supplied respirator.

Eye Protection - Safety glasses or goggles.

Engineering Controls: General ventilation to maintain exposure limits below TLV's as defined in Section 6.

Leak and Spill Procedure: Remove all sources of ignition. Ventilate area. Prevent from entering a watercourse. Use an inert absorbent material and non-sparking type tools.

Waste Disposal: Dispose of in accordance with local, state/provincial or territorial, and federal regulations. Do not incinerate closed containers.

Handling Procedures and Equipment: Do not use near heat, sparks, or open flame. Use PPE as defined in Section 7.

Storage Requirements: Do not store near heat, sparks, flame or above 120° F (49° C).

Special Shipping Information: Consumer Commodity ORM-D.

SECTION 8 - First Aid Measures

Inhalation: Remove from exposure, seek medical attention if signs/symptoms persist.

Ingestion: Do NOT induce vomiting, drink plenty of water, seek medical attention.

Skin Contact: Wash affected area with soap and water, remove contaminated clothing, seek medical attention if irritation persists.

Eye Contact: Flush immediately with water for 15 minutes, seek medical attention if irritation persists.

SECTION 9 - Preparation Information

Prepared by: Technical Department

Telephone Number: 775-783-3100

Preparation Date: 06-2-13

THE INFORMATION CONTAINED HEREIN IS BELIEVED TO BE ACCURATE BUT IS NOT WARRANTED TO BE SO. NOTHING CONTAINED HEREIN CONSTITUTES A SPECIFICATION NOR IS IT INTENDED TO WARRANT SUITABILITY FOR THE INTENDED USE.

NOTE: N / AP = Not Applicable N / AV = Not Available

CE7008MA

MATERIAL SAFETY DATA SHEET
3 PRIMER

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SLUYTER COMPANY LTD.

375 Steelcase Road East
Markham, Ontario L3R 1G3 Canada
Tel (905) 475-6011 Fax (905) 475-3119

SECTION 01: CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

MANUFACTURER-----SLUYTER COMPANY LTD.
375 Steelcase Road East
Markham, Ontario L3R 1G3
Canada
Tel (905) 475-6011
PRODUCT NAME-----3 PRIMER (PVC & CPVC Primer).
PRODUCT USES-----Primer used with PVC and CPVC Solvent Cements.
CHEMICAL FAMILY-----Solvent Blend

SECTION 02: COMPOSITION / INFORMATION ON INGREDIENTS

INGREDIENTS / %	CAS / TLV	LD/50, ROUTE, SPECIES	LC/50, ROUTE, SPECIES
TETRAHYDROFURAN			
15 - 40	109-99-9 200 ppm	1650 mg/kg Oral (Rat)	18000 ppm 4 hours Inhalation (Rat)
ACETONE			
15 - 40	67-64-1 750 ppm	9750 mg/kg Oral (Rat)	16000 ppm 4 hours Inhalation (Rat)
METHYL ETHYL KETONE			
15 - 40	78-93-3 200 ppm	2737 mg/kg Oral (Rat)	23500 mg/m3 8 Hours Inhalation (Rat)

SECTION 03: HAZARDS IDENTIFICATION

ROUTE OF ENTRY:-----
SKIN CONTACT-----Can cause moderate skin irritation,
defatting and dermatitis.
SKIN ABSORPTION-----Tetrahydrofuran can be absorbed through
the skin resulting in toxic effects.
INHALATION-----As described below.
INHALATION CHRONIC-----Can cause damage to the respiratory
system. Can cause headache, dizziness and nausea.
INGESTION-----Can cause gastro-intestinal irritation,
nausea, vomiting and diarrhea.
EYE CONTACT-----Causes eye burns. Severe irritation,
redness, watering and blurred vision.
EFFECTS OF ACUTE EXPOSURE-----Refer to "ROUTE ENTRY" section.
EFFECTS OF CHRONIC EXPOSURE-----May cause damage to the central nervous
system, respiratory system, lungs, eyes,
skin, gastro-intestinal tract, liver,
spleen and kidneys. May cause nausea,
headache, dizziness and
drowsiness. Prolonged or repeated skin
contact may cause drying or cracking of the skin.

3 PRIMER**SECTION 04: FIRST AID MEASURES**

EYE CONTACT-----Check for and remove any contact lenses.
Immediately flush with water for a minimum
of 20 minutes and get medical attention.

SKIN CONTACT-----Remove contaminated clothing. Wash
affected area with water and soap. Seek
medical attention if irritation occurs or persists.

INHALATION-----Remove patient to fresh air. If not
breathing, trained personnel should
administer artificial respiration. Get medical attention.

INGESTION-----Do NOT induce vomiting. Get immediate medical attention.

ADDITIONAL INFORMATION-----Contact your local poison control centre.

SECTION 05: FIRE FIGHTING MEASURES

FLAMMABILITY-----Flammable.

UNDER WHAT CONDITIONS-----Extremely flammable liquid. Dangerous fire
hazard when exposed to heat, flame or
temperatures above the flash point. As
vapours are heavier than air, they may
travel to a source of ignition and flash
back.

SPECIAL PROCEDURES-----A self-contained breathing apparatus is
required for fire fighting personnel. Use
water spray to cool fire exposed surfaces
and to protect personnel.

FLASH POINT (METHOD)----- -5°C TAG Closed Cup.

AUTO IGNITION TEMPERATURE-----321°C.

UPPER FLAMMABLE LIMIT (% VOL)-----12.50.

LOWER FLAMMABLE LIMIT (% VOL)-----11.60.

EXTINGUISHING MEDIA-----Alcohol foam, CO2 or dry chemical.

HAZARDOUS COMBUSTION PRODUCTS-----Oxides of Carbon (CO and CO2). Hydrogen
Chloride.

SENSITIVITY TO MECHANICAL-----Unknown.

IMPACT

SENSITIVITY TO STATIC-----May be sensitive.

DISCHARGE

SECTION 06: ACCIDENTAL RELEASE MEASURES

LEAK/SPILL-----Prevent run-off into drains, sewers and
other waterways. Use a non-combustible
absorbent inorganic material. Ventilate.
Eliminate all sources of ignition. Contain
spill with dike to prevent entry into
sewers and waterways. For large quantities
contact the Environmental Authorities.

SECTION 07: HANDLING AND STORAGE

HANDLING PROCEDURES-----Avoid prolonged or repeated skin
contact. Handle away from all sources of
ignition. Ventilate adequately and wear
appropriate breathing apparatus.

STORAGE NEEDS-----Store in a dry, well ventilated area. Store
in a cool area, away from all sources of
heat and ignition. Keep container closed
and out of reach from children and pets
when not in use.

3 PRIMER**SECTION 08: EXPOSURE CONTROLS / PERSONAL PROTECTION**

PROTECTIVE EQUIPMENT:-----
 EYE/TYPE-----Safely goggles.
 RESPIRATORY/TYPE-----If used indoors on a continuous basis or
 if the TLV is exceeded, the use of a
 cartridge type respirator (NIOSH/MSHA
 approved) is recommended.
 GLOVES/ TYPE-----Wear impervious gloves (Neoprene or Rubber).
 CLOTHING/TYPE-----Not available.
 FOOTWEAR/TYPE-----Safety boots as specified in workplace regulations.
 OTHER/TYPE-----Eye bath and safety shower.
 VENTILATION REQUIREMENTS-----Natural or mechanical (Explosion Proof)
 ventilation to keep vapour levels well
 below the TLV.

SECTION 09: PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE-----Liquid.
 ODOUR-----Strong solvent odour.
 SPECIFIC GRAVITY-----0.84 - 0.88.
 ODOUR THRESHOLD (ppm)-----25 ppm.
 VAPOUR PRESSURE-----145 mmHg @ 20°C.
 VAPOUR DENSITY (AIR=1)-----2.50.
 EVAPORATION RATE-----6.00 (NBUAC = 1).
 BOILING POINT (deg C)-----65°C.
 pH-----Not available.
 SOLUBILITY IN WATER (% W/W)-----Slightly.
 COEFFICIENT OF WATER\OIL-----Not available.
 DISTRIBUTION
 FREEZING POINT-----<0°C.
 MELTING POINT (deg C)-----Not available.
 MOLECULAR WEIGHT-----

SECTION 10: STABILITY AND REACTIVITY

INCOMPATIBILITY-----Ammonia. Do NOT mix with nitrites. Strong
 acids and strong bases.
 REACTIVITY CONDITIONS-----Thermal.
 HAZARDOUS PRODUCTS OF-----Hydrogen Chloride. Oxides of Carbon (CO and
 DECOMPOSITION C02). Peroxides.

SECTION 11: TOXICOLOGICAL INFORMATION

EXPOSURE LIMIT OF MATERIAL-----50 ppm for Toluene.200 ppm for Methyl
 Ethyl Ketone.200 ppm for Tetrahydrofuran.
 IRRITANCY OF MATERIAL-----Irritant upon prolonged exposure. Eye
 irritant.
 SENSITIZING CAPABILITY OF-----Not available.
 MATERIAL
 CARCINOGENICITY OF MATERIAL-----Not available.
 TERATOGENICITY-----No information is available and no adverse
 teratogenicity effects are anticipated.
 MUTAGENICITY-----No information is available and no adverse
 mutagenicity effects are anticipated.
 REPRODUCTIVE EFFECTS-----Not available.
 SYNERGISTIC MATERIALS-----Not available.

3 PRIMER**SECTION 12: ECOLOGICAL INFORMATION**

ENVIRONMENTAL-----Not available. Can be dangerous if allowed to enter drinking water intakes. Product has an unaesthetic appearance and can be a nuisance. Do not contaminate domestic or irrigation water supplies, lakes, streams, ponds and rivers.

BIODEGRADABILITY-----Not available. The solvent portion of this product is biodegradable and vaporizes rapidly.

VOC INFORMATION-----This product emits VOC's (volatile organic compounds in use. Always ensure that the use of this product complies with local VOC Emission Regulations, where they exist. The VOC level is 409 grams/litre (SCAQMD Test Method 316A)

SECTION 13: DISPOSAL CONSIDERATIONS

WASTE DISPOSAL-----To be disposed of in accordance with current Local, Provincial and Federal regulations.

SECTION 14: TRANSPORT INFORMATION

T.D.G. CLASSIFICATION-----

(A)----- (A) In containers up to 1 litre - shipped as CONSUMER COMMODITY. If the shipment exceeds 500 kg in weight, shipped as CONSUMER COMMODITY - FLAMMABLE LIQUIDS N.O.S.(TETRAHYDROFURAN) CLASS 3.

(B)----- (B) In containers over 1 litre - FLAMMABLE LIQUIDS N.O.S. (TETRAHYDROFURAN) CLASS 3 UN1993 P.G. II.

SECTION 15: REGULATORY INFORMATION

WHMIS CLASSIFICATION-----Class B Div.2 Flammable Liquid Class D Div.2B Toxic Material.

SECTION 16: OTHER INFORMATION

IMPORTANT:-----The information on this Material Safety Data Sheet is furnished without warranty, expressed or implied. All the information appearing herein is based upon data obtained from manufacturers and/or recognized technical sources. While the information is believed to be accurate, we make no representations for the accuracy or sufficiency.



MATERIAL SAFETY DATA SHEET

MSDS Number: 1600E

Section 1 PRODUCT AND COMPANY IDENTIFICATION

Trade Name: OATEY 95/5 LEAD-FREE PLUMBING WIRE SOLDER
OATEY 95/5 LEAD-FREE ACID CORE WIRE SOLDER
OATEY 95/5 LEAD-FREE ROSIN CORE WIRE SOLDER

Product Nos.: 95/5 -22004, 22017, 22018, 22025, 53026, 53027, 53181, 53189 95/5 AC - 53170, 53172, 53174, 53176 95/5 RC - 53171, 53173, 53175, 53177, 53190, 29031

Product Use: Solder
Formula: see Section 3
Synonyms: Solder

Firm Name & Address: Oatey Company 4700 West 160th Street, Cleveland, Ohio 44135
www.oatey.com

Firm Phone No: (216) 267-7100
Emergency Phone Nos.: For Emergency First Aid call 1-877-740-5015. For chemical transportation emergencies ONLY, call Chemtrec at 1-800-424-9300. Outside the U.S. 1-703-527-3887.

Prepared by: Technical Department
Preparation Date: 04/07/2013

Section 2 HAZARDS IDENTIFICATION

Emergency Overview: Silver-gray wire metal. The fumes may be hazardous during soldering operations. Fumes can cause eye irritation and may cause headache and respiratory system irritation. Ingestion of metal alloys may be harmful.

OSHA Hazard Classification: Not hazardous as is. In use, irritant and organ effects.

Section 3 COMPOSITION/INFORMATION ON INGREDIENTS

For 95/5 solid wire

Table with 5 columns: INGREDIENTS, %wt/wt, CAS NUMBER, ACGIH TLV TWA, OSHA PEL TWA. Rows for Tin and Antimony.

For 95/5 acid core

Table with 5 columns: INGREDIENTS, %wt/wt, CAS NUMBER, ACGIH TLV TWA, OSHA PEL TWA. Rows for Tin, Antimony, and Acid Flux.

For 95/5 rosin core

Table with 5 columns: INGREDIENTS, %wt/wt, CAS NUMBER, ACGIH TLV TWA, OSHA PEL TWA. Rows for Tin, Antimony, and Rosin Flux.

Section 4 FIRST AID MEASURES

Skin: If irritation arises, wash thoroughly with soap and water. Seek medical attention if irritation persists.

Eyes: If material gets into eyes, immediately flush eyes with water while holding eyelids open until material is removed. If irritation persists, seek medical attention.

Inhalation: Move to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Keep victim quiet and warm. Call a poison control center or physician immediately.

Ingestion: **DO NOT INDUCE VOMITING.** Ingestion is not a likely route of entry. Never give anything by mouth to a person who is unconscious or drowsy. Get medical attention by calling a Poison Control Center, or hospital emergency room.

Section 5 FIRE FIGHTING MEASURES

Flashpoint / Method: Not applicable

Flammability: LEL = Not applicable, UEL = Not applicable

Extinguishing: Use appropriate means of extinguishing surrounding fire.

Media:

Special Fire Fighting Procedure: Not applicable

Unusual Fire And Explosion Hazards: None known

Hazardous Decomposition Products: Material will not decompose under normal conditions. If overheated, oxides of tin and antimony may result.

Section 6 ACCIDENTAL RELEASE MEASURES

Spill or Leak Procedures: Collect solid and place in properly labeled containers for recycle or disposal.

Section 7 HANDLING AND STORAGE

Handling: Avoid inhalation of fumes, vapors or dust. Keep away from children. Wash thoroughly after handling before eating, drinking, or smoking.

Storage: Store in a cool, dry place away from heat or open flame.

Other: None

Section 8 EXPOSURE CONTROLS/PERSONAL PROTECTION

Ventilation: Good general ventilation (equivalent to outdoors) should be adequate for normal use. For operations where the TLV may be exceeded, mechanical ventilation such as local exhaust may be needed to maintain exposure levels below applicable limits.

Respiratory Protection: For operations where the TLV may be exceeded, a NIOSH approved organic vapor respirator or supplied air respirator is recommended. Equipment selection depends on contaminant type and concentration, select in accordance with 29 CFR 1910.134 and good industrial hygiene practice.

Skin Protection: Wear gloves and long sleeves to avoid direct contact with skin.

Eye Protection: Safety glasses with side shields or safety goggles.

Other: Eye wash and safety shower should be available.

Section 9 PHYSICAL AND CHEMICAL PROPERTIES

Boiling Point: Not determined
Melting Point: 450 to 464 Degrees F (232 to 240 Degrees C)
Vapor Pressure: Not determined
Vapor Density: (Air = 1) Greater than 1
Volatile Components: None
Solubility In Water: Negligible
pH: Not applicable
Specific Gravity: 9 to 11
Evaporation Rate: Not applicable
Appearance: Silver-gray wire metal
Odor: None
Will Dissolve In: Not applicable
Material Is: Solid

Section 10 STABILITY AND REACTIVITY

Stability: Stable.
Conditions To Do not heat over 480 degrees F (250 degrees C).
Avoid:
Hazardous If overheated, oxides of tin and antimony.
Decomposition
Products:
Incompatibility/ None.
Materials To
Avoid:
Hazardous Will not occur.
Polymerization:

Section 11 TOXICOLOGICAL INFORMATION

Inhalation: Fumes from soldering operations may be irritating to the respiratory system. Prolonged exposure to fumes may cause stannosis, a mild benign pneumoconiosis. Repeated inhalation of fumes may cause occupational asthma. Symptoms may be delayed.
Skin: Fumes may cause irritation.
Eye: Fumes may cause irritation.
Ingestion: Ingestion may cause abdominal pain, nausea, vomiting, diarrhea, gastrointestinitis, or internal cuts. Long term chronic ingestion may damage the liver, kidneys, nervous system and gastrointestinal system.
Toxicity Data: No data available.
Sensitization: None of the components are known to cause sensitization.
Carcinogenicity: None of the components are listed as a carcinogen or suspect carcinogen by NTP, IARC or OSHA.
Mutagenicity: None of the components have been found to be mutagenic.
Reproductive None of the components are known to cause adverse reproductive effects.
Toxicity:
Medical Persons with pre-existing skin, lung, kidney or liver disorders may be at increased risk from exposure to the fumes of this product.
Conditions
Aggravated By
Exposure:

Section 12 ECOLOGICAL INFORMATION

No data available. Keep out of waterways.

Section 13 DISPOSAL CONSIDERATIONS

Waste Disposal: Dispose of in accordance with federal, state, and local regulations. It is the responsibility of the end-user to determine at the time of disposal of the product.
RCRA Hazardous Waste Number: None
EPA Hazardous Waste ID Number: None
EPA Hazard Waste Number: None.

Section 14 TRANSPORT INFORMATION

DOT
UN/NA Number: None
Proper Shipping Name: Not regulated
Hazard Class: None
Packing Group: None
Hazard Labels: None
IMDG
UN Number: None
Proper Shipping Name: Not regulated
Hazard Class: None
Packing Group: None
Label: None

2008 North American Emergency Response Guidebook Number: Not applicable

Section 15 REGULATORY INFORMATION

Hazard Category for Section 311/312: Acute and chronic health hazards.

Section 302 Extremely Hazardous Substances (TPQ): This product does not contain chemicals regulated under SARA Section 302.
Section 313 Toxic Chemicals: This product contains the following chemicals subject to SARA Title III Section 313 Reporting requirements:

Chemical	CAS #	% wt
Antimony	7440-36-0	3 - 7%

CERCLA 103 Reportable Quantity: This product contains no chemicals subject to CERCLA reporting.

California Proposition 65: This product does not contain any chemicals subject to California Proposition 65 regulations.

TSCA Inventory Canadian WHIMS Classification: All of the components of this product are listed on the TSCA inventory. Class D, Division 2, Subdivision B. This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

Section 16 OTHER INFORMATION

NFPA and HMIS:
NFPA Hazard Signal: Health: 1 Flammability: 0 Reactivity: 0 Special: None
HMIS Hazard Signal: Health: 1 Flammability: 0 Reactivity: 0 PPE: B

Disclaimer:
The information herein has been compiled from sources believed to be reliable, up-to-date, and is accurate to the best of our knowledge. However, we cannot give any guarantees regarding information from other sources, and expressly do not make warranties, nor assume any liability for its use.

Template: tpl-so-e1

SECTION: 1

MANUFACTURER:

Strike First Corporation
c/o Steel Fire Equipment
150 Superior Blvd.
Mississauga, ON
L5T 2L2
Phone: 1-905-564-1500

PRODUCT IDENTIFICATION

ABC SUPER 90 DRY CHEMICAL
Multi-Purpose Dry Chemical
Fire Extinguisher

EMERGENCY PHONE:

Canutec: 1-613-996-6666

SECTION: 2

HAZARDOUS INGREDIENTS

CHEMICAL NAME	CAS #	%	*ACGIH mg/m3		*OSHA mg/m3			OTHER
			W/W	TLV	STEL	PEL	STEL	
Mono Ammonium Phosphate	7722-76-1	95*						
Mica	12001-26-2	<3	3	NE	3	NE	NE	NE
Attaclay	8031-18-3	<3	NE	NE	NE	NE	NE	NE
Silicone Oil	63148-57-2	<1	NE	NE	NE	NE	NE	NE
Calcium Carbonate	471-34-1	<1	NE	NE	NE	NE	NE	NE
Silica	112926-00-8	<1	2	NE	6	NE	NE	NE
Yellow Pigment	5468-75-7	<1	NE	NE	NE	NE	NE	NE

*ACGIH TLV for particulates, not otherwise classified = 10; OSHA PEL for particulates not otherwise regulated, Total dust =15 Respirable fraction 5.

NE = Not established

SECTION :3

PHYSICAL DATA

BOILING POINT	Not applicable
VAPOR PRESSURE	Not applicable
VAPOR DENSITY	Not applicable
SOLUBILITY IN WATER	Not soluble. Water repellent coating.
SPECIFIC GRAVITY	Approximately 0.88
PERCENT VOLATILE BY VOLUME	Not applicable
EVAPORATION RATE	Not applicable
pH: (10% solution)	Approximately 9-10
APPEARANCE & COLOR	This material is a finely divided yellow powder.

MANUFACTURER: Strike First Corporation

PRODUCT IDENTIFICATION: ABC DRY CHEMICAL FIRE EXTINGUISHER

SECTION: 4

FIRE AND EXPLOSION DATA

FLASH POINT	Not applicable
FLAMMABLE LIMITS	Lower (LEL) Not applicable Upper (LEL) Not applicable
EXTINGUISHING MEDIA	None This product is a fire extinguishing agent.
SPECIAL FIREFIGHTING PROCEDURES	Incipient fire responders should wear eye protection. Structural fire fighters must wear Self-Contained Breathing Apparatus and full protective equipment.

SECTION: 5

HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE	*ACGIH TLV for particulars, Not otherwise classified = 10
OSHA PEL	For particulars not otherwise regulated; Total Dust =15, Respirable Fraction 5.

EFFECTS OF OVEREXPOSURE

Acute	This extinguishing material presents only a slight risk of causing acute health effects. If such effects occur, they will be in the form of mild irritation of the skin, nose, or throat and moderate irritation of the eyes. If ingested, this product may cause an upset stomach.
Chronic	This product is not known to cause chronic illnesses or diseases.

EMERGENCY FIRST-AID PROCEDURES

SKIN EXPOSURE	If spilled on skin, immediately begin decontamination with running water. Remove exposed or contaminated clothing, taking care not to contaminate eyes. If reddening or irritation occurs, victim and rescuers must seek immediate medical attention.
EYE EXPOSURE	If chemical is splashed in eyes, open victim's eyes while under gentle running water. Use sufficient force to open eyelids. Have victim "roll" eyes. Minimum flushing is for 15 minutes.

MANUFACTURER: Strike First Corporation

PRODUCT IDENTIFICATION: ABC DRY CHEMICAL FIRE EXTINGUISHER

SECTION: 5

EMERGENCY FIRST-AID PROCEDURES

INHALATION

If chemical is inhaled, remove victim to fresh air. If necessary, use artificial respiration to support vital functions. If reddening or irritation occurs, victim and rescuers must seek immediate medical attention.

SECTION: 6

REACTIVITY DATA

STABILITY

Stable

INCOMPATIBILITY

Strong acids. Reacts violently with lithium.

HAZARDOUS

DECOMPOSITION PRODUCT

Carbon monoxide and carbon dioxide

HAZARDOUS

POLYMERIZATION

Will not occur

SECTION: 7

SPILL OR LEAK PROCEDURES

SMALL SPILLS

Sweep up the spilled solid and place all spill residue in a double plastic bag and seal.

LARGE SPILLS

If it is determined that exposure guidelines for nuisance particulates - 10 mg/m³ (total particulates) or 5 mg/m³ (respirable particulates) is exceeded use Level C: triple gloves (rubber gloves with nitrile gloves, over latex gloves), chemically resistant suit and boots, hard hat, and air purifying respirator with a HEPA filter.

Sweep or vacuum.

Dispose of in accordance with Federal, Provincial and local hazardous waste disposal regulations.

MANUFACTURER: Strike First Corporation

PRODUCT IDENTIFICATION: ABC DRY CHEMICAL FIRE EXTINGUISHER

SECTION: 8

SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION	Respiratory protection is not expected to be needed. Maintain airborne contaminant concentrations below guidelines for nuisance particulates: (see Section 5)
VENTILATION	Use with adequate ventilation. Use a mechanical fan or vent area to outside.
PROTECTIVE GLOVES	Wear rubber gloves for routine industrial use.
EYE PROTECTION	Safety glasses.
OTHER PROTECTIVE EQUIPMENT:	Use body protection appropriate for task.

SECTION: 9

SPECIAL PRECAUTIONS**PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE**

All employees who handle this material should be trained to handle it safely. Avoid breathing dusts generated by this product.

Avoid getting chemicals ON YOU or IN YOU.

OTHER PRECAUTIONS: None

SECTION: 10

TRANSPORTATION

Hazard Class or Division:	Fire Extinguisher,	Class 2.2 UN 1044
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For additional information contact Strike First Corporation

No harm to the environment is expected from this preparation

Fire extinguishers are designed and produced for the specific purpose of providing a safe and efficient safety tool to be used only in the fighting of fires. Improper or careless use may cause severe bodily injury and/or property damage.

Contents are under pressure which is necessary to deliver the contained extinguishing agent to the fire source.

- Contents under pressure. Do not puncture, incinerate or discharge into another person's face.
- Do not store at high temperatures above 120 degrees Fahrenheit or 49 degrees Celcius.
- Keep away from children.
- Avoid inhaling the extinguishing agent. Avoid inhaling smoke and fumes - all fires release toxic substances that are harmful. DO NOT remain in a closed area after use: evacuate the area immediately and ventilate thoroughly before re-entering.
- Although extinguishing agents are non toxic when used properly, contact with them may cause irritation to eyes, nose, throat and other allergic symptoms.

MATERIAL SAFETY DATA SHEET
ABS 55Y-LV SOLVENT CEMENT

Page : 1

SLUYTER COMPANY LTD.

375 Steelcase Road East
Markham, Ontario L3R 1G3 Canada
Tel (905) 475-6011 Fax (905) 475-3119

SECTION 01: CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

MANUFACTURER-----SLUYTER COMPANY LTD.
375 Steelcase Road East
Markham, Ontario L3R 1G3
Canada
Tel (905) 475-6011
PRODUCT NAME-----ABS 55Y-LV (Solvent Cement).
PRODUCT USES-----For welding plastic pipes and fittings.
CHEMICAL FAMILY-----Acrylonitrile-Butadiene Styrene.

SECTION 02: COMPOSITION / INFORMATION ON INGREDIENTS

INGREDIENTS / %	CAS / TLV	LD/50, ROUTE, SPECIES	LC/50, ROUTE, SPECIES
METHYL ETHYL KETONE			
10 - 60	78-93-3 200 ppm	2737 mg/kg Oral (Rat)	23500 mg/m3 8 Hours Inhalation (Rat)
TOLUENE			
10 - 50	108-88-3 200 ppm	>2 g/kg Skin (Rabbit)	8000 ppm 8 hours Inhalation (Rat)
ACETONE			
10 - 20	67-64-1 750 ppm	9750 mg/kg Oral (Rat)	16000 ppm 4 hours Inhalation (Rat)

SECTION 03: HAZARDS IDENTIFICATION

ROUTE OF ENTRY:-----
SKIN CONTACT-----Can cause moderate skin irritation,
defatting and dermatitis.
SKIN ABSORPTION-----Not applicable.
INHALATION-----As described below.
INHALATION CHRONIC-----Breathing of high vapour concentrations
could cause dizziness, headache or even
unconsciousness .May be anesthetic which
could result in other central nervous
system effects.
INGESTION-----Can cause gastro-intestinal irritation,
nausea, vomiting and diarrhea. Small
amounts of liquid aspirated into
respiratory system could cause severe
health effects (e.g. Bronchopneumonia or
Pulmonary Edema).
EYE CONTACT-----Contains materials that are severely
irritating to the eyes. If not removed
promptly, it will injure the eye tissue
and may cause permanent eye damage.
EFFECTS OF ACUTE EXPOSURE-----
EFFECTS OF CHRONIC EXPOSURE-----May cause damage to the central nervous
system. Prolonged or repeated skin contact
may cause drying or cracking of the skin.

Ref: 0000100E

Preparation Date : May.14.2014

EMERGENCY - CALL CANUTEC (613) 996-6666 (Collect)

MATERIAL SAFETY DATA SHEET
ABS 55Y-LV SOLVENT CEMENT

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SECTION 04: FIRST AID MEASURES

EYE CONTACT-----Check for and remove any contact lenses. Immediately flush with water for a minimum of 20 minutes and get medical attention.

SKIN CONTACT-----Remove contaminated clothing. Wash affected area with water and soap. Seek medical attention if irritation occurs or persists.

INHALATION-----Remove patient to fresh air. If not breathing, trained personnel should administer artificial respiration. Get medical attention.

INGESTION-----Do NOT induce vomiting. Get immediate medical attention.

ADDITIONAL INFORMATION-----Contact your local poison control centre.

SECTION 05: FIRE FIGHTING MEASURES

FLAMMABILITY-----Flammable.

UNDER WHAT CONDITIONS-----Extremely flammable liquid. Dangerous fire hazard when exposed to heat, flame or temperatures above the flash point. As vapours are heavier than air, they may travel to a source of ignition and flash back.

SPECIAL PROCEDURES-----A self-contained breathing apparatus is required for fire fighting personnel. Use water spray to cool fire exposed surfaces and to protect personnel.

FLASH POINT (METHOD)----- -4°C TAG Closed Cup.

AUTO IGNITION TEMPERATURE-----480°C.

UPPER FLAMMABLE LIMIT (% VOL)-----11.50.

LOWER FLAMMABLE LIMIT (% VOL)-----1.80.

EXTINGUISHING MEDIA-----Alcohol foam, CO2 or dry chemical.

HAZARDOUS COMBUSTION PRODUCTS-----Traces of monomers. Oxides of Carbon (CO and CO2). Hydrogen Cyanide.

SENSITIVITY TO MECHANICAL-----Not available.

IMPACT

SENSITIVITY TO STATIC-----May be sensitive.

DISCHARGE

SECTION 06: ACCIDENTAL RELEASE MEASURES

LEAK/SPILL-----Ventilate. Remove all sources of ignition, open flames, sparks and heaters. Wear protective gear (See SECTION 8). Small spills can be wiped. Large spills must be collected for disposal. Use a non-combustible absorbent inorganic material. Prevent run-off into drains, sewers and other waterways.

SECTION 07: HANDLING AND STORAGE

HANDLING PROCEDURES-----Avoid skin and eye contact. Avoid breathing vapours. Use adequate ventilation. Keep away

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Preparation Date : May.14.2014

EMERGENCY - CALL CANUTEC (613) 996-6666 (Collect)

MATERIAL SAFETY DATA SHEET
ABS 55Y-LV SOLVENT CEMENT

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from heat, sparks and open flame.
STORAGE NEEDS-----Store away from all sources of heat and ignition. Store in well ventilated area. Keep container closed and out of reach from children and pets when not in use.

SECTION 08: EXPOSURE CONTROLS / PERSONAL PROTECTION

PROTECTIVE EQUIPMENT:-----
EYE/TYPE-----Safety glasses.
RESPIRATORY/TYPE-----None required for normal use if adequate ventilation is maintained. Use NIOSH/MSHA approved respirator if the TLV is exceeded.
GLOVES/ TYPE-----Wear impervious gloves (Neoprene or Rubber).
CLOTHING/TYPE-----Not applicable.
FOOTWEAR/TYPE-----Not applicable.
OTHER/TYPE-----Eye bath and safety shower.
VENTILATION REQUIREMENTS-----Natural or mechanical (Explosion Proof) ventilation to keep vapour levels well below the TLV.

SECTION 09: PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE-----Liquid.
ODOUR-----Aromatic Solvent odour.
SPECIFIC GRAVITY-----0.86 - 0.90.
ODOUR THRESHOLD (ppm)-----25 ppm.
VAPOUR PRESSURE-----22 mmHg @ 20°C.
VAPOUR DENSITY (AIR=1)----- >1.00.
EVAPORATION RATE-----1.80 (NBUAC = 1).
BOILING POINT (deg C)-----110°C.
pH-----Not applicable.
SOLUBILITY IN WATER (% W/W)-----Negligible.
COEFFICIENT OF WATER\OIL-----Not available.
DISTRIBUTION
FREEZING POINT----- <0°C.
MELTING POINT (deg C)-----Not applicable.
MOLECULAR WEIGHT-----Not applicable.

SECTION 10: STABILITY AND REACTIVITY

INCOMPATIBILITY-----Strong acids and strong bases. Chlorinated solvents. Oxidizing agents.
REACTIVITY CONDITIONS-----Excessive heat, sparks and open flame.
HAZARDOUS PRODUCTS OF DECOMPOSITION-----Styrene and Acrylonitrile monomer. Oxides of Carbon (CO and CO2). Toxic fumes. Smoke.

SECTION 11: TOXICOLOGICAL INFORMATION

EXPOSURE LIMIT OF MATERIAL-----See "HAZARDOUS INGREDIENTS" in SECTION 2.
IRRITANCY OF MATERIAL-----Moderate.
SENSITIZING CAPABILITY OF MATERIAL-----Not available.
CARCINOGENICITY OF MATERIAL-----Reversible liver damage at high dosages is possible. Residual amounts of Acrylonitrile and Styrene monomer may be present in decomposition but not in normal use. These are both suspected carcinogens.

Ref: 0000100E

Preparation Date : May.14.2014

EMERGENCY - CALL CANUTEC (613) 996-6666 (Collect)

MATERIAL SAFETY DATA SHEET
ABS 55Y-LV SOLVENT CEMENT

TERATOGENICITY-----No information is available and no adverse
teratogenicity effects are anticipated.
MUTAGENICITY-----No information is available and no adverse
mutagenicity effects are anticipated.
REPRODUCTIVE EFFECTS-----Not available.
SYNERGISTIC MATERIALS-----Not available.

SECTION 12: ECOLOGICAL INFORMATION

ENVIRONMENTAL-----Not available. Can be dangerous if allowed
to enter drinking water intakes. Product
has an unaesthetic appearance and can be a
nuisance. Do not contaminate domestic or
irrigation water supplies, lakes, streams,
ponds and rivers.
BIODEGRADABILITY-----Not available. The solvent portion of this
product is biodegradable and vaporizes rapidly.
VOC INFORMATION-----This product emits VOC's (volatile organic compounds in
use. Always ensure that the use of this product complies
with local VOC Emission Regulations, where they exist. The
VOC level is 311 grams/litre (SCAQMD Test Method 316A)

SECTION 13: DISPOSAL CONSIDERATIONS

WASTE DISPOSAL-----Spilled material and water rinses are
classified as chemical waste. To be
disposed of in accordance with current
Local, Provincial and Federal regulations.

SECTION 14: TRANSPORT INFORMATION

T.D.G. CLASSIFICATION-----In containers up to 5 litres - shipped as CONSUMER
COMMODITY. If the shipment exceeds 500 kg in weight, shipped
as CONSUMER COMMODITY - ADHESIVES CLASS 3. In containers
over 5 litres - ADHESIVES CLASS 3 UN1133 P.G. II.

SECTION 15: REGULATORY INFORMATION

CPR COMPLIANCE-----This product has been classified in
accordance with the hazard criteria of the
CPR and the MSDS contains all the
information required by the CPR.
WHMIS CLASSIFICATION-----Class B Div.2 Flammable Liquid Class D
Div.2B Toxic Material.

SECTION 16: OTHER INFORMATION

IMPORTANT:-----The information on this Material Safety Data Sheet is
furnished without warranty, expressed or implied. All the
information appearing herein is based upon data obtained
from manufacturers and/or recognized technical sources.
While the information is believed to be accurate, we make
no representations for the accuracy or sufficiency.

MATERIAL SAFETY DATA SHEET
ABS 66Y SOLVENT CEMENT

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SLUYTER COMPANY LTD.

375 Steelcase Road East
Markham, Ontario L3R 1G3 Canada
Tel (905) 475-6011 Fax (905) 475-3119

SECTION 01: CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

MANUFACTURER-----SLUYTER COMPANY LTD.
375 Steelcase Road East
Markham, Ontario L3R 1G3
Canada
Tel (905) 475-6011
PRODUCT NAME-----ABS 66Y (Solvent Cement).
PRODUCT USES-----For welding plastic pipes and fittings.
CHEMICAL FAMILY-----Acrylonitrile-Butadiene Styrene.

SECTION 02: COMPOSITION / INFORMATION ON INGREDIENTS

INGREDIENTS / %	CAS / TLV	LD/50, ROUTE, SPECIES	LC/50, ROUTE, SPECIES
METHYL ETHYL KETONE			
60 - 80	78-93-3 200 ppm	2737 mg/kg Oral (Rat)	23500 mg/m3 8 Hours Inhalation (Rat)
ABS POLYMER			
20 - 30	9003-56-9 Not Available	Not Available	Not Available

SECTION 03: HAZARDS IDENTIFICATION

ROUTE OF ENTRY:-----
SKIN CONTACT-----Can cause moderate skin irritation,
defatting and dermatitis.
SKIN ABSORPTION-----Not applicable.
INHALATION-----As described below.
INHALATION CHRONIC-----Breathing of high vapour concentrations
could cause dizziness, headache or even
unconsciousness .May be anesthetic which
could result in other central nervous
system effects.
INGESTION-----Can cause gastro-intestinal irritation,
nausea, vomiting and diarrhea. Small
amounts of liquid aspirated into
respiratory system could cause severe
health effects (e.g. Bronchopneumonia or
Pulmonary Edema).
EYE CONTACT-----Contains materials that are severely
irritating to the eyes. If not removed
promptly, it will injure the eye tissue
and may cause permanent eye damage.
EFFECTS OF ACUTE EXPOSURE-----
EFFECTS OF CHRONIC EXPOSURE-----May cause damage to the central nervous
system. Prolonged or repeated skin contact
may cause drying or cracking of the skin.

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Preparation Date : May.14.2014

EMERGENCY - CALL CANUTEC (613) 996-6666 (Collect)

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ABS 66Y SOLVENT CEMENT

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SECTION 04: FIRST AID MEASURES

EYE CONTACT-----Check for and remove any contact lenses.
Immediately flush with water for a minimum
of 20 minutes and get medical attention.

SKIN CONTACT-----Remove contaminated clothing. Wash
affected area with water and soap. Seek
medical attention if irritation occurs or persists.

INHALATION-----Remove patient to fresh air. If not
breathing, trained personnel should
administer artificial respiration. Get
medical attention.

INGESTION-----Do NOT induce vomiting. Get immediate medical attention.

ADDITIONAL INFORMATION-----Contact your local poison control centre.

SECTION 05: FIRE FIGHTING MEASURES

FLAMMABILITY-----Flammable.

UNDER WHAT CONDITIONS-----Extremely flammable liquid. Dangerous fire
hazard when exposed to heat, flame or
temperatures above the flash point. As
vapours are heavier than air, they may
travel to a source of ignition and flash back.
back.

SPECIAL PROCEDURES-----A self-contained breathing apparatus is
required for fire fighting personnel. Use
water spray to cool fire exposed surfaces
and to protect personnel.

FLASH POINT (METHOD)----- -4°C TAG Closed Cup.

AUTO IGNITION TEMPERATURE-----480°C.

UPPER FLAMMABLE LIMIT (% VOL)-----11.50.

LOWER FLAMMABLE LIMIT (% VOL)-----1.80.

EXTINGUISHING MEDIA-----Alcohol foam, CO2 or dry chemical.

HAZARDOUS COMBUSTION PRODUCTS-----Traces of monomers. Oxides of Carbon (CO
and CO2). Hydrogen Cyanide.

SENSITIVITY TO MECHANICAL-----Not available.

IMPACT

SENSITIVITY TO STATIC-----May be sensitive.

DISCHARGE

SECTION 06: ACCIDENTAL RELEASE MEASURES

LEAK/SPILL-----Ventilate. Remove all sources of ignition,
open flames, sparks and heaters. Wear
protective gear (See SECTION 8). Small
spills can be wiped. Large spills must be
collected for disposal. Use a
non-combustible absorbent inorganic
material. Prevent run-off into drains,
sewers and other waterways.

SECTION 07: HANDLING AND STORAGE

HANDLING PROCEDURES-----Avoid skin and eye contact. Avoid breathing
vapours. Use adequate ventilation. Keep away
from heat, sparks and open flame.

STORAGE NEEDS-----Store away from all sources of heat and
ignition. Store in well ventilated

Ref: 0000101E

Preparation Date : May.14.2014

EMERGENCY - CALL CANUTEC (613) 996-6666 (Collect)

MATERIAL SAFETY DATA SHEET
ABS 66Y SOLVENT CEMENT

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area. Keep container closed and out of reach from children and pets when not in use.

SECTION 08: EXPOSURE CONTROLS / PERSONAL PROTECTION

PROTECTIVE EQUIPMENT:-----
EYE/TYPE-----Safety glasses.
RESPIRATORY/TYPE-----None required for normal use if adequate ventilation is maintained. Use NIOSH/MSHA approved respirator if the TLV is exceeded.
GLOVES/ TYPE-----Wear impervious gloves (Neoprene or Rubber).
CLOTHING/TYPE-----Not applicable.
FOOTWEAR/TYPE-----Not applicable.
OTHER/TYPE-----Eye bath and safety shower.
VENTILATION REQUIREMENTS-----Natural or mechanical (Explosion Proof) ventilation to keep vapour levels well below the TLV.

SECTION 09: PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE-----Liquid.
ODOUR-----Aromatic Solvent odour.
SPECIFIC GRAVITY-----0.86 - 0.90.
ODOUR THRESHOLD (ppm)-----25 ppm.
VAPOUR PRESSURE-----22 mmHg @ 20°C.
VAPOUR DENSITY (AIR=1)----- >1.00.
EVAPORATION RATE-----1.80 (NBUAC = 1).
BOILING POINT (deg C)-----110°C.
pH-----Not applicable.
SOLUBILITY IN WATER (% W/W)-----Negligible.
COEFFICIENT OF WATER\OIL-----Not available.
DISTRIBUTION
FREEZING POINT----- <0°C.
MELTING POINT (deg C)-----Not applicable.
MOLECULAR WEIGHT-----Not applicable.

SECTION 10: STABILITY AND REACTIVITY

INCOMPATIBILITY-----Strong acids and strong bases. Chlorinated solvents. Oxidizing agents.
REACTIVITY CONDITIONS-----Excessive heat, sparks and open flame.
HAZARDOUS PRODUCTS OF DECOMPOSITION-----Styrene and Acrylonitrile monomer. Oxides of Carbon (CO and CO2). Toxic fumes. Smoke.

SECTION 11: TOXICOLOGICAL INFORMATION

EXPOSURE LIMIT OF MATERIAL-----See "HAZARDOUS INGREDIENTS" in SECTION 2.
IRRITANCY OF MATERIAL-----Moderate.
SENSITIZING CAPABILITY OF MATERIAL-----Not available.
CARCINOGENICITY OF MATERIAL-----Reversible liver damage at high dosages is possible. Residual amounts of Acrylonitrile and Styrene monomer may be present in decomposition but not in normal use. These are both suspected carcinogens.
TERATOGENICITY-----No information is available and no adverse teratogenicity effects are anticipated.
MUTAGENICITY-----No information is available and no adverse

Ref: 0000101E

Preparation Date : May.14.2014

EMERGENCY - CALL CANUTEC (613) 996-6666 (Collect)

MATERIAL SAFETY DATA SHEET
ABS 66Y SOLVENT CEMENT

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mutagenicity effects are anticipated.
REPRODUCTIVE EFFECTS-----Not available.
SYNERGISTIC MATERIALS-----Not available.

SECTION 12: ECOLOGICAL INFORMATION

ENVIRONMENTAL-----Not available. Can be dangerous if allowed to enter drinking water intakes. Product has an unaesthetic appearance and can be a nuisance. Do not contaminate domestic or irrigation water supplies, lakes, streams, ponds and rivers.
BIODEGRADABILITY-----Not available. The solvent portion of this product is biodegradable and vaporizes rapidly.
VOC INFORMATION-----This product emits VOC's (volatile organic compounds in use. Always ensure that the use of this product complies with local VOC Emission Regulations, where they exist. The VOC level is 600 grams/litre (SCAQMD Test Method 316A)

SECTION 13: DISPOSAL CONSIDERATIONS

WASTE DISPOSAL-----Spilled material and water rinses are classified as chemical waste. To be disposed of in accordance with current Local, Provincial and Federal regulations.

SECTION 14: TRANSPORT INFORMATION

T.D.G. CLASSIFICATION-----
(A)----- (A) In containers up to 5 litres - shipped as CONSUMER COMMODITY. If the shipment exceeds 500 kg in weight, shipped as CONSUMER COMMODITY - ADHESIVES CLASS 3.
(B)----- (B) In containers over 5 litres - ADHESIVES CLASS 3 UN1133 P.G. II.

SECTION 15: REGULATORY INFORMATION

CPR COMPLIANCE-----This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.
WHMIS CLASSIFICATION-----Class B Div.2 Flammable Liquid Class D Div.2B Toxic Material.

SECTION 16: OTHER INFORMATION

IMPORTANT:-----The information on this Material Safety Data Sheet is furnished without warranty, expressed or implied. All the information appearing herein is based upon data obtained from manufacturers and/or recognized technical sources. While the information is believed to be accurate, we make no representations for the accuracy or sufficiency.

SAFETY DATA SHEET

1. PRODUCT AND COMPANY IDENTIFICATION

COMMON NAME:	ABS Pipe and Fittings	
CHEMICAL NAME:	Not Applicable. Formulation, see section 3.	
FORMULA:	Mixture	
PRODUCT CAS NO.:	Mixture, see section 3.	
Recommended Use:	Drain Waste and Vent Pipe and Fittings	
SUPPLIER:	Charlotte Pipe and Foundry Company (Plastics Division)	
ADDRESS:	4210 Old Charlotte Highway	
CITY, STATE, ZIP:	Monroe, NC 28110	
PHONE:	+1-704-372-3650	EMERGENCY PHONE: +1-704-372-3650

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Toxic and irritating gases and fumes may be given off during burning or thermal decomposition. Avoid generating dust. Fine dust dispersed in air in sufficient concentrations, and in the presence of an ignition source is a potential dust explosion hazard.



GHS Status

This material is hazardous in accordance with the hazard communication standard, 29 CFR 1910.1200

Classification of the substance or mixture

Skin irritation – Category 2

GHS label pictogram
Signal word
Hazard statements

Eye irritation – Category 2 B
Carcinogenicity – Category 2
Health hazard.
Warning
Causes eye irritation.



SAFETY DATA SHEET

Causes skin irritation.
Suspected of causing cancer if inhaled.

Precautionary statements
Prevention

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Wear protective breathing gear, such as an N95 or P95 respirator. Wash skin thoroughly after handling.

Response

If on skin: wash with plenty of water. If in eyes. Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention. Take off contaminated clothing and wash before reuse.

Storage
Disposal
Hazards not otherwise classified

Keep away from intense heat, flames. Store locked up.
Dispose of in accordance with local regulations.
None known.

Relevant routes of exposure
Inhalation

Skin, eyes, inhalation.

Melted product is flammable and produces intense heat and dense smoke during burning. Irritating gases and fumes may be given off during burning or thermal decomposition.

Skin contact
Eye contact
Ingestion

May cause allergic reaction.
No data available.
No data available.

3. HAZARDOUS INGREDIENTS: COMPOSITION/INFORMATION

INGREDIENT	% WEIGHT	PEL-OSHA	TLV-ACGIH	NIOSH REL
Acrylonitrile Butadiene Styrene CAS 9003-56-9	95 - 100	None established for ABS Particulates not otherwise classified: 15 mg/m ³	None Established for ABS Particulates not otherwise classified: 10 mg/m ³ (inhalable fraction)	None established
Corn oil CAS 8001-30-7	0 - 3	Vegetable oil: 5 mg/m ³ (PEL, respirable fraction) 15 mg/m ³ (PEL, total dust)	10 mg/m ³ (8-hour TWA)	Vegetable oil mist: 10 mg/m ³ (total TWA)
Carbon black CAS 1333-86-4	0 - 2	3.5 mg/m ³ (TWA)	3.0 mg/m ³ (TWA)	3.5 mg/m ³ (TWA)

4. FIRST AID MEASURES

EYE CONTACT: Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes.
SKIN CONTACT: Rinse with water. Remove contaminated clothing and shoes. In the event of any complaints or symptoms, avoid further exposure. Wash clothing before reuse. Clean shoes before reuse.

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INHALATION: If vapors from excessive heating, burning or decomposition products are inhaled: remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular, or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing, such as collar, tie, belt, or waistband. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance.

INGESTION: Wash out mouth with water. Remove dentures, if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Loosen tight clothing, such as collar, tie, belt, or waistband.

Notes to physician: In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under surveillance for 48 hours

Specific treatments: None known

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES

FLASH POINT: 388-400°C (730-752°F) Decomposition products may be combustible.

FLAMMABLE LIMITS: LEL: No Data UEL: No data

EXTINGUISHING MEDIA: Use media appropriate for surrounding fire.

FIRE AND EXPLOSION HAZARDS: Thermal decomposition may produce carbon dioxide, carbon monoxide, nitrogen oxides, sulfur oxides, halogenated compounds, and metal oxide/oxides.

PROTECTIVE MEASURES FOR FIRE FIGHTERS: Firefighters must wear a NIOSH-approved, full-face piece self-contained breathing apparatus (SCBA) operated in positive pressure mode and full turnout or bunker gear with additional chemical protective clothing as necessary to protect against thermal decomposition products.

SPECIAL PROTECTIVE ACTIONS FOR FIRE FIGHTERS: If there is a fire, promptly isolate the scene by removing all persons from the vicinity of the incident. No action shall be taken involving any personal risk or without suitable training.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment, and emergency measures

For non-emergency personnel No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders If specialized clothing is required to deal with decomposition products or fumes from burning or excessive heating, take note of information in Section 8 on suitable and unsuitable materials. See also information in "for non-emergency personnel."

Environmental precautions Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains, and sewers. Inform the relevant authorities if the product has caused

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environmental pollution (sewers, waterways, soil, or air).

Methods and materials for containment and clean-up

Small spill

Avoid dust generation. Vacuum dust with equipment fitted with a HEPA filter and place in a closed, labeled waste container. See Section 1 for emergency contact information.

Large spill

Move containers from spill area. Approach release from upwind. Prevent entry into sewers, waterways, basements, and confined areas. Avoid dust generation. Vacuum dust with equipment fitted with a HEPA filter and place in a closed, labeled waste container. See Section 1 for emergency contact information.

7. HANDLING AND STORAGE

Conditions for safe storage, including any incompatibilities

Store in a dry place away from direct sunlight, heat, and incompatible materials. Avoid intense heat and flames.

Precautions for safe handling

Protective measures

Put on appropriate personal protective equipment (see Section 8). Do not handle until all safety precautions have been read and understood. Do not get particles, vapors or fumes in eyes, on skin, or on clothing. Do not ingest. If during normal use, the material presents a respiratory hazard, use only with adequate ventilation or wear appropriate respirator.

Advice on general occupational hygiene

Employees must wash hands and face before eating, drinking, or smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also section 8 for additional information on hygiene measures.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS: If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation, or other engineering controls to keep worker exposure to airborne contaminants below recommended and statutory limits.

RESPIRATORY PROTECTION: Cutting or sanding this product can generate dust. Used a properly fitted particulate filter respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product, and the safe working limits of the respirator. A NIOSH-approved N95 single use or P95 multiple use respirator will protect the employee from at least 95% of airborne particles. Follow the respirator manufacturer's instructions for proper use. If adhesives or other substances are used with this product, refer to the product manufacturer's safety data sheet for applicable respiratory protective measures.

SKIN PROTECTION: Chemical-resistant, impervious gloves complying with an approved standard should be worn when handling this or any chemical product, if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures containing several substances, the protection time of the gloves cannot be accurately estimated. If adhesives or other substances are used with this product, refer to the product manufacturer's safety data sheet for applicable skin protective measures.

BODY PROTECTION: Personal protective equipment for the body should be selected on the task being performed and the risks involved, and should be approved by a specialist before handling this product. If adhesives or other substances are used with this product, refer to the product manufacturer's safety data sheet for applicable skin protective measures.

EYE/FACE PROTECTION: Safety eyewear complying with an approved standard must be used when a risk assessment indicates this is necessary to avoid exposure to dust. Particulates and dust can be formed when cutting, grinding or sanding

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this product. If contact with dust or particulates is possible, the following should be worn unless the assessment indicates a higher degree of protection: safety glasses with side shields. If adhesives or other substances are used with this product, refer to the product manufacturer's safety data sheet for applicable eye and face protective measures.

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE:	Solid. Black.
ODOR:	Slight, sweet, aromatic.
ODOR THRESHOLD:	Not available
BOILING POINT:	Not available
FLASH POINT:	388-400°C (730-752°F)
FLAMMABILITY:	Melted product is flammable.
AUTOIGNITION TEMPERATURE:	495-510°C (923-950°F)
DECOMPOSITION TEMPERATURE:	Approximately 260°C (500°F)
LOWER/UPPER EXPLOSION LIMITS:	Not available
VAPOR PRESSURE:	Not available
LIQUID DENSITY:	Not available
SPECIFIC GRAVITY:	Approximately 1.05
MELTING POINT:	Not available
pH:	Not available
SOLUBILITY:	Insoluble
% VOLATILE:	Not available
VISCOSITY:	Not available

10. STABILITY AND REACTIVITY

Stability:	Stable at normal temperatures and pressures.
Reactivity:	Stable at normal temperatures and pressures.
Conditions to avoid:	Heat, flames, sparks and other sources of ignition.
Incompatible materials/conditions:	Consult the Charlotte Pipe and Foundry chemical resistance guide.
Hazardous decomposition products:	Hydrogen chloride, carbon oxides, small amounts of benzene and aromatic and aliphatic hydrocarbons, phosgene.
Hazardous polymerization:	Not available.

11. TOXICOLOGICAL INFORMATION

ACUTE TOXICITY:



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No toxicological data is available for the finished product.

SENSITIZATION: No data available.

MUTAGENICITY: No data available.

DEVELEPMENTAL: No data available.

Fertility: No data available.

CARCINOGENICITY: This product contains Carbon Black, which is classified by the International Agency for Research on Cancer as 2B: possibly carcinogenic to humans. Not listed on the National Toxicology Program Report on Carcinogens or OSHA Subpart Z.

REPRODUCTIVE TOXICITY: Not available

TERATOGENICITY: Not available

SPECIFIC TARGET ORGANS – SINGLE EXPOSURE: Not available

SPECIFIC TARGET ORGANS – REPEATED EXPOSURE: Not available

ASPIRATION HAZARD: Not available

INFORMATION ON THE LIKELY ROUTES OF EXPOSURE:

Potential acute health effects

Eye contact	No known significant effects or critical hazards. Dust can cause eye irritation.
Inhalation	Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.
Skin contact	Skin irritant.
Ingestion	No known significant effects or critical hazards.

Symptoms related to the physical, chemical, and toxicological characteristics

Eye contact	No data available.
Inhalation	No data available
Skin contact	Adverse symptoms may include irritation.
Ingestion	No data available

Immediate, delayed and chronic effects from short term exposure

Short term exposure

Potential immediate effects	No data available.
Potential delayed effects	No data available

Long term exposure

Potential immediate effects	No data available.
Potential delayed effects	No data available

Potential chronic effects

General	No data available.
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Carcinogenicity	May cause cancer. Risk of cancer depends on duration and level of exposure.
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12. ECOLOGICAL INFORMATION

Numerical measures of toxicity

No data available

Persistence and degradability

Does not biodegrade over time.

Bioaccumulative potential

No data available

Mobility in soil

No data available.

Other adverse effects: No known significant or critical hazards.

13. DISPOSAL CONSIDERATIONS

The generation of waste should be avoided or minimized wherever possible. Disposal of this product, and by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Waste should not be disposed of to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material must be disposed of in a safe way.

14. TRANSPORT INFORMATION

PROPER SHIPPING NAME:	Not Regulated
HAZARD CLASS:	Not Regulated
IDENTIFICATION NUMBER:	Not Regulated
SHIPPING LABEL:	Not Regulated
PACKING GROUP:	Not Regulated

15. REGULATORY INFORMATION

United States

TSCA 8(b):

All ingredients are listed on the U.S. Toxic Substances Control Act inventory.

Airborne unbound particles of carbon black of respirable size are listed as being carcinogenic per California Proposition 65.

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16. OTHER INFORMATION

Date of Preparation: 6 December 2013

Key To Acronyms:

CAS:	Chemical Abstracts Service
CFR:	Code of Federal Regulations
HEPA	High-Efficiency Particulate Air (filter)
IARC:	International Agency for Research on Cancer
LD50	Lethal dose to 50% of exposed laboratory animals
LC50	Lethal concentration to 50% of exposed laboratory animals
LEL:	Lower Explosive Limit
mg/l	Milligrams per liter
NIOSH:	National Institute for Occupational Safety and Health (US)
NTP:	National Toxicology Program
OSHA:	Occupational Safety and Health Administration (US)
PEL:	Permissible Exposure Limit
TSCA	Toxic Substances Control Act
TLV:	Threshold Limit Value – American Conference of Governmental Industrial Hygienists (ACGIH)
TWA:	Time Weighted Average
UEL:	Upper Explosive Limit
ug/ m ³	Micrograms per cubic meter

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Material Safety Data Sheet

Printing date 03/19/2012

Version 6

Reviewed on 03/19/2012

1 Identification of substance

· **Product details**

· **Trade name:** Acetylene

· **Article number:** 030-01-0003

· **Creation date:** 08/09/2006

· **Manufacturer/Supplier:**

Linde Canada Limited

5860 Chedworth Way

Mississauga, Ontario L5R 0A2

Telephone (905) 501-1700

24-HOUR EMERGENCY TELEPHONE NUMBER:

(905) 501-0802

Linde

575 Mountain Avenue

Murray Hill, NJ 07974

Telephone (908) 464-8100

24-HOUR EMERGENCY TELEPHONE NUMBER :

CHEMTREC (800) 424-9300 OR

Linde National Operations Center (800) 232-4726

Pse ensure that this MSDS is received by the appropriate person.

· **Information department:** Customer Service Centre: 1-866-385-5349

2 Composition/Data on components

· **Chemical characterization:**

· **CAS No. Description**

74-86-2 Acetylene

· **Identification number(s)**

· **EINECS Number:** 200-816-9

· **Index number:** 601-015-00-0

3 Hazards identification

· **Hazard description:**



Highly flammable

· **WHMIS-symbols:**

A - Compressed gas

B1 - Flammable gas

F - Dangerously reactive material



· **HMIS-ratings (scale 0 - 4)**

HEALTH 2

Health = 2

FIRE 4

Fire = 4

REACTIVITY 2

Reactivity = 2

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Trade name: Acetylene

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- **NFPA ratings (scale 0 - 4)**



Health = 2
Fire = 4
Reactivity = 2

- **Information pertaining to particular dangers for man and environment:**

Heating may cause an explosion.

Highly flammable.

- **Classification system:**

The classification is in line with internationally approved calculation standards. It is expanded, however, by information from technical literature and by information furnished by supplier companies.

- **GHS label elements**



Danger

2.2/1 - Extremely flammable gas.



Warning

2.5/D - Contains gas under pressure; may explode if heated.

- **Prevention:**

Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

- **Response:**

Leaking gas fire: Do not extinguish, unless leak can be stopped safely.

Eliminate all ignition sources if safe to do so.

- **Storage:**

Protect from sunlight. Store in a well-ventilated place.

Store in a well-ventilated place.

4 First aid measures

- **After inhalation:**

Supply fresh air. If required, provide artificial respiration and consult doctor. Keep patient warm.

- **After skin contact:** Generally the product does not irritate the skin.

- **After eye contact:** Rinse opened eye for at least 15 minutes under running water. Then consult a doctor.

- **After swallowing:** Not applicable

5 Fire fighting measures

- **Suitable extinguishing agents:**

Use fire fighting measures that suit the environment.

In the case of fires caused by ignited acetylene leaks:

- DO NOT extinguish unless it is possible (without risk) to shut-off gas flow; explosive vapours could form and re-ignition may occur.

Evacuate area as soon as possible.

- **Protective equipment:** Wear self-contained respiratory protective device.

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Trade name: Acetylene

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6 Accidental release measures

- **Person-related safety precautions:**

Wear protective equipment. Keep unprotected persons away.

Ensure adequate ventilation.

Stop leak - ONLY if possible to do so without risk.

- **Measures for environmental protection:** Prevent seepage into sewage system, workpits and/or cellars.

- **Measures for cleaning/collecting:** Ensure adequate ventilation.

7 Handling and storage

- **Handling:**

An acetylene cylinder valve should not be opened more than approximately 1&1/2 turns.

DO NOT use acetylene at pressures above 15 psig.

DO NOT withdraw/flow at a rate exceeding 1/10 (one tenth) of the cylinder capacity per hour during intermittent use and 1/15 (one-fifteenth) per hour during continuous use.

- **Information for safe handling:**

Keep away from heat and direct sunlight.

Handle with care. Avoid jolting, friction, and impact.

Use only in well ventilated areas.

Do not mix with air or oxygen above atmospheric pressure.

Store container in a secured area. Limit access to authorized personnel only. Report any incidents involving thefts, misuse, or inventory shortages to law enforcement and the supplier. Security shall be provided in accordance with all local, state (provincial) and federal regulations.

- **Information about protection against explosions and fires:**

Keep ignition sources away - Do not smoke.

Protect from heat.

Protect against electrostatic charges.

Pressurized container: protect from sunlight and do not expose to temperatures exceeding 50°C. Do not pierce or burn, even after use.

Prevent impact and friction.

- **Storage:**

- **Requirements to be met by storerooms and receptacles:**

Store in a cool location.

Do not expose cylinder to temperatures higher than 50°C (122 °F)

Protect cylinders from physical damage. Store in cool, dry, well-ventilated area away from heavily trafficked areas and emergency exits. Do not allow the temperature where cylinders are stored to exceed 125°F (52°C).

Cylinders should be stored upright and firmly secured to prevent falling or being knocked over. Full and empty cylinders should be segregated. Use a "first in-first out" inventory system to prevent full cylinders being stored for excessive periods of time.

- **Information about storage in one common storage facility:**

Store separately from cylinders containing oxygen or oxidants by a minimum distance of 20' or by a barrier of non-combustible material at least 5' high having a fire resistant rating of at least 30minutes.

Sources of ignition should be removed from storage area.

- **Further information about storage conditions:**

Keep cylinder valve tightly closed.

Store in cool, dry conditions in well sealed receptacles.

Store in accordance with local fire code and/or building code or any pertaining regulations.

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8 Exposure controls and personal protection

- **Additional information about design of technical systems:**

Adequate local ventilation.
Safety showers and eyewash stations should be nearby.

- **Components with limit values that require monitoring at the workplace:**

74-86-2 Acetylene (23 - 100%)	
EL	Simple asphyxiant

- **Additional information:** The lists that were valid during the creation were used as basis.

- **Personal protective equipment:**

- **General protective and hygienic measures:**

Wash hands before breaks and at the end of work.
Protective clothing and PPE should be kept free of oil and grease, generally in clean condition
PPE should be inspected and maintained regularly to retain effectiveness.

- **Breathing equipment:**

Use atmosphere-supplying respirators (e.g. supplied-air: demand, pressure-demand, or continuous-flow or self-contained breathing apparatus: demand or pressure-demand or combination supplied-air with auxiliary self-contained air supply atmosphere-supplying respirator) in case of insufficient ventilation.

- **Protection of hands:**



Protective gloves.

- **Material of gloves**

The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer.

- **Eye protection:** Safety glasses

9 Physical and chemical properties

- **General Information**

Form:	Gaseous.
Color:	Colorless
Odor:	Ether-like

- **Change in condition**

Melting point/Melting range:	-80.8°C
Boiling point/Boiling range:	-83°C

- **Flash point:**

< 0°C
Not applicable.

- **Flammability (solid, gaseous):** Highly flammable.

- **Ignition temperature:** 325°C

- **Danger of explosion:**

In use, may form flammable/explosive vapour-air mixture. Heating may cause an explosion.

- **Explosion limits:**

Lower:	2.3 Vol %
Upper:	78> Vol %

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- **Solubility in / Miscibility with Water at 20°C:** 1.185 g/l

* **10 Stability and reactivity**

- **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
- **Materials to be avoided:**
- **Dangerous reactions**
May form explosive gas mixture with air.
May react with oxidizing agents.
- **Dangerous products of decomposition:** No dangerous decomposition products known.

11 Toxicological information

- **Acute toxicity:**
- **LD/LC50 values that are relevant for classification:** LC50 - None available
- **Primary irritant effect:**
- **on the skin:** No irritating effect.
- **on the eye:** No irritating effect.
- **Sensitization:** No sensitizing effects known.

12 Ecological information

- **Additional ecological information:**
- **General notes:** Generally not hazardous for water

* **13 Disposal considerations**

- **Product:**
- **Recommendation:** Unused product should be returned to vendor.
- **Uncleaned packagings:**
- **Recommendation:**
Cylinder and unused product should be returned to vendor. Disposable cylinder must be disposed of in accordance with local regulations.
- **Recommended cleansing agent:** Water, if necessary with cleansing agents.

* **14 Transport information**

- **TDG and DOT regulations:**



- **Hazard class:** 2
- **Identification number:** UN1001
- **Packing group:** -

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Trade name: Acetylene

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- Proper shipping name (technical name): ACETYLENE, DISSOLVED
- Label 2.1
- Packaging group: -

· Maritime transport IMDG:



- IMDG Class: 2.1
- UN Number: 1001
- Label 2.1
- Packaging group: -
- EMS Number: F-D,S-U
- Marine pollutant: No
- Proper shipping name: ACETYLENE, DISSOLVED

· Air transport ICAO-TI and IATA-DGR:



- ICAO/IATA Class: 2
- UN/ID Number: 1001
- Label 2.1
- Packaging group: -
- Proper shipping name: ACETYLENE, DISSOLVED

- UN "Model Regulation": UN1001, ACETYLENE, DISSOLVED, 2.1

15 Regulations

· Sara

· Section 355 (extremely hazardous substances):

Substance is not listed.

· Section 313 (Specific toxic chemical listings):

Substance is not listed.

· TSCA (Toxic Substances Control Act):

Substance is listed.

· Proposition 65

· Chemicals known to cause cancer:

Substance is not listed.

· Chemicals known to cause reproductive toxicity for females:

Substance is not listed.

· Chemicals known to cause reproductive toxicity for males:

Substance is not listed.

· Chemicals known to cause developmental toxicity:

Substance is not listed.

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Trade name: Acetylene

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- **Carcinogenity categories**

- **EPA (Environmental Protection Agency)**

Substance is not listed.

- **NTP (National Toxicology Program)**

Substance is not listed.

- **TLV (Threshold Limit Value established by ACGIH)**

Substance is not listed.

- **NIOSH-Ca (National Institute for Occupational Safety and Health)**

Substance is not listed.

- **OSHA-Ca (Occupational Safety & Health Administration)**

Substance is not listed.

- **Canadian substance listings:**

- **Canadian Domestic Substances List (DSL)**

Substance is listed.

- **Canadian Ingredient Disclosure list (limit 0.1%)**

Substance is not listed.

- **Canadian Ingredient Disclosure list (limit 1%)**

Substance is not listed.

- **Product related hazard informations:**

The product was classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

- **Hazard symbols:**

Highly flammable

- **Risk phrases:**

Heating may cause an explosion.

Highly flammable.

- **Safety phrases:**

After contact with skin, was immediately with plenty of water

Keep container in a well-ventilated place.

Keep away from sources of ignition - No smoking.

Take precautionary measures against static discharges.

16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

Please refer to the section 3 for NFPA and HMIS Hazard Codes.

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Although reasonable care has been taken in the preparation of this document, we extend no warranties and make no representations as to the accuracy or completeness of the information contained herein, and assume no responsibility regarding the suitability of this information for the user's intended purposes or for the consequences of its use. Each individual should make a determination as to the suitability of the information for their particular purpose(s).

GENERAL DISCLAIMER

For terms and conditions, including limitation of liability, please refer to the purchase agreement in effect

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Trade name: Acetylene

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between Linde Inc. (or any of its affiliates and subsidiaries) and the purchaser.

· **Department issuing MSDS:** Customer Service Centre: 1-866-385-5349

· **Abbreviations and Acronyms:**

ACGIH: American Conference of Governmental Industrial Hygienists

CAS: Chemical Abstract Service (Division of the American Chemical Society)

DOT: US Department of Transportation

EINECS: European Inventory of Existing Commercial Chemical Substances

GHS: Globally Harmonized System of Classification and Labelling of Chemicals

HMIS: Hazardous Material Identification System

IATA: International Air Transportation Association

IATA-DGR: Dangerous Goods Regulations by the "International Air Transportation Association"

ICAO: International Civil Aviation Association

ICAO-TI: Technical Instructions by the "International Civil Aviation Organization (ICAO)"

IMDG: International Marine Code for Dangerous Goods

WHIMS: Workplace Hazardous Material Information System

LC50: Lethal Concentration, 50 Percent

LD50: Lethal Dose, 50 Percent

N/A: Not Applicable

CDN



MATERIAL SAFETY DATA SHEET

Section 1: Product & Company Identification

Product Name: Air Tool Oil
Product Number (s): SL2531, SL2533, 74095
Product Use: lubricant for pneumatic equipment

Manufacturer / Supplier Contact Information:

In United States:

CRC Industries, Inc.
885 Louis Drive
Warminster, PA 18974
www.crcindustries.com
1-215-674-4300 (General)
(800) 521-3168 (Technical)
(800) 272-4620 (Customer Service)

In Canada:

CRC Canada Co.
2-1246 Lorimar Drive
Mississauga, Ontario L5S 1R2
www.crc-canada.ca
1-905-670-2291

In Mexico:

CRC Industries Mexico
Av. Benito Juárez 4055 G
Colonia Orquídea
San Luís Potosí, SLP CP 78394
www.crc-mexico.com
52-444-824-1666

24-Hr Emergency – CHEMTREC: (800) 424-9300 or (703) 527-3887

Section 2: Hazards Identification

Emergency Overview

As defined by OSHA's Hazard Communication Standard, this product is non-hazardous.
Appearance & Odor: Amber viscous liquid, faint petroleum odor

Potential Health Effects:

ACUTE EFFECTS:

EYE: Direct contact irritates slightly with redness and swelling.

SKIN: Slightly irritating. Repeated or prolonged contact can result in drying of the skin.

INHALATION: Inhalation hazard at room temperature is unlikely due to the low volatility of this product. Heating can generate vapors that may cause respiratory irritation, nausea and headaches.

INGESTION: May cause stomach pain or vomiting. Main hazard, if ingested, is aspiration into the lungs and subsequent pneumonitis.

CHRONIC EFFECTS: Unknown

TARGET ORGANS: Unknown

Medical Conditions Aggravated by Exposure: Unknown

See Section 11 for toxicology and carcinogenicity information on product ingredients.

Section 3: Composition/ Information on Ingredients

COMPONENT	CAS NUMBER	% by Wt.
Hydrotreated light naphthenic distillates	64742-53-6	93 – 97
Solvent-refined heavy naphthenic distillates	64741-96-4	1 – 5
Zinc, dithiophosphate di-C1-14-alkyl esters	68649-42-3	< 1

Section 4: First Aid Measures

- Eye Contact:** Immediately flush with plenty of water for 15 minutes. Call a physician if irritation persists.
- Skin Contact:** Remove contaminated clothing and wash affected area with soap and water. Call a physician if irritation persists. Wash contaminated clothing prior to re-use.
- Inhalation:** Remove person to fresh air. Keep person calm. If not breathing, give artificial respiration. If breathing is difficult give oxygen. Call a physician.
- Ingestion:** Do NOT induce vomiting. Get medical attention immediately. Never give anything by mouth to an unconscious person.

Note to Physicians: If product is injected into or under the skin, or into any part of the body, the individual should be evaluated immediately as a surgical emergency. Even though symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

Section 5: Fire-Fighting Measures

Flammable Properties: As defined by OSHA, this product is a nonflammable.

Flash Point:	> 300°F (COC)	Upper Explosive Limit:	ND
Autoignition Temperature:	ND	Lower Explosive Limit:	ND

Fire and Explosion Data:

Suitable Extinguishing Media: Foam, dry chemicals, sand, dolomite, carbon dioxide

Products of Combustion: Acrid smoke/fumes; oxides of carbon

Explosion Hazards: Containers, when exposed to heat from fire, may build pressure and rupture.

Protection of Fire-Fighters: Firefighters should wear self-contained, NIOSH-approved breathing apparatus for protection against suffocation and possible toxic decomposition products. Proper eye and skin protection should be provided. Use water spray to keep fire-exposed containers cool and to knock down vapors which may result from product decomposition.

Section 6: Accidental Release Measures

Personal Precautions: Use personal protection recommended in Section 8. Minimize skin contact

Environmental Precautions: Take precautions to prevent contamination of ground and surface waters. Do not flush into sewers or storm drains.

Methods for Containment & Clean-up: Dike area to contain spill. Ventilate the area with fresh air. If in confined space or limited air circulation area, clean-up workers should wear appropriate

respiratory protection. Recover or absorb spilled material using an absorbent designed for chemical spills. Place used absorbents into proper waste containers.

Section 7: Handling and Storage

Handling Procedures: Do not reuse container. Keep container closed when not in use. Ventilate well and avoid breathing vapors. Do not store or mix with strong oxidizers. Avoid strong heating. For product use instructions, please see the product label.

Storage Procedures: Store in a cool dry area out of direct sunlight. Containers should be tightly closed while in storage. Keep away from sources of ignition. Store away from strong acids and oxidizers.

Aerosol Storage Level: NA

Section 8: Exposure Controls/ Personal Protection

Exposure Guidelines:

COMPONENT	OSHA		ACGIH		OTHER		UNIT
	TWA	STEL	TWA	STEL	TWA	SOURCE	
Hydrotreated light naphthenic distillates	5	NE	0.2	NE	NE		mg/m ³
Solvent-refined heavy naphthenic distillates	5	NE	0.2	NE	NE		mg/m ³
Zinc, dithiophosphate di-C1-14-alkyl esters	NE	NE	NE	NE	NE		
N.E. – Not Established (c) – ceiling (s) – skin (v) – vacated							

Controls and Protection:

Engineering Controls: Area should have ventilation to provide fresh air. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at the source, preventing dispersion into the general work area. Use mechanical means if necessary to maintain vapor levels below the exposure guidelines. If working in a confined space, follow applicable OSHA regulations.

Respiratory Protection: None required for normal work where adequate ventilation is provided. If engineering controls are not feasible or if exposure exceeds the applicable exposure limits, use a NIOSH-approved cartridge respirator with organic vapor cartridge. Air monitoring is needed to determine actual employee exposure levels. Use a self-contained breathing apparatus in confined spaces and for emergencies.

Eye/face Protection: For normal conditions, wear safety glasses. Where there is reasonable probability of liquid contact, wear splash-proof goggles.

Skin Protection: Use protective gloves such as nitrile or PVC. Also, use full protective clothing if there is prolonged or repeated contact of liquid with skin.

Section 9: Physical and Chemical Properties

Physical State: liquid (viscous)

Color: amber

Odor: mild petroleum

Odor Threshold: ND

Specific Gravity: 0.91

Initial Boiling Point: > 360°F
 Freezing Point: ND
 Vapor Pressure: ND
 Vapor Density: > 1 (air = 1)
 Evaporation Rate: slow
 Solubility: insoluble in water
 Coefficient of water/oil distribution: ND
 pH: NA
 Volatile Organic Compounds: wt %: 0 g/L: 0 lbs./gal: 0

Section 10: Stability and Reactivity

Stability: Stable
 Conditions to Avoid: Sources of ignition
 Incompatible Materials: Strong acids and oxidizers
 Hazardous Decomposition Products: Oxides of carbon, sulfur and phosphorus
 Possibility of Hazardous Reactions: No

Section 11: Toxicological Information

Long-term toxicological studies have not been conducted for this product. The following information is available for components of this product.

Acute Toxicity:

<u>Component</u>	<u>Oral LD50 (rat)</u>	<u>Dermal LD50 (rabbit)</u>	<u>Inhalation LC50 (rat)</u>
Hydrotreated light naphthenic distillates	> 5000 mg/kg	> 2000 mg/kg	2.18 mg/L/4H
Solvent-refined heavy naphthenic distillates	No data	No data	No data
Zinc, dithiophosphate di-C1-14-alkyl esters	No data	No data	No data

Chronic Toxicity:

<u>Component</u>	<u>OSHA Carcinogen</u>	<u>IARC Carcinogen</u>	<u>NTP Carcinogen</u>	<u>Irritant</u>	<u>Sensitizer</u>
Hydrotreated light naphthenic distillates	No	No	No	E (mild) / S (mild)	Unknown
Solvent-refined heavy naphthenic distillates	No	No	No	Unknown	Unknown
Zinc, dithiophosphate di-C1-14-alkyl esters	No	No	No	Unknown	Unknown

E – Eye S – Skin R - Respiratory

Reproductive Toxicity: No information available
Teratogenicity: No information available
Mutagenicity: No information available
Synergistic Effects: No information available
Other: IARC has determined in reviewing cancer prevalence of exposed workers that the carcinogenic activity of refined oils is related to the severity of processing of the base oil. The base oils in this product contain < 3% DMSO Extractable total polycyclic aromatic compound (PAC) per IP 346.

Section 12: Ecological Information

Ecological studies have not been conducted for this product. The following information is available for components of this product.

Ecotoxicity: No information available
 Persistence / Degradability: No information available
 Bioaccumulation / Accumulation: No information available
 Mobility in Environment: No information available

Section 13: Disposal Considerations

Waste Classification: This product is not a RCRA hazardous waste as packaged. (See 40 CFR Part 261.20 – 261.33) Used oil should be collected and handled in accordance with 40 CFR Part 279. Used oil that is mixed with hazardous waste may be subject to regulation as hazardous waste. Empty containers may be recycled.

All disposal activities must comply with federal, state, provincial and local regulations. Local regulations may be more stringent than state, provincial or national requirements.

Section 14: Transport Information

US DOT (ground): Not Regulated
 ICAO/IATA (air): Not Regulated
 IMO/IMDG (water): Not Regulated
 Special Provisions: None

Section 15: Regulatory Information

U.S. Federal Regulations:

Toxic Substances Control Act (TSCA):

All ingredients are either listed on the TSCA inventory or are exempt.

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA):

Reportable Quantities (RQ's) exist for the following ingredients: None

Spills or releases resulting in the loss of any ingredient at or above its RQ require immediate notification to the National Response Center (800-424-8802) and to your Local Emergency Planning Committee.

Superfund Amendments Reauthorization Act (SARA) Title III:

Section 302 Extremely Hazardous Substances (EHS): None

Section 311/312 Hazard Categories:	Fire Hazard	No
	Reactive Hazard	No
	Release of Pressure	No
	Acute Health Hazard	No
	Chronic Health Hazard	No

Product Name: Air Tool Oil

Product Number (s): SL2531, SL2533, 74095

Section 313 Toxic Chemicals: This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372:
Zinc, dithiophosphate di-C1-14-alkyl esters (zinc compounds): < 1%

Clean Air Act:

Section 112 Hazardous Air Pollutants (HAPs): None

U.S. State Regulations:

California Safe Drinking Water and Toxic Enforcement Act (Prop 65):

This product may contain the following chemicals known to the state of California to cause cancer, birth defects or other reproductive harm: N-Methylpyrrolidone (< 35 ppm)

Consumer Products VOC Regulations: This product is not regulated.

State Right to Know:

New Jersey: Petroleum Oil
Pennsylvania: None
Massachusetts: 64742-53-6
Rhode Island : None

Canadian Regulations:

Controlled Products Regulations:

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

WHMIS Hazard Class: Not Regulated

Canadian DSL Inventory: All ingredients are either listed on the DSL Inventory or are exempt.

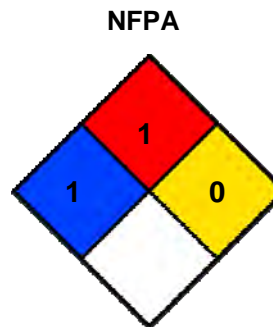
European Union Regulations:

RoHS Compliance: This product is compliant with Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003. This product does not contain any of the restricted substances as listed in Article 4(1) of the RoHS Directive.

Additional Regulatory Information: None

Section 16: Other Information

HMIS® (II)	
Health:	1
Flammability:	1
Reactivity:	0
PPE:	B



Ratings range from 0 (no hazard) to 4 (severe hazard)

Prepared By: Michelle Rudnick
CRC #: 720090
Revision Date: 08/02/2012





Changes since last revision: Revision Date

The information contained in this document applies to this specific material as supplied. It may not be valid for this material if it is used in combination with any other materials. This information is accurate to the best of CRC Industries' knowledge or obtained from sources believed by CRC to be accurate. Before using any product, read all warnings and directions on the label. For further clarification of any information contained on this MSDS consult your supervisor, a health & safety professional, or CRC Industries.

ACGIH: American Conference of Governmental Industrial Hygienists	NA: Not Applicable
CAS: Chemical Abstract Service	ND: Not Determined
CFR: Code of Federal Regulations	NIOSH: National Institute of Occupational Safety & Health
DOT: Department of Transportation	NFPA: National Fire Protection Association
DSL: Domestic Substance List	NTP: National Toxicology Program
g/L: grams per Liter	OSHA: Occupational Safety and Health Administration
HMIS: Hazardous Materials Identification System	PMCC: Pensky-Martens Closed Cup
IARC: International Agency for Research on Cancer	PPE: Personal Protection Equipment
IATA: International Air Transport Association	ppm: Parts per Million
ICAO: International Civil Aviation Organization	RoHS: Restriction of Hazardous Substances
IMDG: International Maritime Dangerous Goods	STEL: Short Term Exposure Limit
IMO: International Maritime Organization	TCC: Tag Closed Cup
lbs./gal: pounds per gallon	TWA: Time Weighted Average
LC: Lethal Concentration	WHMIS: Workplace Hazardous Materials Information System
LD: Lethal Dose	



Material Safety Data Sheet

WHMIS (Pictograms)	WHMIS (Classification)	Personal protective equipment
 	Class B-2: Flammable liquid Class D-1B: Material causing immediate and serious toxic effects (Toxic). Class D-2A: Material causing other toxic effects (Very toxic). Class D-2B: Material causing other toxic effects (Toxic).	 

Section 1. Product and Company Identification

Product name / Trade name	All Season Windshield Washer	Associated Product's Item Code	15-408H52
Synonym	Not available.	CAS #	Mixture.
Chemical family	Not available.	Validation date	Apr. 05 2011
Chemical formula	Not available.	Print date	Apr. 05 2011
Manufacturer/Supplier	Recochem Inc. 850 Montee de Liesse Montreal, Quebec 514-341-3550	In case of emergency	Recochem Inc. Communications and Regulatory Affairs Department (905) 878-5544
Material uses	Consumer products: Windshield de-icing fluid.		

Section 2. Hazards identification

Emergency Overview	WARNING! NOT EXPECTED TO PRODUCE SIGNIFICANT ADVERSE HEALTH EFFECTS WHEN THE RECOMMENDED INSTRUCTIONS FOR USE ARE FOLLOWED. No known significant effects or critical hazards. Avoid prolonged contact with eyes, skin and clothing.
Potential Acute Health Effects	See section 11 for more detailed information on health effects and symptoms. Extremely hazardous by the following route of exposure: of ingestion. Hazardous by the following route of exposure: of inhalation. Slightly hazardous by the following route of exposure: of skin contact (irritant, permeator), of eye contact (irritant). Non-sensitizer to skin. Severe over-exposure can result in death.
Note to Physician	Acute exposure to methanol, either through ingestion or breathing high airborne concentrations can result in symptoms appearing between 40 minutes and 72 hours after exposure. Symptoms and signs are usually limited to CNS, eyes and gastrointestinal tract. Because of the initial CNS's effects of headache, vertigo, lethargy and confusion, there may be an impression of ethanol intoxication. Blurred vision, decreased acuity and photophobia are common complaints. Treatment with ipecac or lavage is indicated in any patient presenting within two hours of ingestion. A profound metabolic acidosis occurs in severe poisoning and serum bicarbonate levels are a more accurate measure of severity than serum methanol levels. Treatment protocols are available from most major hospitals and early collaboration with appropriate hospitals is recommended.

Section 3. Composition, information on ingredients

<u>Canada</u>		
Name	CAS number	Conc. (% w/w)
Methanol	67-56-1	40 - 50

There are no ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Continued on next page

All Season Windshield Washer

Section 4. First aid measures

Eye contact	Immediately flush eyes with plenty of water for at least 20 minutes, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Get medical attention if irritation occurs.
Skin contact	Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.
Inhalation	Move exposed person to fresh air. Keep person warm and at rest. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Get medical attention if symptoms occur. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.
Ingestion	Wash out mouth with water. Remove dentures if any. Move exposed person to fresh air. Keep person warm and at rest. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention if symptoms occur. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.
Notes to physician	See section 2 Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

Section 5. Fire-fighting measures

Products of combustion	No specific data.
Fire-fighting media and instructions	Use an extinguishing agent suitable for the surrounding fire.
Fire Hazards	Explosive in the form of vapor when exposed to heat or flame. Vapor may travel considerable distance to source of ignition and flash back. When heated to decomposition, it emits acrid smoke and irritating fumes.
Explosion Hazards	Highly flammable liquid and vapor.

Section 6. Accidental release measures

Small spill and leak	Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.
Large spill and leak	Stop leak if without risk. Move containers from spill area. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Dispose of via a licensed waste disposal contractor. Note: see section 1 for emergency contact information and section 13 for waste disposal.

Continued on next page

Section 7. Handling and Storage

Handling	Put on appropriate personal protective equipment (see section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking.
Storage	Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

Section 8. Exposure controls/personal protection

Engineering controls	No special ventilation requirements. Good general ventilation should be sufficient to control worker exposure to airborne contaminants. If this product contains ingredients with exposure limits, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure below any recommended or statutory limits.
Personal protection	<p>Eyes Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts. Recommended: splash goggles</p> <p>Body Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.</p> <p>Respiratory Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.</p> <p>Hands Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. >8 hours (breakthrough time): nitrile rubber</p>

United States**Product name**

Methanol

Exposure limits**ACGIH TLV (United States, 1/2008). Absorbed through skin.**

TWA: 200 ppm 8 hour(s).

TWA: 262 mg/m³ 8 hour(s).

STEL: 250 ppm 15 minute(s).

STEL: 328 mg/m³ 15 minute(s).**OSHA PEL 1989 (United States, 3/1989). Absorbed through skin.**

TWA: 200 ppm 8 hour(s).

TWA: 260 mg/m³ 8 hour(s).

STEL: 250 ppm 15 minute(s).

STEL: 325 mg/m³ 15 minute(s).**NIOSH REL (United States, 6/2008). Absorbed through skin.**

TWA: 200 ppm 10 hour(s).

TWA: 260 mg/m³ 10 hour(s).**Continued on next page**

All Season Windshield Washer

STEL: 250 ppm 15 minute(s).
 STEL: 325 mg/m³ 15 minute(s).
OSHA PEL (United States, 11/2006).
 TWA: 200 ppm 8 hour(s).
 TWA: 260 mg/m³ 8 hour(s).
OSHA (United States, 2003).
 TWA: 200 ppm 8 hour(s).
 TWA: 260 mg/m³ 8 hour(s).

**Canada
Occupational exposure limits**

Ingredient	List name	TWA (8 hours)			STEL (15 mins)			Ceiling			Notations
		ppm	mg/m ³	Other	ppm	mg/m ³	Other	ppm	mg/m ³	Other	
Methanol	US ACGIH 1/2008	200	262	-	250	328	-	-	-	-	[1]
	AB 6/2008	200	262	-	250	328	-	-	-	-	[1]
	BC 6/2008	200	-	-	250	-	-	-	-	-	[1]
	ON 6/2008	200	260	-	250	325	-	-	-	-	[1]
	QC 6/2008	200	262	-	250	328	-	-	-	-	[1]

[1] Absorbed through skin.

Section 9. Physical and chemical properties

Physical State and Appearance	Liquid.	Odour	Alcohol. [Slight]
Molecular weight	Not available.	Taste	Not available.
pH	8 to 11	Colour	Purple.
Boiling/condensation point	Not available.	Volatility	Not available.
Melting/freezing point	Not available.	Evaporation rate	2.1 compared to Butyl acetate.
Relative density	0.9 to 0.97	Odour Threshold	Not available.
Vapor pressure	<12.8 kPa (<96 mm Hg)	Viscosity	Not available.
Vapour Density	<1.11 [Air = 1]	Solubility	Soluble in water.
VOC content	Not available.	Other Properties	Not available.

The product is: May be combustible at high temperature.**Auto-ignition temperature** 385°C (725°F)**Flash point** Closed cup: 28°C (82.4°F) [Tagliabue.]**Flammable limits**
Lower: 6%
Upper: 36%

Fire hazards in the presence of various substances Slightly flammable in the presence of the following materials or conditions: open flames, sparks and static discharge and heat.
 Non-flammable in the presence of the following materials or conditions: shocks and mechanical impacts.
 Explosive in the form of vapor when exposed to heat or flame. Vapor may travel considerable distance to source of ignition and flash back. When heated to decomposition, it emits acrid smoke and irritating fumes.

Continued on next page



All Season Windshield Washer

Section 10. Stability and reactivity

Stability	The product is stable. Under normal conditions of storage and use, hazardous polymerization will not occur.
Conditions of instability	Not available.
Incompatibility with various substances	Slightly reactive or incompatible with the following materials: oxidizing materials, acids and alkalis.
Hazardous decomposition products	Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11. Toxicological Information**Canada****Acute toxicity**

Product/ingredient name	Result	Species	Dose	Exposure
Methanol	LC50 Inhalation Gas.	Rat	64000 ppm	4 hours
	LD50 Dermal	Rabbit	15800 mg/kg	-
	LD50 Dermal	Rabbit	15840 mg/kg	-
	LD50 Oral	Rat	5600 mg/kg	-
	LD50 Oral	Rat	5600 mg/kg	-
Conclusion/Summary	Not available.			

Chronic toxicity

Conclusion/Summary : Not available.

Carcinogenicity

Conclusion/Summary : May be fatal or cause blindness if swallowed.

Classification

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA
Methanol	A5	4	-	-	-	None.

Mutagenicity

Conclusion/Summary : Not available.

Teratogenicity

Conclusion/Summary : Not available.

Reproductive Toxicity

Conclusion/Summary : Not available.

Continued on next page

Section 12. Ecological information

For accidental discharges into the environment, see Section 6: "Accidental Release Measures" for suggested instructions.

Ecotoxicity : No known significant effects or critical hazards.

Canada

Aquatic ecotoxicity

Product/ingredient name	Result	Species	Exposure
Methanol	Acute LC50 2500000 ug/L Marine water	Crustaceans - Crangon crangon - Adult	48 hours
	Acute LC50 3289 to 4395 mg/L Fresh water	Daphnia - Daphnia magna - Neonate - <24 hours	48 hours
	Acute LC50 >100000 ug/L Fresh water	Fish - Pimephales promelas - Juvenile (Fledgling, Hatchling, Weanling) - 0.2 to 0.5 g	96 hours

Conclusion/Summary : Not available.

Biodegradability

Conclusion/Summary : Not available.

Section 13. Disposal considerations

Waste information The generation of waste should be avoided or minimized wherever possible. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Section 14. Transport information

Canada TDG Classification

Class Not applicable.

Subsidiary class Not applicable.

Proper Shipping Name (Canada) TDG Windshield washer antifreeze, Alcohol exempt.

UN number Not applicable.

Packing Group Not applicable.

Special provisions In containers of 450L or less, this product meets the requirements for exemption under TDG regulation special provisions, part 1, section 1.36b: Class 3, Flammable liquids: Alcohol Exemption.

No placard (handling and hazard label) required.

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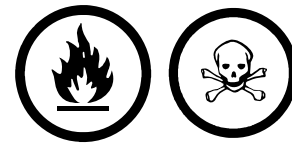
All Season Windshield Washer

IMDG Classification**Class** Class 3: Flammable liquid.**Subsidiary class** -**Proper Shipping Name** Alcohols, n.o.s. (Methanol)**IMDG****UN number** UN 1987**Packing Group** III**Marine pollutant** Not a pollutant.**Special provisions**
Emergency schedules (EmS)
3-06**Remarks**

In a means of containment of 5 L capacity or less this product is classified as a "Limited Quantity".



No placard (handling and hazard label) required.

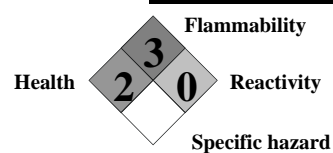
United States DOT (Classification)**Class** Class 3: Flammable liquid.**Subsidiary class** -**Proper Shipping Name (United States) DOT** Alcohols, n.o.s. (Methanol)**UN number** UN 1987**Packing Group** III**Special provisions** In containers of 5 L (5Kg) capacity or less this product is classified as a "Consumer Commodity" under DOT regulations.**International Air Transport Association (IATA)** For air shipment classification and associated regulations, please refer to the latest edition of IATA Dangerous Goods Regulations.**Section 15. Regulatory information****WHMIS Classification (Canada)** Class B-2: Flammable liquid
Class D-1B: Material causing immediate and serious toxic effects (Toxic).
Class D-2A: Material causing other toxic effects (Very toxic).
Class D-2B: Material causing other toxic effects (Toxic).**Canada Domestic Substances List (DSL) Status** This product and/ or all of its components are on the DSL.**HCS Classification (U.S.A.)** Not regulated.**U.S.A. Regulatory Lists** This product and/ or all of its components are on the TSCA inventory list.**Continued on next page**

All Season Windshield Washer

**Hazardous Material
Information System
(U.S.A.)**

Health	2
Flammability	3
Reactivity	0
Personal protection	B

**National Fire
Protection
Association
(U.S.A.)**

**Section 16. Other information**

Validated and verified by Compliance and Technical Information Manager on Apr. 05 2011
ph.# 905-878-5544.

Printed Apr. 05 2011

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

MSDS are available at www.recochem.com

Material Safety Data Sheet

Section 1

Product Identification & Use

Material Name	ALUMINUM ALLOYS (Series 1,2,3,5,6,7 thousand)	Supplier	Samuel, Son & Co. LTD.
Synonyms	Includes all sheet products, plate, strip, bar, slab, ingot, and tubular products	Address	2360 Dixie Road Mississauga, Ontario L4Y 1Z7
WHMIS Class	D2A, D2B	Phone	(905) 279-5460
Material Use	Manufacture of Articles	Toll Free	1-800-26SAMUEL
		Fax	(905) 279-9658

Section 2

Hazardous Ingredients (OF=oxide fumes/DF=dust and fume/TD=Ti dioxide)

ELEMENT	C.A.S.#	% weight	OSHA PEL (mg/m)	TLV (mg/m3)
Aluminum	7429-90-5	90-99.7	N/A	10.0 OF/5.0 DF
Chromium	7440-47-3	<0.01-0.4	1.0 chrome metal	0.2 fume, 0.1 dust
Metal Copper	7440-50-8	<0.05-6.0	0.1 fume 1.0 dust	0.2 fume 1.0 dust
Iron	1309-37-1	<0.35-1.0	10 OF	5 OF
Magnesium	1309-48A	<0.03A.9	15 OF	10 OF
Manganese	7439-96-5	<0.02-1.5	5c dust 5c fume	5c dust 1 fume
Silicon	7440-21-3	<0.25-0.2	N/A	10 total dust
Titanium	7440-32-6	<0.02-0.2	15 TD	10 TD
Zinc	1314-13-2	,0.05-6.1	15 OF	10 dust 5 fume
Bismuth	7440-69-9	<0.40-0.7	N/A	N/A
Boron	7440A2-8	.06 max	15 oxide fume	10 oxide fume
Lead	7439-92-1	<0.40-0.7	0.05 DF	0.15 DF
Vanadium	7440-62-2	0.05 max	0.05c dust, 0.1c fume	0.05 dust & 0.05 fume

Note:

Aluminum alloys will be comprised of various combinations of the elements shown above. In addition, other alloying elements may be present in minute quantities. No permissible exposure limits (PEL) or threshold limit values (TLV) exist for aluminum alloys. Values shown are applicable to component elements.

Section 3

Physical Data

Physical state: Solid Odour: N/a Evaporation Rate: N/a Boiling point: N/a Vapour pressure: N/a
 Vapour density: N/a Freezing point: N/a Coefficient wtr/oil distribution: N/a Ph: N/a
 Odour threshold: N/a Boiling point: N/a Appearance: slvr gry Specific Gravity:H20=1(approx. 2.5-2.9)

Section 4

Fire & Explosion Data

Means of extinction: Dry Powder or Sand *NOTE: do not use water or Halogen on molten Aluminum Flash

Section 5

Reactivity Data

Not applicable Chemical Stability: yes Incompatibility to other substances: yes
 Reactivity & under what condition: Sodium Hydroxide & Halogen ACIDS in contact with Aluminum may generate explosive Hydrogen Mixtures. Hazardous Decomposition Products: extreme heat may produce toxic or irritating airborne particulate, including Alloy Oxide

Section 6

Toxicological Properties of Material

Route of entry: Prolonged skin contact with coated products may cause skin irritation in sensitive individuals
 Inhalation of alloy particulate or elemental oxide fumes generated during welding, burning, grinding or machining may pose acute or chronic effects.
Acute exposure: Inhalation of overexposure may cause metal fume fever characterised by fever and chills (flu like symptoms) appears to 6 hours after exposure with no know long term effects.
Chronic exposure: Chronic inhalation of alloy fume may cause a benign pneumonconiosis (siderosis)

with few or no symptoms. Chronic inhalation of fumes may affect the digestive system, nervous system, respiratory system, muscles and joints.

Sensitisation to product: **Unknown** Synergistic materials: **Unknown** Reproductive effects: **No known effect**

Teratogenicity: **No known effect** Mutagenicity: **No known effect**

Carcinogenicity of material: IARC lists Hexavalent Chromium compounds under its group 1 category.

Confirmed Human Carcinogen

Note: welding fume may also contain contaminants from fluxes or welding consumables.

Section 7 **Preventive Measures**

Personal Protective Equipment: Dependent upon process being performed on material.

Each operation must be addressed for suitable equipment and or engineering controls.

Gloves: Leather faced/ cut protection Eyes: Safety glasses or face shield as appropriate

Footwear: Safety shoes/ boots where required Other: Barrier cream may be used when handling

Respiratory: Approved respiratory protection where applicable.

Engineering Controls (eg. Ventilation, enclosures): General or local exhaust ventilation during welding.

Leak and spill procedures: N/a

Water disposal: N/a

Storage Requirements: Keep stored material dry to prevent corrosion.

Special Shipping Information: N/a

Section 8 **First-Aid Measures**

Skin: Wash affected area with soap and water. Seek medical attention if irritation persists.

Eye: For irritation from any coating material flush eyes with plenty of water.

Seek medical attention if irritation persists.

Inhalation: For overexposure to alloy fumes remove to fresh air.

Seek medical attention for adverse symptoms

Ingestion: N/a

Section 9 **Preparation Date of MSDS**

Prepared by **Samuel, Son & Co. Ltd.**

Phone Number **1-800-267-2683**

Date **January 2012**

The information contained is based on the data considered accurate, however, no warranty is expressed or implied regarding the accuracy of these data or the results obtained from the use thereof.

AMERLOCK® 400

September 2013
Revision of May 2013

DESCRIPTION	High Solids Epoxy Coating
PRINCIPAL CHARACTERISTICS	<ul style="list-style-type: none"> – Low VOC – High performance general maintenance coating for new or old steel – Self priming over most existing coatings – Compatible with prepared damp surfaces – Compatible with adherent rust remaining on prepared surfaces – Dry temperature resistance up to 450°F on insulated or uninsulated surfaces when mixed with <i>Amercoat</i> 880 glass flake additive
COLOR AND GLOSS	<p>Semi-gloss Standard primer colors and custom colors</p> <p><i>* Epoxy coatings will chalk and fade with exposure to sunlight. Light colors are prone to ambering to some extent. Note that product tinted to custom colors are not recommended for immersion service. Only use factory grind batches for immersion.</i></p>
BASIC DATA	
Volume solids	85% ± 3%
VOC	1.5 lbs/gal (180 g/L) 1.4 lbs/gal (163 g/L) Directive 1999/13/EC, SED (Use <i>Amerlock</i> 400VOC when <100 g/L formulation is required)
Recommended Dry film thickness (per coat)	4 – 8 mils (100 – 200 microns)
Theoretical Spread Rate	@ 1 mils dft 1331 ft ² /gal @ 5 mils dft 266 ft ² /gal
Components	2
Dry Temperature Resistance*	Continuous — 250°F Intermittent — 350°F (<5% of the time, max 24 hours) <i>* Color will drift at elevated temperatures.</i>
Shelf Life	3 years from date of manufacture
SURFACE PREPARATION	<p>Coating performance is, in general, proportional to the degree of surface preparation. Abrasive blasting is usually the most effective and economical method. When this is impossible or impractical, <i>Amerlock</i> 400 can be applied over mechanically cleaned surfaces. All surfaces must be clean, dry and free of all contaminants, including salt deposits. Contact PPG for maximum allowable salt containment levels.</p>
Mild Steel	<ul style="list-style-type: none"> – Remove all loose rust, dirt, grease or other contaminants by one of the following depending on the degree of cleanliness required: SSPC-SP2, 3, 6, 7 or 10 (ISO 8501-1 St-2, St-3, Sa 1, Sa 2.5). These minimum surface preparation standards apply to steel that has been previously abrasive blasted. The choice of surface preparation will depend on the system selected and end-use service conditions. For more severe service and immersion, clean to SSPC-SP10 (ISO8501-1 Sa 2.5). Blast to achieve an anchor profile of 1.0-5.0 mils (50-75microns) as indicted by a Keane-Tator Surface profile Comparator or Testex Tape. Previously blasted steel may be ultra-high pressure water jetted to SSPC -SP WJ-2(L) / NACE WJ-2(L). The wet surface can be dried by blowing with dry compressed air giving special attention to horizontal surfaces and recesses.
Concrete	<ul style="list-style-type: none"> – Prepare / clean surface in accordance with SSPC SP-13 guidelines. Abrade surface per ASTM D-4259 to remove all efflorescence and laitance, to expose sub-surface voids, and to provide a surface roughness equivalent of 60 grit sandpaper or coarser. Test for moisture by conducting a plastic sheet test in accordance with ASTM D4263. Fill voids as necessary with <i>Amercoat</i> 114A epoxy filler. For slabs on grade, test for moisture in accordance with ASTM F1869 (calcium chloride test). The maximum allowable moisture transmission is 3 lbs / 1,000 ft²/24 hours. Refer to Information Sheet 1496ACUS for further details regarding moisture measurements.

AMERLOCK 400

- Galvanized Steel
 - Remove oil or soap film with detergent or emulsion cleaner. Lightly abrasive blast with a fine abrasive in accordance with SSPC SP-16 guidelines to achieve a profile of 1.5-3.0 mils. When light abrasive blasting is not possible, galvanizing can be treated with a suitable zinc phosphate conversion coating. Galvanizing that has at least 12 months of exterior weathering and has a rough surface with white rust present may be over-coated after power washing and cleaning to remove white rust and other contaminants. The surface must have a measurable profile. A test patch is recommended to confirm adhesion. Not recommended over chromate sealed galvanizing without blasting to thoroughly remove chromates. Adhesion problems may occur.
- Non-Ferrous Metals and Stainless Steel
 - Abrasive blast in accordance with SSPC SP-16 guidelines to achieve a uniform and dense 1.5-4.0 mil anchor profile. Size and hardness of abrasive should be adjusted as necessary based on the hardness of the substrate. Aluminum may be treated with a surface treatment compliant with Mil-DTL-5541 or equivalent (non-immersion applications only).
- Aged coatings
 - All surfaces must be clean, dry, tightly bonded and free of all loose paint, corrosion products or chalky residue. Abrade surface, or clean with Prep 88. *Amerlock 400* is compatible over most types of properly applied and tightly adhering coatings, however, a test patch is recommended to confirm compatibility.
- Repair
 - Prepare damaged areas to original surface preparation specifications, feathering edges of intact coating. Thoroughly remove dust or abrasive residue before touch-up.

ENVIRONMENTAL CONDITIONS

- Ambient temperatures*
 - 40°F to 122°F (5°C to 50°C)
 - 20°F to 122 °F (-6°C to 50°C) with 1 pint per gal of *Amercoat 861* accelerator per 5 gal
 - * *Amerlock 2* hardener can be used with the *Amerlock 2/400* base component for faster cure and curing in lower temperatures. The A component is the same for *Amerlock 400* and *Amerlock 2*. The B components are interchangeable.
- Material temperatures
 - 40°F to 90°F (5°C to 32°C)
- Relative humidity
 - 0 to 100%, surface must be free of visible moisture. For immersion service and for optimum performance, surface temperature must be at least 5°F above the dew point temperature.
- Surface temperature
 - 40°F to 122°F (5°C to 50°C)
 - 20°F to 122 °F (-6°C to 50°C) with 1 pint of *Amercoat 861* thinner per 5 - gallons
 - * *Amerlock 400* may be applied to surfaces as hot as 250°F (121°C) for non-immersion service. When applying *Amerlock 400* to surfaces between 122°F and 250°F, *Amerlock 400* must be thinned at 1/2 pint per gallon with only *Amercoat 101* thinner. Multiple thin passes may be required to achieve film build and to avoid solvent blistering.
- General air quality
 - Area should be sheltered from airborne particulates and pollutants. Avoid combustion gases or other sources of carbon dioxide that may promote amine blush. Ensure good ventilation during application and curing. Provide shelter to prevent wind from affecting spray patterns. Refer to Information Bulletin #1489 for further information.

INSTRUCTIONS FOR USE

- Mixing ratio by volume
 - 1 part base to 1 part hardener
 - Pre-mix pigmented components with a pneumatic air mixer at moderate speeds to homogenize the container. Add hardener to base and agitate with a power mixer for 1-2 minutes until completely dispersed.
- Pot life

	50°F	70°F	90°F
400	3 hours	2 hours	1 hour
400 w/ 1 pint of 861 per 5 gallons	1.5 hours	1 hour	30 minutes
- Induction time
 - None required
- Airless spray
 - 45:1 pump or larger, 0.017-0.019 fluid tip
 - Can be sprayed with plural component application equipment.
- Air spray
 - Thin up to 20%, standard conventional equipment, 0.070" fluid orifice
- Brush & roll
 - Use a high quality natural bristle brush and / or solvent resistant, 3/8" nap roller. Ensure brush / roller is well loaded to avoid air entrainment. Multiple coats may be necessary to achieve adequate film build.
- Thinner
 - Amercoat 65, Amercoat 101*

AMERLOCK 400

- Cleaning solvent *Amercoat 12 Cleaner or Amercoat 65 thinner (xylene)*
- Primers *Direct to substrate; Dimetcote series primers, Amercoat 68HS*
- Topcoats *Amercoat 450 Series Polyurethanes, Amershield, PSX 700, PSX One, Amercoat 220 Series Acrylics, Pitthane Polyurethanes, PittTech Acrylics*
- Safety precautions *For paint and recommended thinners see safety sheet 1430, 1431 and relevant material safety data sheets*
This is a solvent borne paint and care should be taken to avoid inhalation of spray mist or vapor as well as contact between the wet paint and exposed skin or eyes.

DRY/CURE TIMES

Amerlock 400 @ 5 mils dft

	32°F	50°F	70°F	90°F
Dry to touch	96 hours	28 hours	9 hours	4.5 hours
Dry through	140 hours	48 hours	20 hours	12 hours
Dry to recoat/topcoat	120 hours	36 hours	16 hours	6 hours
Max recoat, self	120 days	120 days	90 days	30 days
Max topcoat, urethanes, PSX	30 days	30 days	30 days	15 days
Cure to immersion <i>factory colors only</i>	NR	21 days	7 days	4 days

ACCELERATED DRY TIMES

Amerlock 400 w/ 1 pint Amercoat 861 per 5 gallons @ 5 mils dft

	20°F	32°F	50°F	70°F	90°F
Dry to touch	96 hours	48 hours	15 hours	4 hours	2 hours
Dry through	160 hours	72 hours	24 hours	9 hours	5 hours
Dry to recoat/topcoat	28 hours	16 hours	16 hours	7 hours	4 hours
Max recoat, self	60 days	60 days	45 days	30 days	15 days
Max topcoat, urethanes, PSX	30 days	30 days	21 days	14 days	5 days
Cure to immersion <i>factory colors only</i>	NR	NR	NR	NR	NR

** Dry times are dependent on air and surface temperatures as well as film thickness, ventilation, and relative humidity. Maximum recoating time is highly dependent upon actual surface temperatures – not simply air temperatures. Surface temperatures should be monitored, especially with sun-exposed or otherwise heated surfaces. Higher surface temperatures shorten the maximum recoat window. An extended recoatable window may be allowable in some circumstances. Please contact your PPG PMC representative for more details.*
Surface must be clean and dry. Any contamination must be identified and removed. A detergent wash with Prep 88 or equivalent is required prior to application of topcoats after 30 days of exposure. However, particular attention must be paid to surfaces exposed to sunlight where chalking may be present. In those situations, a further degree of cleaning may be required. PPG Technical Service can advise on suitable cleaning methods. If maximum recoat/topcoat time is exceeded, then roughen surface.

PRODUCT QUALIFICATIONS

- Compliant with USDA Incidental Food Contact Requirements
- NFPA Class A for Flame Spread and Smoke Development
- Qualified for ANSI / NSF Standard 61 (potable water) for valves only.
For NSF application instructions, please visit our website at: www.ppgamercoat.us.ppgmc.com/NSF/
- AWWA C210-98
- AWWA C550-98
- MPI Category #108
- LEED's compliant for Anti-corrosive Paint category
- Nuclear Service Level 2 (ANSI N 5.12, ANSI N 101.2)

AMERLOCK 400

AVAILABILITY

Packaging	Available in 2-gallon and 5-gallon kits 2-gallon kits have 1 full gallon of base and 1 full gallon of hardener 5 gallon kits have 2.5 gallons of base and 2.5 gallons of hardener	
Inventory (made to order, etc..)	Global availability	
Product codes	AK2-1	Buff
	AK2-3	White
	AK2-9	Black
	AK2-23	Pearl Gray
	AK2-72	Oxide Red
	AK2-81	Safety Yellow
	AK2-T1	Deep Tint base*
	AK2-T2	Light Tint base*
	AK2-T3	Neutral Tint base*
	AK2-T4	Red Tint base*
	AK2-T5	High Hiding Yellow Tint base*
	AK400-B	Hardener component
	AK400AL	Amerlock 400 Aluminum base (Refer to Amerlock 400AL Data Sheet)
	AK400AL-B	Amerlock 400 Aluminum hardener (Refer to Amerlock 400AL Data Sheet)

* Tintable using UCD V-Line colorants only.

Worldwide statement	While it is always the aim of PPG Protective & Marine Coatings to supply the same product on a worldwide basis, slight modification of the product is sometimes necessary to comply with local or national rules/circumstances. Under these circumstances an alternative product data sheet is used.
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WARRANTY STATEMENT

PPG warrants (i) its title to the product, (ii) that the quality of the product conforms to PPG’s specifications for such product in effect at the time of manufacture and (iii) that the product shall be delivered free of the rightful claim of any third person for infringement of any U.S. patent covering the product.

THESE ARE THE ONLY WARRANTIES THAT PPG MAKES AND ALL OTHER EXPRESS OR IMPLIED WARRANTIES, UNDER STATUTE OR ARISING OTHERWISE IN LAW, FROM A COURSE OF DEALING OR USAGE OF TRADE, INCLUDING WITHOUT LIMITATION, ANY OTHER WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE OR USE, ARE DISCLAIMED BY PPG.

Any claim under this warranty must be made by Buyer to PPG in writing within five (5) days of Buyer’s discovery of the claimed defect, but in no event later than the expiration of the applicable shelf life of the product, or one year from the date of the delivery of the product to the Buyer, whichever is earlier. Buyer’s failure to notify PPG of such non-conformance as required herein shall bar Buyer from recovery under this warranty.

LIMITATION OF LIABILITY

IN NO EVENT WILL PPG BE LIABLE UNDER ANY THEORY OF RECOVERY (WHETHER BASED ON NEGLIGENCE OF ANY KIND, STRICT LIABILITY OR TORT) FOR ANY INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES IN ANY WAY RELATED TO, ARISING FROM, OR RESULTING FROM ANY USE MADE OF THE PRODUCT.

The information in this sheet is intended for guidance only and is based upon laboratory tests that PPG believes to be reliable. PPG may modify the information contained herein at any time as a result of practical experience and continuous product development. All recommendations or suggestions relating to the use of the PPG product, whether in technical documentation, or in response to a specific inquiry, or otherwise, are based on data, which to the best of PPG’s knowledge, is reliable. The product and related information is designed for users having the requisite knowledge and industrial skills in the industry and it is the end-user’s responsibility to determine the suitability of the product for its own particular use and it shall be deemed that Buyer has done so, as its sole discretion and risk.

PPG has no control over either the quality or condition of the substrate, or the many factors affecting the use and application of the product. Therefore, PPG does not accept any liability arising from any loss, injury or damage resulting from such use or the contents of this information (unless there are written agreements stating otherwise). Variations in the application environment, changes in procedures of use, or extrapolation of data may cause unsatisfactory results.

This sheet supersedes all previous versions and it is the Buyer’s responsibility to ensure that this information is current prior to using the product.

Current sheets for all PPG Protective & Marine Coatings Products are maintained at www.ppgpmc.com. The English text of this sheet shall prevail over any translation thereof.

Material Safety Data Sheet



Date of issue 29 December 2011

Version 12

1. Product and company identification

Product name : AMERLOCK 400AL RESIN
Code : AK400AL
Supplier : PPG Industries, Inc.
One PPG Place
Pittsburgh, PA 15272
Emergency telephone number : (412) 434-4515 (U.S.)
(514) 645-1320 (Canada)
01-800-00-21-400 (Mexico)
Technical Phone Number : (412) 492-5200 (ALLISON PARK, PA) 8:00 a.m. - 5:00 p.m. EST

2. Hazards identification

Emergency overview : WARNING!
COMBUSTIBLE LIQUID AND VAPOR. MAY CAUSE ALLERGIC SKIN REACTION. MAY BE HARMFUL IF INHALED OR SWALLOWED. MAY CAUSE EYE IRRITATION. PROLONGED OR REPEATED CONTACT MAY DRY SKIN AND CAUSE IRRITATION. CONTAINS MATERIAL THAT CAN CAUSE TARGET ORGAN DAMAGE.

Keep away from heat, sparks and flame. Do not get on skin or clothing. Avoid contact with eyes. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. Wash thoroughly after handling.

Potential acute health effects

Inhalation : May be harmful if inhaled.
Ingestion : May be harmful if swallowed.
Skin : May cause skin dryness and irritation. May cause an allergic skin reaction.
Eyes : Moderately irritating to eyes.

Over-exposure signs/symptoms

Repeated exposure to high vapor concentrations may cause irritation of the respiratory system and permanent brain and nervous system damage. Inhalation of vapor/aerosol concentrations above the recommended exposure limits causes headaches, drowsiness and nausea and may lead to unconsciousness or death. There is some evidence that repeated exposure to organic solvent vapors in combination with constant loud noise can cause greater hearing loss than expected from exposure to noise alone.

Medical conditions aggravated by over-exposure : Pre-existing skin disorders and disorders involving any other target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

This Material Safety Data Sheet has been prepared in accordance with Canada's Workplace Hazardous Materials Information System (WHMIS) and the OSHA Hazard Communication Standard (29 CFR 1910.1200).

See toxicological information (Section 11)

3. Composition/information on ingredients

<u>Name</u>	<u>CAS number</u>	<u>%</u>
Epoxy Resin (MW<=700)	25068-38-6	30 - 60
Aluminium powder (stabilized)	7429-90-5	10 - 30
2,3-epoxypropyl neodecanoate	26761-45-5	10 - 30
Stoddard solvent	8052-41-3	7 - 13
ethanol	64-17-5	0.1 - 1

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

4 . First aid measures

If ingestion, irritation, any type of overexposure or symptoms of overexposure occur during or persists after use of this product, contact a POISON CONTROL CENTER, EMERGENCY ROOM OR PHYSICIAN immediately; have Material Safety Data Sheet information available. Never give anything by mouth to an unconscious or convulsing person.

- Eye contact** : Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Seek immediate medical attention.
- Skin contact** : Remove contaminated clothing and shoes. Wash skin thoroughly with soap and water or use recognized skin cleanser. Do NOT use solvents or thinners.
- Inhalation** : Remove to fresh air. Keep person warm and at rest. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel.
- Ingestion** : If swallowed, seek medical advice immediately and show this container or label. Keep person warm and at rest. Do not induce vomiting.
- Notes to physician** : No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

5 . Fire-fighting measures

Flammability of the product : Combustible liquid. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. Vapors may accumulate in low or confined areas or travel a considerable distance to a source of ignition and flash back.

Extinguishing media

- Suitable** : Use dry chemical, CO₂, water spray (fog) or foam.
- Not suitable** : Do not use water jet.
- Special exposure hazards** : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.
- Hazardous combustion products** : Decomposition products may include the following materials:
carbon oxides
halogenated compounds
metal oxide/oxides
- Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

6 . Accidental release measures

- Personal precautions** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see Section 8).
- Environmental precautions** : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Water polluting material. May be harmful to the environment if released in large quantities.
- Large spill** : Stop leak if without risk. Move containers from spill area. Approach release from upwind. Use spark-proof tools and explosion-proof equipment. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see section 1 for emergency contact information and section 13 for waste disposal.

6 . Accidental release measures

Small spill : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Dilute with water and mop up if water-soluble or absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

7 . Handling and storage

Handling : Put on appropriate personal protective equipment (see Section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Persons with a history of skin sensitization problems should not be employed in any process in which this product is used. Do not swallow. Do not get on skin or clothing. Avoid breathing vapor or mist. Avoid contact with eyes. Avoid release to the environment. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use non-sparking tools. Take precautionary measures against electrostatic discharges. Vapors are heavier than air and may spread along floors. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Empty containers retain product residue and can be hazardous. Do not reuse container. If this material is part of a multiple component system, read the Material Safety Data Sheet(s) for the other component or components before blending as the resulting mixture may have the hazards of all of its parts.

Storage : Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination. Do not store above the following temperature: 120F / 49C.

8 . Exposure controls/personal protection

Name	Result	ACGIH	OSHA	Ontario	Mexico	PPG
Aluminium powder (stabilized)	TWA	1 mg/m ³ R	5 mg/m ³ (as Al) R 15 mg/m ³ (as Al) TD	1 mg/m ³ R	5 mg/m ³ 5 mg/m ³	Not established
Stoddard solvent	TWA	100 ppm	500 ppm	100 ppm	100 ppm	Not established
	STEL	Not established	Not established	Not established	200 ppm	Not established
ethanol	TWA	Not established	1000 ppm	Not established	1000 ppm	Not established
	STEL	1000 ppm	Not established	1000 ppm	Not established	Not established

Key to abbreviations

A	= Acceptable Maximum Peak	S	= Potential skin absorption
ACGIH	= American Conference of Governmental Industrial Hygienists.	SR	= Respiratory sensitization
C	= Ceiling Limit	SS	= Skin sensitization
F	= Fume	STEL	= Short term Exposure limit values
IPEL	= Internal Permissible Exposure Limit	TD	= Total dust
OSHA	= Occupational Safety and Health Administration.	TLV	= Threshold Limit Value
R	= Respirable	TWA	= Time Weighted Average
Z	= OSHA 29CFR 1910.1200 Subpart Z - Toxic and Hazardous Substances		

8 . Exposure controls/personal protection

Consult local authorities for acceptable exposure limits.

Recommended monitoring procedures : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.

Engineering measures : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal protection

Eyes : Safety glasses with side shields.

Hands : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

Gloves : butyl rubber

Respiratory : If workers are exposed to concentrations above the exposure limit, they must use appropriate, certified respirators. Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Skin : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

9 . Physical and chemical properties

Physical state	: Liquid.
Flash point	: Closed cup: 43.33°C (110°F)
Explosion limits	: Lower: 1.1%
Color	: Not available.
Odor	: Not available.
pH	: Not available.
Boiling/condensation point	: >37.78°C (>100°F)
Melting/freezing point	: Not available.
Specific gravity	: 1.2
Density (lbs / gal)	: 10.01
Vapor pressure	: 0.56 kPa (4.2 mm Hg) [20°C]
Vapor density	: Not available.
Volatility	: 16% (v/v), 10.48% (w/w)
Evaporation rate	: 0.23 (butyl acetate = 1)
Partition coefficient: n-octanol/water	: Not available.
% Solid. (w/w)	: 89.52

10 . Stability and reactivity

- Stability** : The product may not be stable under certain conditions of storage or use.
- Conditions to avoid** : Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Avoid increased storage temperature. Pressure hazard
- Materials to avoid** : Reactive or incompatible with the following materials:.,water,acids,oxidizing materials,strong alkalis
- Hazardous decomposition products** : Under normal conditions of storage and use, hazardous decomposition products should not be produced.
- Hazardous polymerization** : Under normal conditions of storage and use, hazardous polymerization will not occur.

11 . Toxicological information

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Epoxy Resin (MW<=700)	LD50 Oral	Rat	>2 g/kg	-
	LD50 Dermal	Rabbit	>2 g/kg	-
2,3-epoxypropyl neodecanoate	LD50 Oral	Rat	9.6 g/kg	-
Stoddard solvent	LD50 Oral	Rat	>5 g/kg	-
ethanol	LD50 Oral	Rat	7 g/kg	-
	LC50 Inhalation	Rat	124700 mg/m3	4 hours

Conclusion/Summary : Not available.

Chronic toxicity

Conclusion/Summary : Not available.

Defatting irritant

: Prolonged or repeated contact can defat the skin and lead to irritation, cracking and/or dermatitis.

Target organs

: Contains material which causes damage to the following organs: brain, eye, lens or cornea.
Contains material which may cause damage to the following organs: kidneys, lungs, the nervous system, liver, upper respiratory tract, skin, central nervous system (CNS), testes.

Carcinogenicity

Classification

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA
Aluminium powder (stabilized)	A4	-	-	-	-	-

12 . Ecological information

Environmental effects : Water polluting material. May be harmful to the environment if released in large quantities.

Aquatic ecotoxicity

Product/ingredient name	Result	Species	Exposure
Aluminium powder (stabilized)	Acute LC50 120 ug/L Fresh water	Fish - Rainbow trout,donaldson trout - Oncorhynchus mykiss	96 hours
ethanol	Acute LC50 42000 ug/L Fresh water	Fish - Rainbow trout,donaldson trout - Oncorhynchus mykiss	4 days
	Acute EC50 2000 ug/L Fresh water	Daphnia - Water flea - Daphnia magna	48 hours
	Chronic NOEC <6.3 g/L Fresh water	Daphnia - Water flea - Daphnia magna	48 hours

13 . Disposal considerations

Waste disposal : The generation of waste should be avoided or minimized wherever possible. Significant quantities of waste product residues should not be disposed of via the foul sewer but processed in a suitable effluent treatment plant. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Vapor from product residues may create a highly flammable or explosive atmosphere inside the container. Do not cut, weld or grind used containers unless they have been cleaned thoroughly internally. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Disposal should be in accordance with applicable regional, national and local laws and regulations.
Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees. Section 6. Accidental release measures

14 . Transport information

Regulation	UN number	Proper shipping name	Classes	PG*	Additional information
UN	1263	PAINT	3	III	-
IMDG	1263	PAINT. Marine pollutant (Epoxy Resin (MW<=700), 2,3-epoxypropyl neodecanoate)	3	III	-
DOT	1263	PAINT	3	III	Remarks USA Only: Can be reclassified as Combustible Liquid. Non-Bulk highway shipments (Less than or Equal to 450Liters) can be shipped as non-regulated.

PG* : Packing group
Reportable quantity RQ : CERCLA: Hazardous substances.: No products were found.

15 . Regulatory information

- United States inventory (TSCA 8b)** : All components are listed or exempted.
- Australia inventory (AICS)** : All components are listed or exempted.
- Canada inventory (DSL)** : All components are listed or exempted.
- China inventory (IECSC)** : All components are listed or exempted.
- Europe inventory (REACH)** : Please contact your supplier for information on the inventory status of this material.
- Japan inventory (ENCS)** : All components are listed or exempted.
- Korea inventory (KECI)** : All components are listed or exempted.
- New Zealand (NZIoC)** : All components are listed or exempted.
- Philippines inventory (PICCS)** : All components are listed or exempted.

United States

- U.S. Federal regulations** :
 - SARA 302/304/311/312 extremely hazardous substances:** No products were found.
 - SARA 302/304 emergency planning and notification:** No products were found.
 - SARA 302/304/311/312 hazardous chemicals:** Stoddard solvent; Aluminium powder (stabilized)
 - CERCLA: Hazardous substances.: No products were found.

SARA 311/312 MSDS Distribution - Chemical Inventory - Hazard Identification:

<u>Chemical name</u>	<u>CAS #</u>	<u>Acute</u>	<u>Chronic</u>	<u>Fire</u>	<u>Reactive</u>	<u>Pressure</u>
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15. Regulatory information

Epoxy Resin (MW<=700)	25068-38-6	Y	N	N	N	N
Aluminium powder (stabilized)	7429-90-5	N	N	N	Y	N
2,3-epoxypropyl neodecanoate	26761-45-5	Y	N	N	N	N
Stoddard solvent	8052-41-3	Y	N	Y	N	N
Product as-supplied :		Y	N	Y	Y	N

SARA 313	Chemical name	CAS number	Concentration
Supplier notification	: Aluminium powder (stabilized)	7429-90-5	10 - 30

Additional environmental information is contained on the Environmental Data Sheet for this product, which can be obtained from your PPG representative.

Canada

WHMIS (Canada) : Class B-3: Combustible liquid with a flash point between 37.8°C (100°F) and 93.3°C (200°F). Class D-2B: Material causing other toxic effects (Toxic).

Mexico

Classification

Flammability : 2 **Health** : 2 **Reactivity** : 1

16. Other information

Hazardous Material Information System (U.S.A.)

Health : 2 **Flammability** : 2 **Physical hazards** : 1

(*) - Chronic effects

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings are not required on MSDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

National Fire Protection Association (U.S.A.)

Health : 2 **Flammability** : 2 **Instability** : 1

Date of previous issue : 5/22/2011.

Organization that prepared the MSDS : EHS

☑ Indicates information that has changed from previously issued version.

Disclaimer

The information contained in this data sheet is based on present scientific and technical knowledge. The purpose of this information is to draw attention to the health and safety aspects concerning the products supplied by PPG, and to recommend precautionary measures for the storage and handling of the products. No warranty or guarantee is given in respect of the properties of the products. No liability can be accepted for any failure to observe the precautionary measures described in this data sheet or for any misuse of the products.

SAFETY DATA SHEET

Version 4.10
 Revision Date 03/04/2014
 Print Date 03/05/2014

1. PRODUCT AND COMPANY IDENTIFICATION

Product name	: Antimony	
Product Number	: 266329	
Brand	: Aldrich	
Product Use	: For laboratory research purposes.	
Supplier	: Sigma-Aldrich Canada Co. 2149 Winston Park Drive OAKVILLE ON L6H 6J8 CANADA	Manufacturer : Sigma-Aldrich Corporation 3050 Spruce St. St. Louis, Missouri 63103 USA
Telephone	: +1 9058299500	
Fax	: +1 9058299292	
Emergency Phone # (For both supplier and manufacturer)	: 1-800-424-9300	
Preparation Information	: Sigma-Aldrich Corporation Product Safety - Americas Region 1-800-521-8956	

2. HAZARDS IDENTIFICATION

Emergency Overview

Target Organs

Heart, Respiratory system

WHMIS Classification

D1B Toxic Material Causing Immediate and Serious Toxic Effects Toxic by inhalation.

GHS Classification

Acute toxicity, Oral (Category 4)
 Acute toxicity, Inhalation (Category 4)
 Acute aquatic toxicity (Category 2)
 Chronic aquatic toxicity (Category 2)

GHS Label elements, including precautionary statements

Pictogram



Signal word

Warning

Hazard statement(s)

H302 + H332 Harmful if swallowed or if inhaled
 H411 Toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P273 Avoid release to the environment.

HMIS Classification

Health hazard: 2
 Chronic Health Hazard: *
 Flammability: 0

Physical hazards:	0
Potential Health Effects	
Inhalation	Toxic if inhaled. May cause respiratory tract irritation.
Skin	Harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.
Ingestion	Harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : Sb
Molecular Weight : 121.76 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
Antimony			
7440-36-0	231-146-5	-	<=100%

4. FIRST AID MEASURES

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIREFIGHTING MEASURES

Conditions of flammability

Not flammable or combustible.

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for firefighters

Wear self contained breathing apparatus for fire fighting if necessary.

Hazardous combustion products

Hazardous decomposition products formed under fire conditions. - Antimony oxide

Explosion data - sensitivity to mechanical impact

no data available

Explosion data - sensitivity to static discharge

no data available

6. ACCIDENTAL RELEASE MEASURES

Personal precautions

Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Avoid breathing dust.

Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.

Conditions for safe storage

Keep container tightly closed in a dry and well-ventilated place.

Air sensitive. Moisture sensitive. Handle and store under inert gas. Keep in a dry place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value	Control parameters	Basis
Antimony	7440-36-0	TWA	0.5 mg/m ³	Canada. Alberta, Occupational Health and Safety Code (table 2: OEL)
Remarks	Occupational exposure limit is based on irritation effects and its adjustment to compensate for unusual work schedules is not required			
		TWA	0.5 mg/m ³	Canada. British Columbia OEL
		TWAEV	0.5 mg/m ³	Canada. Ontario OELs
		TWAEV	0.5 mg/m ³	Québec. Regulation respecting occupational health and safety, Schedule 1, Part 1: Permissible exposure values for airborne contaminants
		TWA	0.5 mg/m ³	USA. ACGIH Threshold Limit Values (TLV)

Personal protective equipment

Respiratory protection

For nuisance exposures use type P95 (US) or type P1 (EU EN 143) particle respirator. For higher level protection use type OV/AG/P99 (US) or type ABEK-P2 (EU EN 143) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm

Break through time: 480 min

Material tested: Dermatrill® (KCL 740 / Aldrich Z677272, Size M)

Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm

Break through time: 480 min

Material tested: Dermatrill® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Eye protection

Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin and body protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Hygiene measures

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Specific engineering controls

Use mechanical exhaust or laboratory fumehood to avoid exposure.

9. PHYSICAL AND CHEMICAL PROPERTIES**Appearance**

Form	powder
Colour	no data available

Safety data

pH	no data available
Melting point/freezing point	Melting point/range: 630 °C (1,166 °F) - lit.
Boiling point	1,635 °C (2,975 °F) - lit.
Flash point	not applicable
Ignition temperature	no data available
Auto-ignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Vapour pressure	no data available
Density	6.69 g/cm ³ at 25 °C (77 °F)
Water solubility	no data available
Partition coefficient: n-octanol/water	no data available
Relative vapour density	no data available
Odour	no data available
Odour Threshold	no data available
Evaporation rate	no data available

10. STABILITY AND REACTIVITY**Chemical stability**

Stable under recommended storage conditions.

Possibility of hazardous reactions

no data available

Conditions to avoid

no data available

Materials to avoid

Oxidizing agents, acids, Highly toxic fumes

Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Antimony oxide

Other decomposition products - no data available

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Oral LD50

Inhalation LC50

no data available

Dermal LD50

no data available

Other information on acute toxicity

no data available

Skin corrosion/irritation

no data available

Serious eye damage/eye irritation

no data available

Respiratory or skin sensitisation

no data available

Germ cell mutagenicity

no data available

Carcinogenicity

Carcinogenicity - rat - Inhalation

Tumorigenic: Carcinogenic by RTECS criteria. Lungs, Thorax, or Respiration: Tumors.

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

Reproductive toxicity

no data available

Teratogenicity

no data available

Specific target organ toxicity - single exposure (Globally Harmonized System)

no data available

Specific target organ toxicity - repeated exposure (Globally Harmonized System)

no data available

Aspiration hazard

no data available

Potential health effects

Inhalation

Toxic if inhaled. May cause respiratory tract irritation.

Ingestion

Harmful if swallowed.

Skin

Harmful if absorbed through skin. May cause skin irritation.

Eyes

May cause eye irritation.

Signs and Symptoms of Exposure

Nausea, Vomiting, Headache, Dizziness

Synergistic effects

no data available

Additional Information

RTECS: CC4025000

12. ECOLOGICAL INFORMATION

Toxicity

Toxicity to fish mortality NOEC - Cyprinodon variegatus (sheepshead minnow) - 6.2 mg/l - 96.0 h
LC50 - Cyprinodon variegatus (sheepshead minnow) - 6.2 - 8.3 mg/l - 96.0 h

Persistence and degradability

no data available

Bioaccumulative potential

no data available

Mobility in soil

no data available

PBT and vPvB assessment

no data available

Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

Product

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 2871 Class: 6.1 Packing group: III
Proper shipping name: Antimony powder
Reportable Quantity (RQ): 5000 lbs
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG

UN number: 2871 Class: 6.1 Packing group: III EMS-No: F-A, S-A
Proper shipping name: ANTIMONY POWDER
Marine pollutant: No

IATA

UN number: 2871 Class: 6.1 Packing group: III
Proper shipping name: Antimony powder

15. REGULATORY INFORMATION

WHMIS Classification

D1B Toxic Material Causing Immediate and Serious Toxic by inhalation.
Toxic Effects

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

16. OTHER INFORMATION

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Material Safety Data Sheet



Argon

Section 1. Chemical product and company identification

Product name : Argon
Supplier : AIRGAS INC., on behalf of its subsidiaries
259 North Radnor-Chester Road
Suite 100
Radnor, PA 19087-5283
1-610-687-5253
Product use : Synthetic/Analytical chemistry.
Synonym : argon, compressed; Cryogenic Liquid Argon, Liquid Argon
MSDS # : 001004
Date of Preparation/Revision : 5/6/2013.
In case of emergency : 1-866-734-3438

Section 2. Hazards identification

Physical state : Gas. [COLORLESS, ODORLESS INERT GAS OR LIQUID]
Emergency overview : WARNING!
GAS:
CONTENTS UNDER PRESURE.
Do not puncture or incinerate container.
Can cause rapid suffocation.
May cause severe frostbite.
LIQUID:
Extremely cold liquid and gas under pressure.
Can cause rapid suffocation.
May cause severe frostbite.
Do not puncture or incinerate container.
Contact with rapidly expanding gases or liquids can cause frostbite.
Routes of entry : Inhalation
Potential acute health effects
Eyes : Contact with rapidly expanding gas may cause burns or frostbite. Contact with cryogenic liquid can cause frostbite and cryogenic burns.
Skin : Contact with rapidly expanding gas may cause burns or frostbite. Contact with cryogenic liquid can cause frostbite and cryogenic burns.
Inhalation : Acts as a simple asphyxiant.
Ingestion : Ingestion is not a normal route of exposure for gases. Contact with cryogenic liquid can cause frostbite and cryogenic burns.
Medical conditions aggravated by over-exposure : Acute or chronic respiratory conditions may be aggravated by overexposure to this gas.

See toxicological information (Section 11)

Section 3. Composition, Information on Ingredients

<u>Name</u>	<u>CAS number</u>	<u>% Volume</u>	<u>Exposure limits</u>
Argon	7440-37-1	100	Oxygen Depletion [Asphyxiant]

Section 4. First aid measures

No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

- Eye contact** : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.
- Skin contact** : None expected.
- Frostbite** : Try to warm up the frozen tissues and seek medical attention.
- Inhalation** : Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.
- Ingestion** : As this product is a gas, refer to the inhalation section.

Section 5. Fire-fighting measures

- Flammability of the product** : Non-flammable.
- Products of combustion** : No specific data.
- Fire-fighting media and instructions** : Use an extinguishing agent suitable for the surrounding fire.

Apply water from a safe distance to cool container and protect surrounding area. If involved in fire, shut off flow immediately if it can be done without risk.

Contains gas under pressure. In a fire or if heated, a pressure increase will occur and the container may burst or explode.
- Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

- Personal precautions** : Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment (section 8). Shut off gas supply if this can be done safely. Isolate area until gas has dispersed.
- Environmental precautions** : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.
- Methods for cleaning up** : Immediately contact emergency personnel. Stop leak if without risk. Note: see section 1 for emergency contact information and section 13 for waste disposal.

Section 7. Handling and storage

- Handling** : High pressure gas. Do not puncture or incinerate container. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement.
Never allow any unprotected part of the body to touch uninsulated pipes or vessels that contain cryogenic liquids. Prevent entrapment of liquid in closed systems or piping without pressure relief devices. Some materials may become brittle at low temperatures and will easily fracture.
- Storage** : Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 52 °C (125 °F).
For additional information concerning storage and handling refer to Compressed Gas Association pamphlets P-1 Safe Handling of Compressed Gases in Containers and P-12 Safe Handling of Cryogenic Liquids available from the Compressed Gas Association, Inc.

Section 8. Exposure controls/personal protection

- Engineering controls** : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.
- Personal protection**
- Eyes** : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts.
When working with cryogenic liquids, wear a full face shield.
- Skin** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Respiratory** : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.
The applicable standards are (US) 29 CFR 1910.134 and (Canada) Z94.4-93
- Hands** : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.
Insulated gloves suitable for low temperatures
- Personal protection in case of a large spill** : Self-contained breathing apparatus (SCBA) should be used to avoid inhalation of the product.

Product name

argon Oxygen Depletion [Asphyxiant]

Consult local authorities for acceptable exposure limits.

Section 9. Physical and chemical properties

- Molecular weight** : 39.95 g/mole
- Molecular formula** : Ar
- Boiling/condensation point** : -185.7°C (-302.3°F)
- Melting/freezing point** : -189.2°C (-308.6°F)
- Critical temperature** : -122.4°C (-188.3°F)
- Vapor density** : 1.38 (Air = 1). Liquid Density@BP: 87 lb/ft³ (1393 kg/m³)
- Specific Volume (ft³/lb)** : 9.70874
- Gas Density (lb/ft³)** : 0.103

Section 10. Stability and reactivity

- Stability and reactivity** : The product is stable.
- Hazardous decomposition products** : Under normal conditions of storage and use, hazardous decomposition products should not be produced.
- Hazardous polymerization** : Under normal conditions of storage and use, hazardous polymerization will not occur.

Section 11. Toxicological information

Toxicity data

- Other toxic effects on humans** : No specific information is available in our database regarding the other toxic effects of this material to humans.
- Specific effects**
- Carcinogenic effects** : No known significant effects or critical hazards.
- Mutagenic effects** : No known significant effects or critical hazards.
- Reproduction toxicity** : No known significant effects or critical hazards.

Section 12. Ecological information

Aquatic ecotoxicity

Not available.

Environmental fate : Not available.




Environmental hazards : No known significant effects or critical hazards.

Toxicity to the environment : Not available.

Section 13. Disposal considerations

Product removed from the cylinder must be disposed of in accordance with appropriate Federal, State, local regulation. Return cylinders with residual product to Airgas, Inc. Do not dispose of locally.

Section 14. Transport information

Regulatory information	UN number	Proper shipping name	Class	Packing group	Label	Additional information
DOT Classification	UN1006	ARGON, COMPRESSED	2.2	Not applicable (gas).		Limited quantity Yes.
	UN1951	Argon, refrigerated liquid				Packaging instruction Passenger aircraft Quantity limitation: 75 kg Cargo aircraft Quantity limitation: 150 kg
TDG Classification	UN1006	ARGON, COMPRESSED	2.2	Not applicable (gas).		Explosive Limit and Limited Quantity Index 0.125
	UN1951	Argon, refrigerated liquid				Passenger Carrying Road or Rail Index 75 Special provisions 42
Mexico Classification	UN1006	ARGON, COMPRESSED	2.2	Not applicable (gas).		-
	UN1951	Argon, refrigerated liquid				-

“Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product.”

Section 15. Regulatory information

United States

- U.S. Federal regulations** : TSCA 8(a) IUR: argon
United States inventory (TSCA 8b): This material is listed or exempted.
SARA 302/304/311/312 extremely hazardous substances: No products were found.
SARA 302/304 emergency planning and notification: No products were found.
SARA 302/304/311/312 hazardous chemicals: argon
SARA 311/312 MSDS distribution - chemical inventory - hazard identification: argon: Sudden release of pressure
Clean Water Act (CWA) 307: No products were found.
Clean Water Act (CWA) 311: No products were found.
- Clean Air Act (CAA) 112 regulated flammable substances**: No products were found.
Clean Air Act (CAA) 112 regulated toxic substances: No products were found.
- State regulations** : **Connecticut Carcinogen Reporting**: This material is not listed.
Connecticut Hazardous Material Survey: This material is not listed.
Florida substances: This material is not listed.
Illinois Chemical Safety Act: This material is not listed.
Illinois Toxic Substances Disclosure to Employee Act: This material is not listed.
Louisiana Reporting: This material is not listed.
Louisiana Spill: This material is not listed.
Massachusetts Spill: This material is not listed.
Massachusetts Substances: This material is listed.
Michigan Critical Material: This material is not listed.
Minnesota Hazardous Substances: This material is not listed.
New Jersey Hazardous Substances: This material is listed.
New Jersey Spill: This material is not listed.
New Jersey Toxic Catastrophe Prevention Act: This material is not listed.
New York Acutely Hazardous Substances: This material is not listed.
New York Toxic Chemical Release Reporting: This material is not listed.
Pennsylvania RTK Hazardous Substances: This material is listed.
Rhode Island Hazardous Substances: This material is not listed.

Canada

- WHMIS (Canada)** : Class A: Compressed gas.
CEPA Toxic substances: This material is not listed.
Canadian ARET: This material is not listed.
Canadian NPRI: This material is not listed.
Alberta Designated Substances: This material is not listed.
Ontario Designated Substances: This material is not listed.
Quebec Designated Substances: This material is not listed.

Section 16. Other information

United States

- Label requirements** : **GAS**:
CONTENTS UNDER PRESURE.
Do not puncture or incinerate container.
Can cause rapid suffocation.
May cause severe frostbite.
LIQUID:
Extremely cold liquid and gas under pressure.
Can cause rapid suffocation.
May cause severe frostbite.

Canada

- Label requirements** : Class A: Compressed gas.

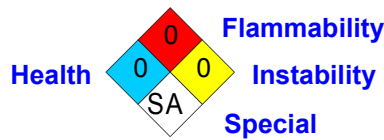
Hazardous Material Information System (U.S.A.) :

Health	0
Flammability	0
Physical hazards	0

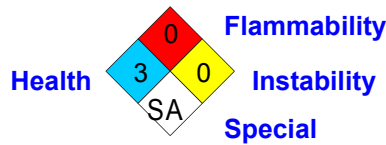
liquid:

Health	3
Fire hazard	0
Reactivity	0
Personal protection	C

National Fire Protection Association (U.S.A.) :



liquid:



Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

ARSENIC**PRODUCT IDENTIFICATION**

Chemical Name and Synonyms: Arsenic metal, granules
Chemical Family: Metal
Chemical Formula: As
Product Use: Laboratory reagent
Manufacturers Name and Address: Caledon Laboratories Ltd. 40
Armstrong Avenue Georgetown, Ontario L7G 4R9
Telephone No: (905) 877-0101
Fax No: (905) 877-6666
Emergency Telephone No: CANUTEC (613) 996-6666

HAZARDOUS INGREDIENTS OF MATERIALS

Ingredients, %, TLV Units, CAS No: Arsenic, 99.99, 0.01 mg/m³,
7440-38-2

PHYSICAL DATA

Physical State: Solid
Odour and Appearance: Silver-grey, brittle, crystalline solid, odourless.
Odour Threshold (ppm): Not applicable.
Vapour Pressure (mm Hg): ~ 0
Vapour Density (Air = 1): Not applicable.
Evaporation Rate: Not applicable.
Boiling Point (degrees C): Not applicable (sublimes)
Melting Point (degrees C): 613 °C (sublimes)
pH: Not applicable.
Specific Gravity: 5.727 at 14 °C
Coefficient of Water/Oil distribution: Not applicable.

SHIPPING DESCRIPTION

UN: 1558
T.D.G. Class: 6.1
Pkg. Group: II

REACTIVITY DATA

Incompatibility with other substances: May react violently or explosively with acids, oxidizing agents, halogens, halogen gases, halides, halogenates.
Reactivity: Avoid excessive heat, generation of dust, exposure to air, all incompatible materials.
Hazardous Decomposition Products: Arsenic oxides, highly toxic arsine gas.

FIRE AND EXPLOSION DATA

Flammability: Not combustible. As dust, presents slight explosion hazard when exposed to flame.
Extinguishing Media: Carbon dioxide, dry chemical, alcohol or polymer foam. Fight fire from a safe distance and from upwind. Firefighters should wear self-contained breathing apparatus and protective clothing sufficient to prevent contact.
Flash Point (Method Used): Not applicable.
Autoignition Temperature: Not applicable.
Upper Flammable Limit (% by volume): Not applicable.
Lower Flammable Limit (% by volume): Not applicable.
Hazardous Combustion Products: Produces poisonous fumes at high temperatures.
Sensitivity to Impact: None identified.

Sensitivity to Static discharge: Mixtures of dust with air may be sensitive under certain conditions, when ignited by an electrostatic or other high-voltage spark, or other ignition source.

TOXICOLOGICAL PROPERTIES AND HEALTH DATA**Toxicological Data:**

LD50: (oral, rat) 763 mg/kg

LC50: Not available.

Effects of Acute Exposure to Product:

Inhaled: Toxic. Inhalation of fumes or dust may cause irritation of respiratory tract, perforated septum, gastrointestinal disturbances and in severe overexposures, may be fatal. Absorption into the body leads to the formation of methemoglobin which in sufficient concentration causes cyanosis. Onset of symptoms may be delayed for several hours.

In contact with skin: Toxic if absorbed. Not a normal route of exposure.

In contact with eyes: Not a normal route of exposure.

Ingested: Not a normal route of exposure. Harmful if ingested in sufficient quantities.

Effects of Chronic Exposure to Product: Chronic overexposure to arsenic compounds may cause skin and eye irritation, peripheral neuritis of the hands and feet, increased risk of lung and skin cancer, damage to liver, kidneys, and nervous system. Symptoms of chronic exposure include weight loss, nausea, diarrhea, weakness, loss of appetite, skin lesions.

Carcinogenicity: Carcinogenicity designation A1, confirmed human carcinogen (ACGIH, IARC, NTP)

Teratogenicity: Developmental abnormalities, pre and post-implantation mortality in testing with rats (RTECS No. CG0525000)

Reproductive Effects: No information available.

Mutagenicity: No information available.

Synergistic Products: None known.

PREVENTIVE MEASURES

Engineering Controls: Local exhaust ventilation required.

Respiratory Protection: Dust mask. Use only in a chemical fumehood. At concentrations above the NIOSH Recommended Exposure Limit (0.002 mg/m³), or at any detectable concentration, NIOSH-approved positive-pressure, full face-piece self-contained breathing apparatus, or positive-pressure, full face-piece supplied-air respirator with auxiliary positive-pressure self-contained breathing apparatus. Do not breathe mist or vapours.

Skin Protection: Rubber gloves. Other protective clothing, sleeves, apron, boots, or coveralls, sufficient to prevent contact.

Other Personal Protective Equipment: An eyewash and safety shower should be nearby and ready for use.

Leak and Spill Procedure: Cleanup personnel must be thoroughly trained in the handling of hazardous materials, and must wear protective equipment and clothing sufficient to prevent any contact or inhalation. Mix with dry lime, soda ash or other inert material. Clean up using a method that does not generate dust. Transfer carefully into container and arrange removal by disposal company. Wash site of spillage thoroughly with detergent and copious amounts of water.

Waste Disposal: Follow all federal, provincial and local regulations.

ARSENIC

Handling Procedures and Equipment: VERY TOXIC, CARCINOGEN, TERATOGEN. Workers using this material should be thoroughly trained in its hazards and its safe use, and must wear appropriate protective equipment and clothing. Follow routine safe handling and good housekeeping procedures. Use the smallest amount possible for the purpose, in a designated area with suitable ventilation. Use good housekeeping procedures to prevent accumulation of dust. Avoid inhalation and contact with skin and eyes. Keep away from incompatible materials.

Storage Requirements: Store in cool, dry, well-ventilated area, out of direct sunlight, and away from heat or ignition sources and incompatible materials. Store away from incompatible material. Keep containers tightly closed. Protect from moisture. Protect from damage.

FIRST AID MEASURES**Specific Measures:**

Eyes: Unlikely route of exposure. Flush eyes thoroughly with gently running water for at least fifteen (15) minutes, holding eyelids open while flushing. Get medical attention if irritation develops.

Skin: Unlikely route of exposure. Remove contaminated clothing. Brush or wipe off dry material. Wash skin with plenty of running water for five to ten (5 to 10) minutes, or until no trace of chemical remains. If irritation develops get medical attention.

Inhalation: IMMEDIATELY remove casualty from contaminated area to fresh air (caution must be used by rescuers to avoid exposure to contaminating fumes). Give oxygen and get medical attention for any breathing difficulty. If breathing has stopped, give artificial respiration. Get medical attention. Onset of symptoms may be delayed; if victim feels unwell during the next 24 hours, get medical attention immediately.

Ingestion: Unlikely route of exposure. If casualty is alert and NOT convulsing, rinse mouth with water and give 1 to 2 cups of water to drink to dilute material. Get medical attention. If spontaneous vomiting occurs, rinse mouth and give more water to drink. Onset of symptoms may be delayed; if victim feels unwell during the next 24 hours, get medical attention.

REFERENCES USED

Budavari: The Merck Index, 12th ed., 1997

CCINFO disc: Cheminfo, MSDSs

Sax: Dangerous Properties of Industrial Materials, 5th ed., 1979

Sax, Lewis: Hawleys Condensed Chemical Dictionary, 11th ed., 1987

Suppliers Material Safety Data Sheets:

ADDITIONAL INFORMATION

Date Issued: 15-Jul-91

Revision: Sep 2013

Proposed WHMIS Designation: D1B; D2A

Prepared by: Caledon Laboratories Ltd. (905) 877-0101

BISMUTH

PRODUCT IDENTIFICATION**Chemical Name and Synonyms:** Bismuth.**Chemical Family:** Metal**Chemical Formula:** Bi**Product Use:** Laboratory reagent**Manufacturers Name and Address:** Caledon Laboratories Ltd. 40
Armstrong Avenue Georgetown, Ontario L7G 4R9**Telephone No:** (905) 877-0101**Fax No:** (905) 877-6666**Emergency Telephone No:** CANUTEC (613) 996-6666**HAZARDOUS INGREDIENTS OF MATERIALS****Ingredients, %, TLV Units, CAS No:** Bismuth, > 99, 0.5 mg/m³,
7440-69-9**PHYSICAL DATA****Physical State:** Solid**Odour and Appearance:** Silvery shot with bright lustre, odourless.**Odour Threshold (ppm):** Not applicable.**Vapour Pressure (mm Hg):** < 0.1 mm at 20 °C**Vapour Density (Air = 1):** Not applicable.**Evaporation Rate:** Not applicable.**Boiling Point (degrees C):** 1564 °C**Melting Point (degrees C):** 272 °C**pH:** Not available.**Specific Gravity:** 9.8**Coefficient of Water/Oil distribution:** Not available.**SHIPPING DESCRIPTION****UN:** Not regulated.**T.D.G. Class:** Not regulated.**Pkg. Group:** Not regulated.**REACTIVITY DATA****Chemical Stability:** May decompose on exposure to air.**Incompatibility with other substances:** Oxidizing agents, halogens,
acids. Molten bismuth reacts violently with concentrated nitric acid.**Reactivity:** May decompose on exposure to air. Avoid excessive heat,
ignition sources, generation of dust.**Hazardous Decomposition Products:** Forms bismuth oxide fume at
elevated temperatures.**FIRE AND EXPLOSION DATA****Flammability:** Non flammable in air. Burns spontaneously in gaseous
chlorine. As with most organic compounds, fine dust dispersed in air in
the presence of an ignition source is a potential dust explosion hazard.**Extinguishing Media:** Use any means suitable for surrounding fire. Do
not use water where molten metal is present. Fight fire from a safe
distance and from upwind. Firefighters should wear self-contained
breathing apparatus and protective clothing sufficient to prevent contact.
Use any means suitable for surrounding fire.**Flash Point (Method Used):** Not applicable.**Autoignition Temperature:** Not applicable.**Upper Flammable Limit (% by volume):** Not applicable.**Lower Flammable Limit (% by volume):** Not applicable.**Hazardous Combustion Products:** Emits toxic bismuth oxide fumes in
fire conditions.**Sensitivity to Impact:** None**Sensitivity to Static discharge:** Under certain conditions, dust/air
mixtures can explode if in contact with an electrostatic spark or other
ignition source.**TOXICOLOGICAL PROPERTIES AND HEALTH DATA****Toxicological Data:****LD50:** (oral, rat) 5 g/kg; (oral, mouse) 10 g/kg**LC50:** Not available.**Effects of Acute Exposure to Product:****Inhaled:** May be harmful. Dust is irritating to mucous membranes,
causing coughing, shortness of breath. Over- exposure to fumes from
molten material may cause metal fume fever; symptoms resemble
influenza and occur several hours after exposure. Symptoms include
chills, lassitude, fatigue, headache, low back pain, muscle ache, chest
tightness and dry cough. The symptoms are reversible and subside after
6 to 12 hours. There is no long-term illness resulting from metal fume
fever.**In contact with skin:** Dust may cause irritation.**In contact with eyes:** Dust will cause mechanical irritation, reddening,
tearing.**Ingested:** May cause irritation. Not a normal route of exposure. Low
toxicity. Excessive ingestion of bismuth salts can cause loss of appetite,
headache, skin rashes, kidney damage.**Effects of Chronic Exposure to Product:** Prolonged or repeated
ingestion of bismuth salts can cause excessive salivation, bad breath,
gingivitis, bismuth line or black spots o gums, liver and kidney damage.**Carcinogenicity:** Not listed by IARC, ACGIH, NTP.**Teratogenicity:** No information available.**Reproductive Effects:** No information available.**Mutagenicity:** No information available.**Synergistic Products:** None known.**PREVENTIVE MEASURES****Engineering Controls:** Local exhaust ventilation required.**Respiratory Protection:** Dust mask in dusty conditions. NIOSH approved
respirator when working with molten metal, or for exposures exceeding
TLV. In high or unknown concentrations, as in fire or spill conditions,
NIOSH approved respirator or self-contained breathing apparatus.**Eye Protection:** Chemical safety glasses or goggles. Face shield (8-inch
minimum).**Skin Protection:** Wear protective gloves and clean body-covering
clothing sufficient to limit contact.**Other Personal Protective Equipment:** Safety shower and eye wash
fountain readily available in work area.**Leak and Spill Procedure:** Ventilate area and restrict access. Cleanup
personnel must be thoroughly trained in the handling of hazardous
materials, and must wear protective equipment and clothing sufficient to
prevent any contact or inhalation. Gather up carefully, in a manner that
avoids raising dust, and place in covered container for waste disposal.
Contain spill with inert absorbent material. Flush area of spill thoroughly
with copious amounts of running water.**Waste Disposal:** Dispose of in compliance with local, provincial and
federal regulations.

Handling Procedures and Equipment: Combustible dust. Workers using this chemical must be properly trained in its hazards and its safe use. Wear appropriate protective clothing and equipment. Avoid generating dust. If dust is present, use non-sparking tools, and ground and bond containers where static electricity may be generated. Use the smallest amount possible for the purpose in an area with adequate ventilation. Maintain good housekeeping procedures to avoid accumulation of dust. Avoid contact with skin and eyes. Avoid inhalation. Wash thoroughly after handling.

Storage Requirements: Store in cool, dry, well-ventilated area, out of direct sunlight, and away from heat or ignition sources and incompatible materials. Store away from incompatible material.

FIRST AID MEASURES

Specific Measures:

Eyes: Flush eyes thoroughly with gently running water for at least fifteen (15) minutes, holding eyelids open while flushing. Get medical attention if irritation persists.

Skin: Remove contaminated clothing. Brush or wipe off dry material. Flush skin with plenty of running water until no evidence of chemical remains. If irritation persists, get medical attention.

Inhalation: Remove to fresh air. Give oxygen and get medical attention for any breathing difficulty.

Ingestion: If victim is alert and NOT convulsing, rinse mouth, give several glasses of water to drink to dilute. If discomfort occurs, or if a large amount has been ingested, get medical attention.

REFERENCES USED

Budavari: The Merck Index, 12th ed., 1997

Sax: Dangerous Properties of Industrial Materials, 5th ed., 1979

Sax, Lewis: Hawleys Condensed Chemical Dictionary, 11th ed., 1987

Suppliers Material Safety Data Sheets:

ADDITIONAL INFORMATION

Date Issued: 20-May-91

Revision: Nov 2013

Proposed WHMIS Designation: Not a controlled product. Not required to be updated every three years (WHMIS 1992, B-40, Section 29,2).

Prepared by: Caledon Laboratories Ltd. (905) 877-0101



MATERIAL SAFETY DATA SHEET

Page 1 of 6

BK10014T - BAKOR 100-14 FIBRATED EMULSION INSULATION COATING

1. Product And Company Identification			
Supplier HENRY COMPANY 999 N. Sepulveda Blvd., Suite 800 El Segundo, CA 90245-2716 Company Contact: Technical Services Telephone Number: (800) 486-1278 Web Site: www.henry.com www.bakor.com		Manufacturer HENRY COMPANY 999 N. Sepulveda Blvd., Suite 800 El Segundo, CA 90245-2716 Company Contact: Technical Services Telephone Number: (800) 486-1278 Web Site: www.henry.com www.bakor.com	
Supplier Emergency Contacts & Phone Number CHEMTREC: (800) 424-9300 CHEMTREC: (703) 527-3887 CANUTEC: (613) 996-6666		Manufacturer Emergency Contacts & Phone Number CHEMTREC: (800) 424-9300 CHEMTREC: (703) 527-3887 CANUTEC: (613) 996-6666	
Issue Date: 08/16/2013 Product Name: BK10014T - BAKOR 100-14 FIBRATED EMULSION INSULATION COATING Product Code: BK10014T			
2. Composition/Information On Ingredients			
Ingredient Name		CAS Number	Percent Of Total Weight
asphalt, petroleum		8052-42-4	30 - 50
attapulgite		12174-11-7	1 - 5
bentonite		1302-78-9	1 - 5
kaolin		1332-58-7	5 - 10
silica, quartz		14808-60-7	0.1 - 1
stoddard solvent		8052-41-3	1 - 5
water		7732-18-5	30 - 50
Substances in this product have been pre-registered in accordance with the REACH Regulation - (EC) No. 1907/2006. See Section 15 for additional information.			
EMERGENCY OVERVIEW			
CAUTION! Vapor may cause light-headedness, headache, nausea, loss of coordination and respiratory tract irritation. Causes skin irritation.			
Appearance/Odor: Black dispersion, petroleum and wood-like odor			
3. Hazards Identification			
Primary Routes(s) Of Entry Inhalation			
Eye Hazards May cause eye irritation (burning, tearing, redness or swelling).			
Skin Hazards May cause skin irritation and contact dermatitis upon prolonged contact.			

**BK10014T - BAKOR 100-14 FIBRATED EMULSION
INSULATION COATING****3. Hazards Identification - Continued****Ingestion Hazards**

May be harmful if swallowed. May cause gastric distress, vomiting and diarrhea.

Inhalation Hazards

Exposure to vapors may cause respiratory tract irritation. Inhalation of vapors or mists may cause central nervous system depression, light-headedness, headache, nausea and loss of coordination.

Chronic/Carcinogenicity Effects

This product or one of its ingredients present at 0.1% or more is listed as a carcinogen by NTP, IARC or OSHA. See Section 11 (Toxicological Information) for more details.

4. First Aid Measures**Eye**

In case of contact, hold eyelids apart and immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention immediately if irritation develops and persists.

Skin

Remove contaminated clothing and shoes. Wash affected areas with soap and water.

Ingestion

Get medical attention immediately. DO NOT INDUCE VOMITING. Never give anything by mouth to an unconscious victim. Call a physician or poison control center immediately.

Inhalation

Remove the person from the contaminated area to fresh air. If breathing is difficult, give oxygen. Get medical attention immediately.

Note To Physician

Aspiration of liquid into the lungs during swallowing or vomiting can cause lung inflammation, serious lung damage and even death from chemical pneumonitis.

5. Fire Fighting Measures

Flash Point: >212 °F

Flash Point Method: Setaflash

Lower Explosive Limit: not available

Upper Explosive Limit: not available

Fire And Explosion Hazards

Thermal decomposition (burning) may release irritating, corrosive and/or toxic gases, vapors and fumes.

Extinguishing Media

Chemical foam, carbon dioxide (CO₂), water fog or dry chemical.

Fire Fighting Instructions

Firefighters should wear self-contained breathing apparatus and full protective gear.

6. Accidental Release Measures

Contain and/or absorb spill with inert material (e.g. sand, vermiculite). Collect and dispose in accordance with applicable regulations. Avoid runoff to waterways and sewers.

7. Handling And Storage**Handling And Storage Precautions**

Keep containers tightly closed. Store in a cool, dry, well-ventilated area. Do not handle or store near strong oxidants or strong acids. Use only with adequate ventilation.



BK10014T - BAKOR 100-14 FIBRATED EMULSION
INSULATION COATING

8. Exposure Controls/Personal Protection

Engineering Controls

Use with adequate general and local exhaust ventilation. When used outdoors, stay well away from building air intakes or close and seal the intakes to prevent product from entering building.

Eye/Face Protection

Safety glasses with side shields or goggles recommended.

Skin Protection

Use with chemical-protective gloves to prevent skin contact.

Respiratory Protection

This product is an encapsulated mixture which reduces the likelihood of exposure to hazardous particulates. Airborne exposures to hazardous dusts or mists may be generated by spraying, sanding or grinding.

The level of respiratory protection needed should be based on the evaluation of chemical exposures by a health or safety professional. If required, use a NIOSH-approved air purifying respirator with organic vapor cartridge and particulate filter or supplied air respirator.

Occupational Exposure Limits for individual ingredients (if available) are listed below.

Ingredient(s) - Exposure Limits

asphalt, petroleum

OSHA PEL-TWA 5mg/m3

ACGIH TLV-TWA 0.5mg/m3 (Benzene soluble aerosol)

bentonite

ACGIH TLV-TWA 10 mg/m3 (total dust)

ACGIH TLV-TWA 3 mg/m3 (respirable dust)

OSHA PEL-TWA 15 mg/m3 (total dust)

OSHA PEL-TWA 5 mg/m3 (respirable dust)

kaolin

ACGIH TLV-TWA 2 mg/m3

OSHA PEL-TWA 15 mg/m3

OSHA PEL-TWA 5 mg/m3

silica, quartz

ACGIH TLV-TWA 0.025 mg/m3

OSHA PEL-TWA 30mg/m3 / (%SiO2+2) (total dust)

OSHA PEL-TWA 10 mg/m3/ (%SiO2+2) (respirable dust)

stoddard solvent

ACGIH TLV-TWA 100 ppm

OSHA PEL-TWA 500 ppm

9. Physical And Chemical Properties

Appearance

black dispersion

Odor

petroleum and wood-like odor

Chemical Type: Mixture

Physical State: Liquid

Boiling Point: 212 °F

Specific Gravity: 1.06

Percent Volatiles: 53.5

Vapor Pressure: not available



BK10014T - BAKOR 100-14 FIBRATED EMULSION
INSULATION COATING

9. Physical And Chemical Properties - Continued
Odor - Continued Vapor Density: >1 pH Factor: not available Solubility: dispersible Evaporation Rate: <1
10. Stability And Reactivity
Stability: Stable Hazardous Polymerization: Will not occur Incompatible Materials Avoid contact with strong oxidizing agents and acids. Hazardous Decomposition Products Toxic and irritating gases, vapors or fumes, carbon monoxide (CO), carbon dioxide (CO2).
11. Toxicological Information
Chronic/Carcinogenicity IARC has concluded that the following chemicals in this product are carcinogenic to humans (Group 1): silica, quartz ACGIH has designated the following chemicals in this product as suspected human carcinogens (A2): silica, quartz NTP has listed the following chemicals in this product as known human carcinogens: silica, quartz Risk of cancer depends on duration and level of exposure to this product as a dust or aerosol mist. Miscellaneous Toxicological Information Toxicological testing has not been conducted for this product overall. Available toxicological data for individual ingredients are summarized below. Ingredient(s) - Toxicological Data silica, quartz iv-rat LD50: 500 mg/kg bw/Quartz (10-200 um) stoddard solvent oral-rat LD50: >5000 mg/kg dermal-rabbit LD50: >3000 mg/kg inhal-rat LC50: >5500 mg/m3 (880 ppm) inhal-rat LC50: >1300 ppm
12. Ecological Information
No specific information available.
13. Disposal Considerations
Dispose in accordance with applicable federal, state and local government regulations.
14. Transport Information
Ground Not Restricted IMDG Not Restricted IATA Not Restricted

**BK10014T - BAKOR 100-14 FIBRATED EMULSION
INSULATION COATING**

15. Regulatory Information

U.S. Regulatory Information

Asphalt may contain detectable amounts of chemicals known to the State of California to cause cancer or reproductive harm.

Ingredient(s) - State Regulations

- asphalt, petroleum
 - California - Proposition 65
- attapulgitite
 - California - Proposition 65
- kaolin
 - Pennsylvania - Workplace Hazard
- silica, quartz
 - New Jersey - Workplace Hazard
 - Pennsylvania - Workplace Hazard
 - California - Proposition 65
 - Massachusetts - Hazardous Substance
- stoddard solvent
 - New Jersey - Workplace Hazard
 - Pennsylvania - Workplace Hazard
 - Massachusetts - Hazardous Substance
 - New York City - Hazardous Substance

Canadian Regulatory Information

This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR. WHMIS Classification: D2A - Very Toxic

Ingredient(s) - Canadian Regulatory Information

- silica, quartz
 - WHMIS - Ingredient Disclosure List
- stoddard solvent
 - WHMIS - Ingredient Disclosure List

European Union (EU) Regulatory Information

REACH Pre-registration Information:

Substance (CAS#)	Reference Number
Asphalt (8052-42-4)	05-2114366982-36-0000
Bentonite (1302-78-9)	05-2114501887-43-0000
Kaolin (1337-58-7)	05-2114366993-33-0000
Water (7732-18-5)	NA - Naturally Occurring Substance
Attapulgitite (12174-11-7)	NA - Naturally Occurring Substance

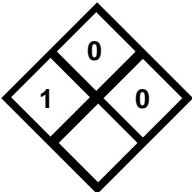
WHMIS - Canada (Pictograms)





MATERIAL SAFETY DATA SHEET

BK10014T - BAKOR 100-14 FIBRATED EMULSION INSULATION COATING

NFPA	HMIS								
	<table border="1"><tr><td>HEALTH</td><td style="text-align: center;">1</td></tr><tr><td>FLAMMABILITY</td><td style="text-align: center;">0</td></tr><tr><td>REACTIVITY</td><td style="text-align: center;">0</td></tr><tr><td>PERSONAL PROTECTION</td><td></td></tr></table>	HEALTH	1	FLAMMABILITY	0	REACTIVITY	0	PERSONAL PROTECTION	
HEALTH	1								
FLAMMABILITY	0								
REACTIVITY	0								
PERSONAL PROTECTION									

16. Other Information

Revision/Preparer Information

This MSDS Supersedes A Previous MSDS Dated: 08/26/2010

Disclaimer

Although reasonable care has been taken in the preparation of this document, we extend no warranties and make no representations as to the accuracy or completeness of the information contained therein, and assume no responsibility regarding the suitability of this information for the user's intended purposes or for the consequences of its use. Each individual should make a determination as to the suitability of the information for their particular purposes(s).



MATERIAL SAFETY DATA SHEET

Page 1 of 6

BK12009 - BAKOR 120-09 FIRE RESISTIVE LAGGING COATING HEAVY DUTY

1. Product And Company Identification

Supplier HENRY COMPANY 999 N. Sepulveda Blvd., Suite 800 El Segundo, CA 90245-2716 Company Contact: Technical Services Telephone Number: (800) 486-1278 Web Site: www.henry.com www.bakor.com	Manufacturer HENRY COMPANY 999 N. Sepulveda Blvd., Suite 800 El Segundo, CA 90245-2716 Company Contact: Technical Services Telephone Number: (800) 486-1278 Web Site: www.henry.com www.bakor.com
Supplier Emergency Contacts & Phone Number CHEMTREC: (800) 424-9300 CHEMTREC: (703) 527-3887 CANUTEC: (613) 996-6666	Manufacturer Emergency Contacts & Phone Number CHEMTREC: (800) 424-9300 CHEMTREC: (703) 527-3887 CANUTEC: (613) 996-6666

Issue Date: 06/05/2014

Product Name: BK12009 - BAKOR 120-09 FIRE RESISTIVE LAGGING COATING HEAVY DUTY

Product Code: BK12009

Product/Material Uses

Fire resistive lagging coating.

2. Composition/Information On Ingredients

Ingredient Name	CAS Number	Percent Of Total Weight
calcium carbonate	1317-65-3	15 - 30
ethylene glycol	107-21-1	1 - 5
polyvinyl acetate	9003-20-7	10 - 20
silica, quartz	14808-60-7	0.1 - 1
titanium dioxide	13463-67-7	1 - 5
tris(2-chloroethyl)phosphate	115-96-8	1 - 5
water	7732-18-5	25 - 45
calcium silicate	13983-17-0	5 - 10

EMERGENCY OVERVIEW

CAUTION! May be irritating to the eyes, skin and respiratory tract. May be harmful if swallowed.

Appearance/Odor: White viscous liquid. Acetic acid odor.

3. Hazards Identification

Primary Routes(s) Of Entry

Inhalation

Eye Hazards

May cause eye irritation.

Skin Hazards

May cause skin irritation and contact dermatitis upon prolonged contact.



BK12009 - BAKOR 120-09 FIRE RESISTIVE LAGGING COATING HEAVY DUTY

3. Hazards Identification - Continued

Ingestion Hazards

May be harmful if swallowed. May cause gastric distress, vomiting, diarrhea, blurred vision and central nervous system effects. May cause severe kidney effects.

Inhalation Hazards

Exposure to vapors may cause respiratory tract irritation. Inhalation of vapors or mists may cause central nervous system depression, light-headedness, headache, nausea and loss of coordination.

Chronic/Carcinogenicity Effects

This product or one of its ingredients present at 0.1% or more is listed as a carcinogen by NTP, IARC or OSHA. See Section 11 (Toxicological Information) for more details.

Signs And Symptoms

Irritation of the nose, throat, and respiratory tract when inhaled. Upon ingestion, upset stomach, blurred vision, dizziness, and drowsiness may occur.

4. First Aid Measures

Eye

In case of contact, hold eyelids apart and immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention immediately if irritation develops and persists.

Skin

Remove contaminated clothing and shoes. Wash affected areas with soap and water.

Ingestion

If victim is fully conscious, give one or two cups of water or milk to drink. Never give anything by mouth to an unconscious victim. Call a physician or poison control center immediately.

Inhalation

Remove the person from the contaminated area to fresh air. If breathing is difficult, give oxygen. Get medical attention immediately.

5. Fire Fighting Measures

Flash Point: None °F

Flammability Class: non-flammable

Lower Explosive Limit: not available

Upper Explosive Limit: not available

Fire And Explosion Hazards

Thermal decomposition (burning) may release irritating, corrosive and/or toxic gases and vapors including carbon monoxide, carbon dioxide, hydrogen chloride, and phosphorus oxide.

Extinguishing Media

Chemical foam, carbon dioxide (CO₂), water fog or dry chemical.

Fire Fighting Instructions

Firefighters should wear self-contained breathing apparatus and full protective gear.

6. Accidental Release Measures

Contain and/or absorb spill with inert material (e.g. sand, vermiculite). Collect and dispose in accordance with applicable regulations. Avoid runoff to waterways and sewers.



**BK12009 - BAKOR 120-09 FIRE RESISTIVE LAGGING
COATING HEAVY DUTY**

7. Handling And Storage

Handling And Storage Precautions

Keep containers tightly closed. Store in a cool, dry, well-ventilated area. Protect from freezing. Do not handle or store near strong oxidants or strong acids. Use only with adequate ventilation.

8. Exposure Controls/Personal Protection

Engineering Controls

Use with adequate general and local exhaust ventilation. When used outdoors, stay well away from building air intakes or close and seal the intakes to prevent product from entering building.

Eye/Face Protection

Safety glasses with side shields or goggles recommended.

Skin Protection

Use with chemical-protective gloves to prevent skin contact.

Respiratory Protection

Airborne exposures to hazardous dusts or mists may be generated by spraying, sanding or grinding.

The level of respiratory protection needed should be based on the evaluation of chemical exposures by a health or safety professional.

Occupational Exposure Limits for individual ingredients (if available) are listed below.

Ingredient(s) - Exposure Limits

ethylene glycol

ACGIH TLV-CEILING 100 mg/m³

silica, quartz

ACGIH TLV-TWA 0.025 mg/m³

OSHA PEL-TWA 30mg/m³ / (%SiO₂+2) (total dust)

OSHA PEL-TWA 10 mg/m³/ (%SiO₂+2) (respirable dust)

titanium dioxide

ACGIH TLV-TWA 10 mg/m³ (respirable)

OSHA PEL-TWA 15 mg/m³ (total dust)

9. Physical And Chemical Properties

Appearance

White viscous liquid

Odor

Acetic acid odor

Chemical Type: Mixture

Physical State: Liquid

Boiling Point: 212 °F 100 °C

Specific Gravity: 1.33

Percent Volatiles: 59

Percent VOCs: <100 g/L

Vapor Pressure: Not available

Vapor Density: Not available

pH Factor: 6 - 8

Solubility: Miscible in water

Evaporation Rate: Same as water



BK12009 - BAKOR 120-09 FIRE RESISTIVE LAGGING
COATING HEAVY DUTY

10. Stability And Reactivity

Stability: Stable

Hazardous Polymerization: Will not occur

Incompatible Materials

Avoid contact with strong oxidizing agents and acids.

Hazardous Decomposition Products

Toxic and irritating gases, or vapors, such as carbon monoxide (CO), carbon dioxide (CO₂) hydrogen chloride and phosphorus oxide.

11. Toxicological Information

Chronic/Carcinogenicity

IARC has concluded that the following chemicals in this product are carcinogenic to humans (Group 1): silica, quartz
IARC has concluded that the following chemicals in this product are possibly carcinogenic to humans (Group 2B): titanium dioxide.

ACGIH has designated the following chemicals in this product as suspected human carcinogens (A2): silica, quartz
NTP has listed the following chemicals in this product as known human carcinogens: silica, quartz

Risk of cancer depends on duration and level of exposure to this product as a dust or aerosol mist.

Miscellaneous Toxicological Information

Toxicological testing has not been conducted for this product overall. Available toxicological data for individual ingredients are summarized below.

Ingredient(s) - Carcinogenicity

polyvinyl acetate

Listed In The IARC Monographs

silica, quartz

NTP - Listed On The National Toxicology Program

Listed In The IARC Monographs

Ingredient(s) - Toxicological Data

calcium carbonate

LD50 (oral-rat) : 6450 mg/kg

ethylene glycol

LD50 (oral, rat): 5.89 g/kg

LD50 (dermal, rabbit): 9.5 g/kg

silica, quartz

LD50 (iv-rat) : 500 mg/kg bw/Quartz (10-200 um)

titanium dioxide

LD50 (oral, mouse): >10,000 mg/kg

LD50 (oral, rat): >25,000 mg/kg

LD50 (dermal, rabbit): >10,000 mg/kg

LC50 (inhalation,rat): >6820 mg/m³ (4 Hr)

tris(2-chloroethyl)phosphate

LD50 (oral-rat): 550mg/Kg

LD50 (dermal-rabbit 0: >5000mg/Kg

LD50 (Inhalation-rat) : >5000mg/Kg (4hr.)

12. Ecological Information

No specific information available.



BK12009 - BAKOR 120-09 FIRE RESISTIVE LAGGING COATING HEAVY DUTY

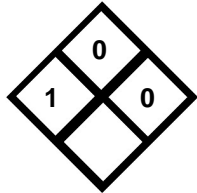
13. Disposal Considerations
Dispose in accordance with applicable federal, state and local government regulations.
14. Transport Information
Ground Not restricted
IMDG Not restricted
IATA Not restricted
15. Regulatory Information
U.S. Regulatory Information Warning: This product contains a substance(s) known to the State of California to cause cancer. Ingredient(s) - U.S. Regulatory Information ethylene glycol SARA Title III - Section 313 Form "R"/TRI Reportable Chemical Ingredient(s) - State Regulations calcium carbonate Pennsylvania - Workplace Hazard ethylene glycol New Jersey - Workplace Hazard New Jersey - Environmental Hazard Pennsylvania - Workplace Hazard Massachusetts - Hazardous Substance New York City - Hazardous Substance silica, quartz New Jersey - Workplace Hazard Pennsylvania - Workplace Hazard California - Proposition 65 Massachusetts - Hazardous Substance titanium dioxide New Jersey - Workplace Hazard Pennsylvania - Workplace Hazard New York City - Hazardous Substance tris(2-chloroethyl)phosphate California - Proposition 65 calcium silicate Pennsylvania - Workplace Hazard Canadian Regulatory Information This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR. WHMIS Classification: D2A - Very Toxic Ingredient(s) - Canadian Regulatory Information ethylene glycol WHMIS - Ingredient Disclosure List silica, quartz WHMIS - Ingredient Disclosure List titanium dioxide WHMIS - Ingredient Disclosure List

**BK12009 - BAKOR 120-09 FIRE RESISTIVE LAGGING
COATING HEAVY DUTY**

WHMIS - Canada (Pictograms)



NFPA



HMIS

HEALTH	1
FLAMMABILITY	0
REACTIVITY	0
PERSONAL PROTECTION	

16. Other Information

Revision/Preparer Information

This MSDS Supersedes A Previous MSDS Dated: 06/07/2011

Disclaimer

Although reasonable care has been taken in the preparation of this document, we extend no warranties and make no representations as to the accuracy or completeness of the information contained therein, and assume no responsibility regarding the suitability of this information for the user's intended purposes or for the consequences of its use. Each individual should make a determination as to the suitability of the information for their particular purposes(s).



MATERIAL SAFETY DATA SHEET

Page 1 of 5

BK23038 - BAKOR 230-38 FIRE RESISTIVE ADHESIVE

1. Product And Company Identification

<u>Supplier</u> HENRY COMPANY 999 N. Sepulveda Blvd., Suite 800 El Segundo, CA 90245-2716 Company Contact: Technical Services Telephone Number: (800) 486-1278 Web Site: www.henry.com www.bakor.com	<u>Manufacturer</u> HENRY COMPANY 999 N. Sepulveda Blvd., Suite 800 El Segundo, CA 90245-2716 Company Contact: Technical Services Telephone Number: (800) 486-1278 Web Site: www.henry.com www.bakor.com
<u>Supplier Emergency Contacts & Phone Number</u> CHEMTREC: (800) 424-9300 CHEMTREC: (703) 527-3887 CANUTEC: (613) 996-6666	<u>Manufacturer Emergency Contacts & Phone Number</u> CHEMTREC: (800) 424-9300 CHEMTREC: (703) 527-3887 CANUTEC: (613) 996-6666

Issue Date: 02/11/2014

Product Name: BK23038 - BAKOR 230-38 FIRE RESISTIVE ADHESIVE

Product Code: BK23038

Product/Material Uses

Fire-resistant adhesive.

2. Composition/Information On Ingredients

Ingredient Name	CAS Number	Percent Of Total Weight
hydrocarbon resins	NA - Mixture	5 - 15
long chain chlorinated paraffins	63449-39-8	5 - 15
trichloroethylene	79-01-6	60 - 80

EMERGENCY OVERVIEW

Warning! Vapor may cause light-headedness, headache, nausea, drowsiness, loss of coordination and respiratory tract irritation. Causes eye and skin irritation. Harmful if swallowed or inhaled. Affects heart, central nervous system, liver and kidneys.

Appearance/Odor: Blue liquid with chlorinated solvent odor

3. Hazards Identification

Primary Routes(s) Of Entry

Inhalation

Eye Hazards

May cause irritation (burning, tearing, redness or swelling).

Skin Hazards

May cause skin irritation, defatting and dermatitis upon prolonged contact.

Ingestion Hazards

May be harmful if swallowed. May cause gastric distress, vomiting and diarrhea.



BK23038 - BAKOR 230-38 FIRE RESISTIVE ADHESIVE

3. Hazards Identification - Continued

Inhalation Hazards

Exposure to vapors may cause respiratory tract irritation. Inhalation of vapors or mists may cause central nervous system depression, dizziness, fatigue, nausea, alcohol-like intoxication, and unconsciousness.

Chronic/Carcinogenicity Effects

This product or one of its ingredients present at 0.1% or more is listed as a carcinogen by NTP, IARC or OSHA. See Section 11 (Toxicological Information) for more details.

4. First Aid Measures

Eye

In case of contact, hold eyelids apart and immediately flush eyes with plenty of water for at least 20 minutes. Get medical attention.

Skin

Remove contaminated clothing and shoes. Wash affected areas with soap and water. Get medical attention immediately if irritation (redness, rash, blistering) develops and persists.

Ingestion

Get medical attention immediately. DO NOT INDUCE VOMITING. Never give anything by mouth to an unconscious victim. Call a physician or poison control center immediately.

Inhalation

Remove the person from the contaminated area to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Get medical attention immediately.

5. Fire Fighting Measures

Flash Point: not available °F not available °C

Flammability Class: not flammable

Lower Explosive Limit: 8.0

Upper Explosive Limit: 52.0

Fire And Explosion Hazards

During a fire, irritating and highly toxic gases may be generated.

Extinguishing Media

Chemical foam, carbon dioxide (CO₂), dry chemical. Water fog for large fires.

Fire Fighting Instructions

Firefighters should wear self-contained breathing apparatus and full protective gear. Water can be used to cool and protect exposed material.

6. Accidental Release Measures

Contain and/or absorb spill with inert material (e.g. sand, vermiculite). Collect and dispose of in accordance with applicable regulations. Avoid runoff to waterways and sewers.

7. Handling And Storage

Handling And Storage Precautions

Store in a cool, dry, well-ventilated area. Keep away from ignition sources. Use only with adequate ventilation.

8. Exposure Controls/Personal Protection

Engineering Controls

Use with adequate general and local exhaust ventilation. When used outdoors, stay well away from building air intakes or close and seal the intakes to prevent product from entering building.

8. Exposure Controls/Personal Protection - Continued

Eye/Face Protection

Safety glasses with side shields or goggles recommended.

Skin Protection

Use with chemical-protective gloves (solvent-resistant) to prevent skin contact.

Respiratory Protection

Airborne exposures to hazardous vapors or mists may be generated by spraying or use in confined spaces.

The level of respiratory protection needed should be based on the evaluation of chemical exposures by a health or safety professional. If required, use a NIOSH-approved air purifying respirator with organic vapor cartridge. Occupational Exposure Limits for individual ingredients (if available) are listed below.

Ingredient(s) - Exposure Limits

trichloroethylene

ACGIH TLV-TWA 10 ppm (A2 Suspected Carcinogen)

ACGIH TLV-STEL 25 ppm

OSHA PEL-TWA 50 ppm

OSHA STEL-TWA 200 ppm

9. Physical And Chemical Properties

Appearance

Blue liquid

Odor

Chlorinated solvent odor

Chemical Type: Mixture

Physical State: Liquid

Boiling Point: approximately 187 °F approximately 86 °C

Specific Gravity: 1.2-1.3

Percent Volatiles: 54-60% < 850 g/L

Vapor Pressure: 58 mmHg@20 °C

Vapor Density: 4.54

pH Factor: not applicable

Solubility: insoluble

Evaporation Rate: approximately 3

10. Stability And Reactivity

Stability: Stable

Hazardous Polymerization: Not expected to occur

Conditions To Avoid (Stability)

Keep away from ignition sources, heat, sparks and flames.

Incompatible Materials

Avoid contact with strong acids, strong bases, strong oxidizers, chemically active metals, copper, aluminum powder, aluminum chloride, potassium nitrate, and strong reducing agents.

Hazardous Decomposition Products

Toxic and irritating gases or vapors including hydrogen chloride, phosgene, chlorine, carbon monoxide (CO), carbon dioxide (CO₂), and oxides of nitrogen and sulfur.

11. Toxicological Information

Subchronic (Target Organ Effects)

Liver, kidneys, central nervous system.

Chronic/Carcinogenicity

Trichloroethylene is present in this product at concentrations equal to or greater than 0.1%, and has been determined to be carcinogenic as follows: IARC: Group 2A NTP: listed, and ACGIH: A2

Miscellaneous Toxicological Information

Toxicological testing has not been conducted for this product overall. Available toxicological data for individual ingredients are summarized below.

Ingredient(s) - Carcinogenicity

trichloroethylene

NTP - Listed On The National Toxicology Program
Listed In The IARC Monographs

12. Ecological Information

None identified.

13. Disposal Considerations

Dispose in accordance with applicable federal, state and local government regulations.

14. Transport Information

Ground or Water (Domestic Voyage)

If shipped in containers < 4 L (1.06 gallons)

USA Consumer Commodity, ORM-D
Canada Ltd. Qty.

If shipped in containers >4 L. (1.06 gallons)

Both US/TDG UN1710, Trichloroethylene, mixture, 6.1, III
IMDG UN1710, Trichloroethylene, mixture, 6.1, III
IATA UN1710, Trichloroethylene, mixture, 6.1, III

If shipped in containers >140 lbs, to, from or within the US:

RQ, UN1710, Trichloroethylene, mixture, 6.1, III

DOT (Pictograms)



TDG - Canada (Pictograms)



15. Regulatory Information

U.S. Regulatory Information

May contain detectable amounts of chemicals known to the State of California to cause cancer or reproductive harm.

Ingredient(s) - State Regulations

trichloroethylene

California - Proposition 65

Canadian Regulatory Information

This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR. WHMIS Classification: Class D, Div 1 - Poisonous or Infectious Material: immediate and serious toxic effects, Class D, Div 2, Subdivision A - Materials Causing Other Toxic Effects, Very Toxic Material at greater than or equal to 0.1%, Class D, Div 2, Subdivision B - Materials Causing Other Toxic Effects, Toxic Material at greater than or equal to 1.0%

Ingredient(s) - Canadian Regulatory Information

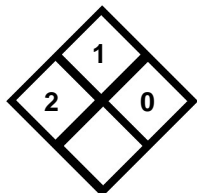
trichloroethylene

WHMIS - Ingredient Disclosure List

WHMIS - Canada (Pictograms)



NFPA



HMIS

HEALTH	2
FLAMMABILITY	1
REACTIVITY	0
PERSONAL PROTECTION	

16. Other Information

Revision/Preparer Information

This MSDS Supersedes A Previous MSDS Dated: 03/12/2011

Disclaimer

Although reasonable care has been taken in the preparation of this document, we extend no warranties and make no representations as to the accuracy or completeness of the information contained therein, and assume no responsibility regarding the suitability of this information for the user's intended purposes or for the consequences of its use. Each individual should make a determination as to the suitability of the information for their particular purposes(s).

ITW Permatex
 10 Columbus Blvd.
 Hartford, CT 06106 USA
 Telephone: 1-87-Permatex
 (877) 376-2839
 Emergency: 800-255-3924 (ChemTel)
 International Emergency: 00+ 1+ 813-248-0585

Material Safety Data Sheet

1. PRODUCT IDENTIFICATION

Product Name: BLUE LABEL HAND CLEANER 4.5 LB
Item No: 01406
Product Type: Waterless hand cleaner

2. COMPOSITION/INFORMATION ON INGREDIENTS

Component	Weight%	ACGIH; TLV-TWA	OSHA PEL
WATER 7732-18-5	>80	Not listed	Not listed
DISTILLATES (PETROLEUM), HYDROTREATED LIGHT 64742-47-8	<5	Not listed	Not listed
ETHOXYLATED C11-C16 ALCOHOL 127036-24-2	<2	Not listed	Not listed
TRIETHANOLAMINE 102-71-6	<2	5 mg/m ³	Not listed

3. HAZARDS IDENTIFICATION

Toxicity: May irritate the eyes. May irritate respiratory system upon frequent or prolonged use.
Primary Routes of Entry: Eye and skin contact, ingestion, inhalation
Signs and Symptoms of Exposure: None under normal conditions of use. Excessive accidental exposure may cause headache, dizziness, nausea and mild respiratory irritation. May cause redness to eyes and irritation to nasal passages.

Component	Weight%	NTP	ACGIH Carcinogens	IARC Carcinogen
TRIETHANOLAMINE 102-71-6	<2	male rat-equivocal evidence; female rat-no evidence; male mice-inadequate; female mice-inadequate		Group 3; Monograph 77, 2000

Aggravated Medical Condition: None known.

4. FIRST AID MEASURES

Ingestion: If swallowed, DO NOT induce vomiting. Keep individual calm. Obtain medical attention.
Inhalation: Move to fresh air in case of accidental inhalation of vapours.
Skin Contact: Flush with water
Eye Contact: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.

5. FIRE FIGHTING MEASURES

Flash Point °F(C°): >200°F (>93°C)
Recommended Extinguishing Media: Water, Dry chemical, Carbon dioxide, Foam
Special Fire-Fighting Procedures: No special procedures.
Hazardous Products of Combustion: Oxides of carbon
Unusual Fire/Explosion Hazards: None.

Lower Explosive Limit: n/d
Upper Explosive Limit: n/d

6. ACCIDENTAL RELEASE MEASURES

Spill Procedures: Rinse away with water or wipe up with a towel.

7. HANDLING AND STORAGE

Storage: Hand cleaner should be stored at temperatures between 40 degrees F. and 100 degrees F. Do not allow freezing.

Handling: Follow all general safety precautions.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Eyes: Not required.

Skin: Not required.

Ventilation: None under normal use.

Respiratory Protection: Not required under normal use.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: White cream

Odor: Fresh

Boiling Point: 212°F

pH: 6.0-8.0

Solubility in Water: Soluble

Specific Gravity: 0.99

VOC(Wt.%): <1%

Vapor Pressure: n/d

Vapor Density (Air=1): >1

Evaporation Rate: <1 (butyl acetate = 1)

10. STABILITY AND REACTIVITY

Chemical Stability: Stable at normal conditions

Hazardous Polymerization: Will not occur

Incompatibilities: None known

Conditions to Avoid: Freezing

Hazardous Products of Combustion: Oxides of carbon

11. TOXICOLOGICAL INFORMATION

See Section 3

12. ECOLOGICAL INFORMATION

No data available

13. DISPOSAL CONSIDERATIONS

Recommended Method of Disposal: Disposal should be made in accordance with federal, state and local regulations

US EPA Waste Number: NH - Not a RCRA Hazardous Waste Material

14. TRANSPORTATION INFORMATION

DOT (49CFR 172)

U.S. Department of Transportation - DOT - 49 CFR (Ground)

DOT Shipping Name: Not regulated

Hazard Class: None

UN/ID Number: None

IATA (Air)

Proper Shipping Name: Not regulated

Class or Division: None

UN/ID Number: None

IMDG (Vessel)

Proper Shipping Name: Not regulated

Hazard Class: None

UN Number: None

Marine Pollutant: None

15. REGULATORY INFORMATION

SARA 313 Chemicals: The following component(s) is listed as a SARA Section 313 Toxic Chemical.

Product Name: BLUE LABEL HAND CLEANER 4.5 LB

Item No. 01406

NONE

California Proposition 65: No California Prop 65 chemicals are known to be present at or above the No Significant Risk Level

TSCA Inventory Status: All components of this product are listed (or exempt) on the EPA TSCA inventory.

16. OTHER INFORMATION

Estimated NFPA Rating: HEALTH 1, FLAMMABILITY 1, REACTIVITY 0.

Estimated HMIS Classification: HEALTH 1, FLAMMABILITY 1, PHYSICAL HAZARD 0

(NFPA is a registered trademark of the National Fire Protection Association)

(HMIS is a registered trademark of the National Paint and Coatings Association)

Prepared By: Denise Boyd, Manager-Environmental, Health & Safety
Company: ITW Permatex 10 Columbus Blvd. Hartford, CT USA 06106
Telephone No.: 1-87-Permatex (877) 376-2839

Revision Date: October 04, 2012

Revision Number: 4

Copper-Phosphorus Brazing Alloys

Safety Data Sheet

1. Product and Company Identification

----- Suppliers and Manufacturers

Lucas Milhaupt, Inc.
5656 South Pennsylvania Avenue
Cudahy, WI 53110 USA
Telephone: 414-769-6000
www.lucasmilhaupt.com

Lucas-Milhaupt Toronto
290 Carlingview Drive
Rexdale, ON M9W 5G1, Canada
Telephone: 416-675-1860
www.lucasmilhaupt.com

Emergency Phone Number

Chemtrec: 800-424-9300

Issue Date: 05/03/2013

Product Name: Copper-Phosphorus Brazing Alloys

SDS Number: 78

Product Codes: 69-050; 69-060; 69-070; 69-080; 69-675

2. Composition/Information on Ingredients

Ingredient Name	CAS Number	%
Copper	7440-50-8	91-95
Phosphorus	7723-14-0	5-9

3. Hazards Identification

----- Primary Routes(s) of Entry

Ingestion; inhalation.

Eye Hazards

Eye contact with this product in finely-divided forms may cause irritation, conjunctivitis, and/or ulceration of the cornea.

Skin Hazards

Skin contact with this product, particularly in finely-divided forms, may cause irritation, discoloration, and/or contact dermatitis.

Ingestion Hazards

Ingestion of this product in finely-divided forms may cause nausea, vomiting, and gastrointestinal irritation.

Inhalation Hazards

Inhalation of the components of this product is not known to present a significant risk to health when used according to instructions and with appropriate protective measures (see Section #8). Inhalation of component elements has been reported to cause one or more of the following symptoms and effects upon excessively high or prolonged exposure:

COPPER: Acute exposure may cause respiratory tract irritation, fever, muscle ache, chills, cough, weakness, and a metallic taste. Chronic exposure may damage the liver, kidney, spleen, pancreas, and brain.

PHOSPHORUS: The red form of phosphorus is stable and relatively non-toxic at room temperature. When heated in the presence of air, it is converted to phosphorus pentoxide, which is corrosive and irritating to the eyes, nose, throat, and mucous membranes.

4. First Aid Measures

Eye

Flush affected areas with water for at least fifteen minutes. Seek medical assistance if necessary.

Skin

Remove contaminated clothing. Wash affected area with large quantities of water for at least five minutes. Seek medical attention if necessary. Launder or dry-clean clothing before reuse.

Ingestion

If subject is conscious, induce vomiting. If unconscious or convulsive, seek immediate medical assistance.

Inhalation

If signs and symptoms of toxicity are observed, remove subject from area, administer oxygen, and seek medical attention. Keep the subject warm and at rest. Perform artificial respiration if breathing has stopped.

Note to Physician

None of the components are acutely toxic by ingestion, nor are they absorbed through the skin. Extensive or prolonged skin contact may cause dermatitis.

5. Fire Fighting Measures

Flash Point: Not Applicable (N/Appl.)

Autoignition Point: N/Appl.

Flammability Class: N/Appl.

Lower Explosive Limit: N/Appl.

Upper Explosive Limit: N/Appl.

Fire and Explosion Hazards

In finely-divided form, these products may ignite when exposed to flame or by reaction with incompatible materials (see Section #10). If present in a fire or explosion, they may emit fumes of the constituent metals or metal oxides.

Extinguishing Media

Use dry chemical. Do not use water.

Fire Fighting Instructions

If fighting a fire in which these products are present, wear a self-contained breathing apparatus with full facepiece operated in pressure-demand or other

positive pressure mode.

6. Accidental Release Measures

If a finely-divided form of product is spilled, clean up spillage so as to minimize dispersion of dust. Wet sweeping or vacuuming using HEPA filtration are recommended.

7. Handling and Storage

----- Handling Precautions

No special handling precautions are required.

Storage Precautions

Do not store in proximity to incompatible materials (see Section #10).

Work/Hygienic Practices

To minimize ingestion, wash hands and face before eating, drinking, applying cosmetics, or using tobacco.

8. Exposure Controls/Personal Protection

----- Engineering Controls

Use appropriate ventilation (e.g., dilution, local exhaust) adequate to maintain concentrations of all components to within their applicable standards.

Eye/Face Protection

Wear eye protection adequate to prevent eye contact with finely-divided product and injury from the hazards of brazing. Plastic-frame spectacles with side shields and filter lenses (shade #3/#4) are recommended.

Skin Protection

Wear appropriate protective gloves and clothing to prevent skin injuries from the hazards of brazing and/or for prolonged or repeated contact with finely-divided forms of product. Avoid flammable fabrics.

Respiratory Protection

If an exposure level exceeds an applicable exposure standard, use a NIOSH-approved respirator having a configuration (type of facepiece, filter media, assigned protection factor, etc.) appropriate to the concentration of the contaminant(s) generated. For guidance on selection and use of respirators, consult American National Standard Z88.2 (ANSI, New York, NY 10036 USA).

Ingredient(s) - Exposure Limits

----- Copper

ACGIH TLVs: 0.2 mg/m³ TWA (fume); 1 mg/m³ TWA (dusts and mists)

OSHA PELs: 0.1 mg/m³ TWA (fume); 1 mg/m³ TWA (dusts and mists)

Phosphorus

No applicable ACGIH TLV(s)

No applicable OSHA PEL(s)

9. Physical and Chemical Properties

Appearance: copper-yellow alloys, various physical forms
Odor: No odor
Chemical Type: alloy
Physical State: solid
Melting Point: 1115-1225oF./600-665oC.
Specific Gravity: 9.0-9.9
Solubility: Insoluble

Other physical properties (odor threshold, evaporation rate, vapor pressure, vapor density, evaporation rate, boiling point, freezing point, pH, oil-water distribution coefficient, percent volatiles, percent VOCs) are not applicable to these products.

10. Stability and Reactivity

Stability: stable
Hazardous Polymerization: will not occur

Conditions to Avoid

Copper can form an unstable acetylide if in contact with acetylene gas.

Incompatible Materials

Strong oxidizers; ammonia; azides; bromates, chlorates, and iodates of alkali and alkali earth metals; halogens; alkaline hydroxides.

Hazardous Decomposition Products

Heating to elevated temperatures may copper and phosphorus oxide fumes.

11. Toxicological Information

Carcinogenicity

The products contain no chemicals classified as potential or demonstrated carcinogens by IARC, NTP, or OSHA.

Conditions Aggravated by Overexposure

Pre-existing pulmonary diseases (e.g., bronchitis, asthma) may be aggravated by inhalation exposure, particularly as fume. Chronic exposure by inhalation and/or ingestion may aggravate pre-existing diseases of the liver, kidneys, gastrointestinal system, and nervous system.

Ingredient(s) - Toxicological Data

Copper

LD50: No data available LC50: No data available

Phosphorus

LD50: >15,000 mg/kg (oral/rat) LC50: 4,300 mg/m3 for 1 hr (rat)

12. Ecological Information

In their intended manner of use, these products should not be released into the environment, and adverse effects on ecosystems are not anticipated under

recommended conditions of use, storage, and disposal.

13. Disposal Considerations

Dispose of unused or unusable product in accordance with applicable Federal, State/Provincial, and local regulations.

14. Transport Information

These products are not Hazardous Substances or Dangerous Goods per USDOT, TDG (Canada), IATA, or IMO regulations.

15. Regulatory Information

TSCA Information

All components of these products are listed on the EPA's TSCA registry.

SARA Hazard Classes

Acute Health Hazard; Chronic Health Hazard

Ingredient(s) - U.S. Regulatory Information

These products contain these components subject to the requirements of Section 313 of the Emergency Preparedness and Community Right-to-Know Act (EPCRA) of 1986 and of 40CFR, Part 372:

1. Copper (CASRN 7440-50-8)
2. Phosphorus (CASRN 7723-14-0)

Canadian Regulatory Information

All components of these products are on either the Domestic Substances List (DSL) or the Nondomestic Substances List (NDSL).

WHMIS Class(es) and Division(s): D2B

Components on Ingredients Disclosure List:

1. Copper, elemental (CASRN 7440-50-8)
2. Phosphorus (CASRN 7723-14-0)

16. Other/Revision Information

HMIS Ratings

Health - 2* Flammability - 1 Physical Hazard - 0 PPE - see Note

Note: Lucas-Milhaupt, Inc. and Lucas-Milhaupt Toronto recommend use of protective eyewear and gloves (Personal Protection Index "B") as standard PPE. HMIS recommends that its ratings be used only in conjunction with a fully implemented HMIS program, and that specific PPE codes be created by the user, who is familiar with the actual conditions under which the product is used. We cannot anticipate every condition of the product's use, and it is the user's responsibility to evaluate the hazards pertinent to its specific operations, and to determine the specific PPE required.

NFPA Ratings

Health - 2 Flammability - 1 Reactivity - 0

Revision Information

This SDS supersedes a previous SDS dated 05/03/2010.

Disclaimer

Although reasonable care has been taken in the preparation of this document, we extend no warranties and make no representations as to the accuracy or completeness of the information contained therein, and assume no responsibility regarding the suitability of this information for the user's intended purposes or for the consequences of its use. Each individual should make a determination as to the suitability of the information for their particular purpose(s).

Lucas Milhaupt, Inc.

Lucas-Milhaupt Toronto

Material Safety Data Sheet

Section 1 Product and Company Identification

Product Name:

BRITE REGULAR FLUX LIQUID

Revision #: 2.4

Date Prepared: June 3, 1993

Date Revised: February 4, 2013

Manufacturer:

LA-CO INDUSTRIES, Inc. *Markal Co.*

1201 Pratt Blvd.

Elk Grove Village, IL, USA 60007-5746

Information Telephone: 847-956-7600

Emergency Telephone: Call CHEMTREC

USA 800-424-9300

International (Call Collect) 1-703-527-3887

Chemical Formula: Mixture

CAS No.: Not Applicable. Derivation: Not Applicable.

Synonyms: Not Applicable.

General Use: Soldering Flux for use with Copper,

Galvanized Iron, Sheet Lead, Zinc, Nickel, Tin,

Silver, Mild Steel, Terne Plate, Malleable Iron.

Supplier/Importer:

Section 2 Composition/Information on Ingredients

Ingredient

Ammonium Chloride^{3,4,5,6}

CAS No.

12125-02-9

%

5 - 10

For Fume - ACGIH: TWA = 10mg\m³ STEL = 20mg\m³

EPA: CERCLA RQ = 5000 lbs.

(For Section 2 footnotes: See Section 15)

Section 3 Hazards Identification

EMERGENCY OVERVIEW: Fumes evolved during soldering may be irritating.

POTENTIAL HEALTH EFFECTS

Primary Exposure Routes: Eyes, Skin, Ingestion, Inhalation

Acute Effects

Eyes: Fumes evolved during soldering may be irritating depending on substrate conditions and type of solder used.

Skin: Not Applicable.

Ingestion: Not Applicable.

Inhalation: Fumes evolved during soldering may be irritating depending on substrate conditions and type of solder used.

Chronic Effects

Eyes: Not Applicable.

Skin: Not Applicable.

Ingestion: Not Applicable.

Inhalation: Not Applicable.

Carcinogenicity: Not Applicable.

Target Organ Effects: Not Applicable.

Medical Conditions Aggravated by Long-Term Exposure: Not Determined.

Other Information: LA-CO[®] BRITE REGULAR FLUX LIQUID WAS TESTED BY AN INDEPENDENT LABORATORY AND FOUND TO BE NON-TOXIC BY INGESTION AND NON-IRRITATING TO THE SKIN AND EYES WHEN TESTED IN ACCORDANCE WITH THE FEDERAL HAZARDOUS SUBSTANCES ACT. LA-CO[®] REGULAR FLUX PASTE, A MORE

Product Name:

BRITE REGULAR FLUX LIQUID

Revision #: 2.4

Date Prepared: June 3, 1993

Date Revised: February 4, 2013

CONCENTRATED FORM OF LA-CO® BRITE WAS TESTED FOR INHALATION TOXICITY ACCORDING TO A MODIFIED CONSUMER PRODUCT SAFETY COMMISSION REGULATIONS PROCEDURE FROM THE CODE OF FEDERAL REGULATIONS, NO. 16, PART 1500.3 (6) (i). TESTING PRODUCED NO TOXIC EFFECTS.

LA-CO BRITE REGULAR FLUX LIQUID CONTAINS NO LEAD AND IS CONSIDERED A LEAD-FREE PRODUCT.

Section 4

First Aid

Eye Contact: Flush with water. Contact physician if irritation persists.

Skin Contact: Rinse with water. Contact physician if irritation persists.

Ingestion: Drink water if irritation develops. Contact physician if irritation persists.

Inhalation: Remove from exposure. Contact physician if irritation persists.

Other Information: Consult physician if any exposure symptoms persist.

Section 5

Fire Fighting Measures

Flash Point (method): Not Applicable.

Autoignition Temperature: Not Applicable.

LEL: Not Applicable. **UEL:** Not Applicable

Flammability Classification: Not Applicable

Extinguishing Media: Not Applicable

Hazardous Combustion Products: Carbon Monoxide, Carbon Dioxide, Ammonia, Ammonium Chloride, Hydrogen Chloride.

Unusual Fire or Explosion Hazards: Not Applicable

Fire-Fighting Instructions/Equipment: Keep personnel removed and upwind of any fire. Wear full fire-fighting turn-out gear (full Bunker gear), and respiratory protection (SCBA).

Section 6

Accidental Release Measures

Use recommended personal protective equipment (see Section 8).

Small Spill: Wipe up. Flush remainder with water.

Large Spill: Contain spill. Soak up with absorbent material. Flush remainder with water.

Section 7

Handling and Storage

Handling Precautions: Use recommended personal protective equipment (see Section 8). Wash thoroughly after handling.

Storage Requirements: Store away from incompatible chemicals (see Sec. 10). Store in a cool, dry area.

Section 8

Exposure Controls/Personal Protection

Eye/Face Protection: Goggles or face shield recommended to protect from burns when soldering.

Skin/Hand Protection: Gloves recommended to protect from burns when soldering.

Respiratory Protection: : Acid gas respirator in very enclosed areas.

Other Equipment: Eye wash and safety shower recommended.

Engineering Controls: Normal room ventilation. Local exhaust recommended in confined areas.

Product Name:

BRITE REGULAR FLUX LIQUID

Revision #: 2.4

Date Prepared: June 3, 1993

Date Revised: February 4, 2013

Administrative Controls: Users of this product must be properly trained and qualified in its use.

Other Information: Not Applicable.

Section 9 Physical and Chemical Properties

Appearance/Physical State: Yellow to light brown colored liquid.

Odor: Low odor

Odor Threshold (ppm): Not Determined.

Specific Gravity (H₂O = 1): 1.08 (8.97 lbs./gal.)

Solubility - Water: Soluble.

- **Fat:** Insoluble.

Coefficient of Water/Oil Solubility: >>1

Partition Coefficient (n-octanol/water): <<1

pH: 6.5 to 7

Melting Point: Not Applicable.

Boiling Point: Approximately 212°F (100°C)

Vapor Pressure (mm Hg at 20°C): Not Determined.

Vapor Density (Air = 1): Not Determined.

Evaporation Rate (n-BuAc=1): <<1

V.O.C.: 0%(w/w), 0%(v/v), 0 lbs./gal.(U.S.), 0 kg/l

Flash Point (method): (see Section 5)

Autoignition Temperature: (see Section 5)

Flammability Classification: (see Section 5)

Unusual Fire or Explosion Hazards: (see Section 5)

Oxidizing Properties: Not Applicable.

Other Information: None.

Section 10 Stability and Reactivity

Chemical Stability: Stable.

Hazardous Polymerization: Will not occur

Conditions to Avoid: Not Applicable.

Chemicals to Avoid: Oxidizers, Cyanides, Sulfides.

Hazardous Decomposition Products (non-thermal): Not Determined.

Section 11 Toxicological Information

Sensitization to Product: Not Applicable.

Irritancy of Product: Fumes evolved during soldering may be irritating depending on substrate conditions and type of solder used.

Reproductive Toxicity: Not Applicable.

Teratogenicity: Not Applicable.

Mutagenicity: Not Applicable.

Further hazard information, if applicable, may be found in Section 3. Toxicological information regarding individual ingredients, if applicable, may be found in Section 2.

Product Name:

BRITE REGULAR FLUX LIQUID

Revision #: 2.4

Date Prepared: June 3, 1993

Date Revised: February 4, 2013

Section 12

Ecological Information

Mobility: Not Determined.

Degradability: Not Determined.

Accumulation: Not Determined.

Ecotoxicity: Not Determined.

Other Adverse Effects: Not Determined.

Section 13

Disposal Considerations

Dispose of in accordance with all applicable regulations.

Section 14

Transport Information

D.O.T. (U.S.)

Proper Shipping Name: Flux, Soldering, NOI, O/T Liquid

Hazard Class or Division: None

Hazard Label: None

I.D. Number: None

TDG (Canada): Flux, Soldering, NOI, O/T Liquid

IATA: Not Regulated.

ICAO: Not Regulated.

IMO: Not Regulated.

Australian Code for the Transport of Dangerous Goods

Dangerous Goods Class and Subsidiary Risk: Not Determined.

Section 15

Regulatory Information

Footnotes for Section 2:

- 1 Subject to the reporting requirements of SARA Title III, Section 313.
- 2 Appears on the California Safe Drinking Water and Toxic Enforcement Act Substances List.
- 3 Appears on the Massachusetts Substances List.
- 4 Appears on the New Jersey Right-To-Know Hazardous Substances List.
- 5 Appears on the Pennsylvania Hazardous Substances List.
- 6 Appears on the Canadian WHMIS Ingredient Disclosure List.

U.S.A.

OSHA Hazard Status: This product is not considered to be hazardous as defined by the U.S. OSHA HCS (29 CFR 1910.1200).

EPA SARA sec. 311/312 Hazard Categories: None.

Toxic Substances Control Act (TSCA): All ingredients contained in this product are listed on the U.S. EPA TSCA Chemical Substance Inventory.

HMIS Rating: Health 1, Flammability 0, Reactivity 0

NFPA Rating: Health 1, Flammability 1, Reactivity 0

CANADA

WHMIS Status: This product is not considered to be hazardous as defined by Canadian WHMIS Controlled Products Regulations.

WHMIS Rating: None.

WHMIS Risk Phrases: None.

WHMIS Precautionary Statements: None.

Domestic Substances List (DSL): All ingredients contained in this product are listed on the Canadian

Product Name:

BRITE REGULAR FLUX LIQUID

Revision #: 2.4

Date Prepared: June 3, 1993

Date Revised: February 4, 2013

EPA (CEPA) Domestic Substances List (DSL).

E.U.

European Inventory of Existing Chemical Substances (EINECS): All ingredients contained in this product are listed on the European Inventory of Existing Chemical Substances (EINECS).

Categories of Danger (Labeling Information): None.

Risk (R) Phrases: None.

Safety (S) Phrases: None.

AUSTRALIA

Worksafe Australia Status: This product is not classified as hazardous according to criteria of Worksafe Australia.

HAZCHEM Code: None allocated.

Poisons Schedule Number: None allocated.

Further regulatory information regarding individual ingredients, if applicable, may be found in Section 2.

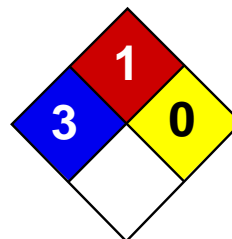
This product has been classified in accordance with the hazard criteria of the U.S. OSHA Hazard Communication Standard, the Canadian WHMIS Controlled Products Regulations, the British CHIP2 regulation 6, and the Australian NMRCWHS. This MSDS contains the information required by the above regulations and conforms to ANSI Z400.1-1993.

Section 16

Other Information

MSDS Prepared By: Director of Chemical Safety

The information contained herein is based on data available to us and is accurate and reliable to the best of our knowledge and belief. However, LA-CO Industries, Inc. makes no representations as to its completeness or accuracy. Information is supplied on condition that persons receiving such information will make their own determination as to its suitability for their purposes prior to use. In no event will LA-CO Industries, Inc. be responsible for damages of any nature whatsoever resulting from the use of or reliance upon the information contained herein.



Health	3
Fire	1
Reactivity	0
Personal Protection	E

Material Safety Data Sheet Cadmium MSDS

Section 1: Chemical Product and Company Identification

Product Name: Cadmium

Catalog Codes: SLC3484, SLC5272, SLC2482

CAS#: 7440-43-9

RTECS: EU9800000

TSCA: TSCA 8(b) inventory: Cadmium

CI#: Not applicable.

Synonym:

Chemical Name: Cadmium

Chemical Formula: Cd

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Cadmium	7440-43-9	100

Toxicological Data on Ingredients: Cadmium: ORAL (LD50): Acute: 2330 mg/kg [Rat.]. 890 mg/kg [Mouse]. DUST (LC50): Acute: 50 ppm 4 hour(s) [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:

Hazardous in case of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant, sensitizer), of eye contact (irritant). Severe over-exposure can result in death.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Classified A2 (Suspected for human.) by ACGIH, 2 (Reasonably anticipated.) by NTP.
MUTAGENIC EFFECTS: Not available. **TERATOGENIC EFFECTS:** Not available. **DEVELOPMENTAL TOXICITY:** Not available. The substance is toxic to kidneys, lungs, liver. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated exposure to an highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4: First Aid Measures

Eye Contact: No known effect on eye contact, rinse with water for a few minutes.

Skin Contact:

After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact: Not available.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. **WARNING:** It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:

Do not induce vomiting. Examine the lips and mouth to ascertain whether the tissues are damaged, a possible indication that the toxic material was ingested; the absence of such signs, however, is not conclusive. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: 570°C (1058°F)

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances:

Non-flammable in presence of open flames and sparks, of heat, of oxidizing materials, of reducing materials, of combustible materials, of moisture.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards:

Material in powder form, capable of creating a dust explosion. When heated to decomposition it emits toxic fumes.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Use appropriate tools to put the spilled solid in a convenient waste disposal container.

Large Spill:

Use a shovel to put the material into a convenient waste disposal container. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep locked up Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Wear suitable protective clothing In case of insufficient ventilation, wear suitable respiratory equipment If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents.

Storage:

Keep container dry. Keep in a cool place. Ground all equipment containing material. Keep container tightly closed. Keep in a cool, well-ventilated place. Highly toxic or infectious materials should be stored in a separate locked safety storage cabinet or room.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 0.01 (ppm) Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid. (Lustrous solid.)

Odor: Not available.

Taste: Not available.

Molecular Weight: 112.4 g/mole

Color: Silvery.

pH (1% soln/water): Not applicable.

Boiling Point: 765°C (1409°F)

Melting Point: 320.9°C (609.6°F)

Critical Temperature: Not available.

Specific Gravity: 8.64 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Insoluble in cold water, hot water, methanol, diethyl ether, n-octanol.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Not considered to be corrosive for metals and glass.

Special Remarks on Reactivity: Reacts violently with potassium.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Inhalation. Ingestion.

Toxicity to Animals:

WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 890 mg/kg [Mouse]. Acute toxicity of the dust (LC50): 229.9 mg/m³ 4 hour(s) [Rat].

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: Classified A2 (Suspected for human.) by ACGIH, 2 (Reasonably anticipated.) by NTP. The substance is toxic to kidneys, lungs, liver.

Other Toxic Effects on Humans:

Hazardous in case of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant, sensitizer).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: An allergen. 0047 Animal: embryotoxic, passes through the placental barrier.

Special Remarks on other Toxic Effects on Humans: May cause allergic reactions, exzema and/or dehydration of the skin.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are as toxic as the original product.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification:

Identification:

Special Provisions for Transport:

Section 15: Other Regulatory Information

Federal and State Regulations:

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Cadmium California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Cadmium Pennsylvania RTK: Cadmium Massachusetts RTK: Cadmium TSCA 8(b) inventory: Cadmium SARA 313 toxic chemical notification and release reporting: Cadmium CERCLA: Hazardous substances.: Cadmium

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada):

CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):

R26- Very toxic by inhalation. R45- May cause cancer.

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 1

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 3

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Safety glasses.

Section 16: Other Information

References:

-Hawley, G.G.. The Condensed Chemical Dictionary, 11e ed., New York N.Y., Van Nostrand Reinold, 1987. -Liste des produits purs tératogènes, mutagènes, cancérogènes. Répertoire toxicologique de la Commission de la Santé et de la Sécurité du Travail du Québec. -Material safety data sheet emitted by: la Commission de la Santé et de la Sécurité du Travail du Québec. -SAX, N.I. Dangerous Properties of Industrial Materials. Toronto, Van Nostrand Reinold, 6e ed. 1984. -The Sigma-Aldrich Library of Chemical Safety Data, Edition II. -Guide de la loi et du règlement sur le transport des marchandises dangereuses au Canada. Centre de conformité international Ltée. 1986.

Other Special Considerations: Not available.

Created: 10/09/2005 04:29 PM

Last Updated: 05/21/2013 12:00 PM

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Section 1 - Chemical Product and Company Identification

MSDS Name: Carbon Dioxide Activity Standard
Catalog Numbers: 13-620-804
Synonyms:
Company Identification: Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
For information in the US, call: 201-796-7100
Emergency Number US: 201-796-7100
CHEMTREC Phone Number, US: 800-424-9300

Section 2 - Composition, Information on Ingredients

Risk Phrases:

CAS#: 144-55-8
Chemical Name: Sodium bicarbonate
%: <1.0
EINECS#: 205-633-8
Hazard Symbols:

Risk Phrases:

CAS#: 7732-18-5
Chemical Name: Water
%: Balance
EINECS#: 231-791-2
Hazard Symbols:

Text for R-phrases: see Section 16

Hazard Symbols: None listed
Risk Phrases: None listed

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Caution! This is expected to be a low hazard for usual industrial handling. May cause irritation. Target Organs: None.

Potential Health Effects

Eye: May cause eye irritation.
Skin: Low hazard for usual industrial handling.
Ingestion: Ingestion of large amounts may cause gastrointestinal irritation. Low hazard for usual industrial handling.
Inhalation: Low hazard for usual industrial handling.
Chronic: No information found.

Section 4 - First Aid Measures

Eyes: Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.
Skin: Get medical aid if irritation develops or persists. Flush skin with plenty of soap and water.
Ingestion: Never give anything by mouth to an unconscious person. Get medical aid.
Inhalation: Remove from exposure and move to fresh air immediately. Get medical aid if cough or other symptoms appear.

Notes to

Physician:

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear.

Extinguishing Media: Substance is nonflammable; use agent most appropriate to extinguish surrounding fire.

Autoignition Not available.

Temperature:

Flash Point: Not available

Explosion Limits: Not available

Lower:

Explosion Limits: Not available

Upper:

NFPA Rating: health: 1; flammability: 0; instability: 0;

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.

Spills/Leaks: Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Use with adequate ventilation. Avoid contact with eyes, skin, and clothing. Keep container tightly closed. Avoid ingestion and inhalation.

Storage: Store in a cool, dry, well-ventilated area away from incompatible substances.

Section 8 - Exposure Controls, Personal Protection

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Sodium bicarbonate	none listed	none listed	none listed
Water	none listed	none listed	none listed

OSHA Vacated PELs: Sodium bicarbonate: None listed Water: None listed

Engineering Controls:

Good general ventilation should be sufficient to control airborne levels.

Exposure Limits

Personal Protective Equipment

Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin: Wear appropriate gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure. Wear appropriate clothing to prevent skin exposure.

Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Liquid

Color: clear light yellow green

Odor: chlorine-like

pH: Not available

Vapor Pressure: 14 mm Hg

Vapor Density: 0.7

Evaporation Rate: >1.0 (Ether=1)

Viscosity: Not available

Boiling Point: Decomposes

Freezing/Melting Point: 32 deg F (0.00°C)

Decomposition Temperature: Not available

Solubility in water: Soluble in water.
Specific Gravity/Density: 1.1
Molecular Formula: NaOCl
Molecular Weight: 75.4492

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: Incompatible materials.
Incompatibilities with Other Materials: Not available
Hazardous Decomposition Products: Chlorine, sodium oxide.
Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#: CAS# 144-55-8: VZ0950000
CAS# 7732-18-5: ZC0110000

LD50/LC50: RTECS:
CAS# 144-55-8: Draize test, rabbit, eye: 100 mg/30S Mild;
Oral, mouse: LD50 = 3360 mg/kg;
Oral, rat: LD50 = 4220 mg/kg;

RTECS:
CAS# 7732-18-5: Oral, rat: LD50 = >90 mL/kg;

Carcinogenicity: Sodium bicarbonate - Not listed as a carcinogen by ACGIH, IARC, NTP, or CA Prop 65.
Water - Not listed as a carcinogen by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: Not available
Teratogenicity: Not available
Reproductive: Not available
Neurotoxicity: Not available
Mutagenicity: Not available
Other: Not available

Section 12 - Ecological Information

Not available

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification. RCRA P-Series: None listed. RCRA U-Series: None listed.

Section 14 - Transport Information

US DOT
Shipping Name: Not regulated as a hazardous material
Hazard Class:
UN Number:
Packing Group:
Canada TDG
Shipping Name: Not available
Hazard Class:
UN Number:
Packing Group:

Section 15 - Regulatory Information

US Federal

TSCA
CAS# 144-55-8 is listed on the TSCA Inventory.
CAS# 7732-18-5 is listed on the TSCA Inventory.

Health & Safety Reporting List None of the chemicals are on the Health & Safety Reporting List.

Chemical Test Rules Section 12b None of the chemicals in this product are under a Chemical Test Rule. None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs None of the chemicals in this material have an RQ.

SARA Section 302 Extremely Hazardous Substances Section 313 None of the chemicals in this product have a TPQ. No chemicals are reportable under Section 313.

Clean Air Act: This material does not contain any hazardous air pollutants. This material does not contain any Class 1 Ozone depletors. This material does not contain any Class 2 Ozone depletors.

Clean Water Act: None of the chemicals in this product are listed as Hazardous Substances under the CWA. None of the chemicals in this product are listed as Priority Pollutants under the CWA. None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

STATE Sodium bicarbonate is not present on state lists from CA, PA, MN, MA, FL, or NJ. Water is not present on state lists from CA, PA, MN, MA, FL, or NJ.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols: Not available

Risk Phrases:

Safety Phrases:

WGK (Water Danger/Protection)

CAS# 144-55-8: 0

CAS# 7732-18-5: Not available

Canada

CAS# 144-55-8 is listed on Canada's DSL List

CAS# 7732-18-5 is listed on Canada's DSL List

Canadian WHMIS Classifications: Not controlled.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

CAS# 144-55-8 is not listed on Canada's Ingredient Disclosure List.

CAS# 7732-18-5 is not listed on Canada's Ingredient Disclosure List.

Section 16 - Other Information

MSDS Revision #4 Date: June 28, 2011

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall the company be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential, or exemplary damages howsoever arising, even if the company has been advised of the possibility of such damages.

Praxair Material Safety Data Sheet

1. Chemical Product and Company Identification

Product Name: Carbon dioxide Liquid Carbon dioxide	Trade Name: Carbon dioxide, Medipure® Liquid Carbon dioxide
Product Use: Many	
Chemical Name: Carbon dioxide	Synonym: Carbon anhydride, Carbonic acid gas.
Chemical Formula: CO ₂	Chemical Family: Acid anhydrides (Acid.)
Telephone: Emergencies: * 1-800-363-0042	Supplier /Manufacture: Praxair Canada Inc. 1 City Centre Drive Suite 1200 Mississauga, ON L5B 1M2 Phone: 905-803-1600 Fax: 905-803-1682

**Call emergency numbers 24 hours a day only for spills, leaks, fire, exposure, or accidents involving this product. For routine information, contact your supplier or Praxair sales representative.*

2. Hazards Identification

Emergency Overview

CAUTION! High-pressure liquid and gas. Can cause rapid suffocation. Can increase respiration and heart rate. May cause nervous system damage. May cause frostbite. May cause dizziness and drowsiness. Self-contained breathing apparatus and protective clothing may be required by rescue workers. This product is a colourless, odourless gas at normal temperature and pressure. The gas is slightly acidic and may be felt to have a slight, pungent odour and biting taste.

ROUTES OF EXPOSURE: Inhalation. Skin contact. Eye contact.

EFFECTS OF A SINGLE (ACUTE) OVEREXPOSURE:

- INHALATION:** Asphyxiant. Effects are due to lack of oxygen. Moderate concentrations may cause headaches, drowsiness, dizziness, excitation, excess salivation, vomiting, and unconsciousness. Lack of oxygen can kill.
- SKIN CONTACT:** No harm expected from vapour. Liquid may cause frostbite.
- SKIN ABSORPTION:** No harm expected. Liquid may cause frostbite.
- SWALLOWING:** This product is a gas at normal temperature and pressure. Liquid may cause frostbite.
- EYE CONTACT:** Vapour may cause a stinging sensation; liquid may cause frostbite.

EFFECTS OF REPEATED (CHRONIC) OVEREXPOSURE:

No evidence of adverse effects from available information.

OTHER EFFECTS OF OVEREXPOSURE:

Damage to retial ganglion cells and central nervous system may occur.

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE:

Repeated or prolonged exposure is not known to aggravate medical condition.

SIGNIFICANT LABORATORY DATA WITH POSSIBLE RELEVANCE TO HUMAN HEALTH HAZARD EVALUATION:

A single study has shown an increase in heart defects in rats exposed to 6% carbon dioxide in air for 24 hours at different time during gestation. There is no evidence that carbon dioxide is tetratogenic in humans.

CARCINOGENICITY:

Not listed as carcinogen by OSHA, NTP or IARC.

3. Composition and Information on Ingredients

COMPONENTS	CAS NUMBER	CONCENTRATION % by Mole
Carbon dioxide	124-38-9	100

4. First Aid Measures

INHALATION:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

SKIN CONTACT:

For exposure to liquid, immediately warm frostbite area with warm water not to exceed 41 C. In case of massive exposure, remove contaminated clothing while showering with warm water. Call a physician.

SWALLOWING:

This product is a gas at normal temperature and pressure.

EYE CONTACT:

For contact with the liquid, immediately flush eyes throughly with warm water for at least 15 minutes. Hold the eyelids open and away from the eyeballs to ensure that all surfaces are flushed thoroughly. See a physician, preferably an ophthalmologist, immediately.

NOTES TO PHYSICIAN:

There is no specific antidote. Treatment of over-exposure should be directed at the control of symptoms and the clinical condition.

5. Fire Fighting Measures

FLAMMABLE : No. **IF YES, UNDER WHAT CONDITIONS?** Not applicable.

EXTINGUISHING MEDIA:

This material cannot catch fire. Use media appropriate for surrounding fire.

PRODUCTS OF COMBUSTION:

Not applicable.

PROTECTION OF FIREFIGHTERS:

CAUTION! High-pressure gas. Asphxiant. Effects are due to lack of oxygen. Evacuate all personnel from danger area. Immediately deluge cylinders with water from maximum distance until cool; then move them away from fire area if without risk.

SPECIFIC PHYSICAL AND CHEMICAL HAZARDS:

Gas cannot catch fire. Container may rupture due to heat of fire. No part of a container should be subjected to a temperature higher than 52 C. Most containers are provided with a pressure relief device designed to vent contents when they are exposed to elevated temperature.

SENSITIVITY TO IMPACT:

Avoid impact against container.

SENSITIVITY TO STATIC DISCHARGE:

Not applicable.

PROTECTIVE EQUIPMENT AND PRECAUTIONS FOR FIREFIGHTERS:

Firefighters should wear self-contained breathing apparatus and full fire-fighting turnout gear.

FLAMMABLE LIMITS IN AIR, % by volume:

LOWER: Not applicable.

UPPER: Not applicable.

FLASH POINT:

Not applicable.

AUTOIGNITION TEMPERATURE:

Not applicable.

6. Accidental Release Measures

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:

Personal Precautions:

CAUTION! **High-pressure gas.** Evacuate all personnel from danger area. Use self-contained breathing apparatus where needed. Shut off flow if you can do so without risk. Ventilate area or move cylinder to a well-ventilated area. Test for sufficient oxygen, especially in confined spaces, before allowing reentry.

Environmental Precautions:

Prevent waste from contaminating the surrounding environment. Keep personnel away. Discard any product, residue, disposable container, or liner in an environmentally acceptable manner, in full compliance with federal, provincial, and local regulations. If necessary, call your local supplier for assistance.

7. Handling and Storage

PRECAUTIONS TO BE TAKEN IN HANDLING:

Protect cylinders from damage. Use a suitable hand truck to move cylinders; do not drag, roll, slide, or drop. Never attempt to lift a cylinder by its cap; the cap is intended solely to protect the valve. Never insert an object (e.g., wrench, screwdriver, pry bar) into cap openings; doing so may damage the valve and cause a leak. Use an adjustable strap wrench to remove over-tight or rusted caps. Open valve slowly. If valve is hard to open, discontinue use and contact your supplier. For other precautions, see section 16.

For additional information on storage and handling, refer to Compressed Gas Association (CGA) pamphlet P-1, *Safe Handling of Compressed Gases in Containers*, available from the CGA. Refer to section 16 for the address and phone number along with a list of other available publications.

PRECAUTIONS TO BE TAKEN IN STORAGE:

Store and use with adequate ventilation. Firmly secure cylinders upright to keep them from falling or being knocked over. Screw valve protection cap firmly in place by hand. Store only where temperature will not exceed 52 C. Store full and empty cylinders separately. Use a first-in, first-out inventory system to prevent storing full cylinders for long periods.

OTHER HAZARDOUS CONDITIONS OF HANDLING, STORAGE, AND USE:

Product Name: Carbon dioxide
Liquid Carbon dioxide

MSDS# E-4574-L

Date: Oct. 15, 2013

Extremely cold liquid and gas. Do not get liquid or vapours in eyes, on skin, or clothing. Safety showers and eyewash fountains should be immediately available. Use only in a closed system. Use piping and equipment adequately designed to withstand pressures to be encountered. **Store and use with adequate ventilation at all times.** Close valve after each use; keep closed even when empty. **Prevent reverse flow.** Reverse flow into cylinder may cause rupture. **When returning cylinder to supplier,** be sure valve is closed. **Never work on a pressurized system.** If there is a leak, close the cylinder valve. Vent the system down in a safe and environmentally sound manner in compliance with all federal, provincial, and local laws; then repair the leak. **Never place a compressed gas cylinder where it may become part of an electrical circuit.**

RECOMMENDED PUBLICATIONS:

Additional information on storage, handling, and use of this product is provided in **NFPA 55: Standard for the Storage, Use, and Handling of Compressed and Liquefied Gases in Portable Cylinders**, published by the National Fire Protection Association.

See also Praxair publication P-14-153, *Guidelines for Handling Gas Cylinders and Containers*. Obtain from your local supplier.

8. Exposure Controls/Personal Protection

INGREDIENTS	CAS NUMBER	LD ₅₀ (Species & Routes)	LC ₅₀ (Rat, 4 hrs.)	Exposure Limits
Carbon dioxide	124-38-9	Not available.	Not available.	TWA: 5000 ppm 8 hours, STEL: 30000 ppm 15 minutes.

IMMEDIATELY DANGEROUS TO LIFE AND HEALTH (IDLH):

VENTILATION/ENGINEERING CONTROLS:

LOCAL EXHAUST: Preferred.

MECHANICAL (General): General exhaust ventilation may be acceptable if it can maintain an adequate supply of air.

SPECIAL: Not applicable.

OTHER: Not applicable.

PERSONAL PROTECTION:

RESPIRATORY PROTECTION: Use air supplied respirator when working in confined space or where local exhaust or ventilation does not keep exposure below TLV. Select in accordance with the provincial regulations or guidelines. Selection should also be based on the current CSA standards Z94.4, "Selection, care and use of respirators". Respirators should be approved by NIOSH and MSHA.

SKIN PROTECTION: Insulated neoprene gloves.

EYE PROTECTION: Wear safety glasses when handling cylinders.

Select in accordance with the current CSA standard Z94.3, "Industrial Eye and Face Protection", and any provincial regulations, local bylaws or guidelines.

OTHER PROTECTIVE EQUIPMENT: Metatarsal shoes for cylinder handling. Protective clothing where needed. Cuffless trousers should be worn outside the shoes. Select in accordance with the current CSA standard Z195, "Protective Foot Wear", and any provincial regulations, local bylaws or guidelines.

9. Physical and Chemical Properties

PHYSICAL STATE: Compressed Liquefied Gas.	FREEZING POINT: Not applicable.	pH: Not applicable.
BOILING POINT Sublimation: -78.5 C	VAPOUR PRESSURE 5775.2 kPa (@ 20°C)	MOLECULAR WEIGHT: 44.01 g/mole
SPECIFIC GRAVITY: LIQUID (Water = 1) Not applicable.	SOLUBILITY IN WATER, Slight.	
SPECIFIC GRAVITY: VAPOUR (air = 1) 1.522 @ 0 C	EVAPORATION RATE (Butyl Acetate=1): >1 compared to (Butyl Acetate = 1)	COEFFICIENT OF WATER/OIL DISTRIBUTION: Not applicable.
VAPOUR DENSITY: 0.00198 g/ml @ 0 C	% VOLATILES BY VOLUME: 100% (v/v).	ODOUR THRESHOLD: Odourless.

APPEARANCE & ODOUR: Colourless. Odourless gas. It is felt by some to have a slight, pungent odour and biting taste.

10. Stability and Reactivity

STABILITY:	The product is stable.
CONDITIONS OF CHEMICAL INSTABILITY:	Not applicable.
INCOMPATIBILITY (materials to avoid):	Alkali metals, alkaline earth metals, metal acetylides, chromium, titanium above 550 C, uranium above 750 C.
HAZARDOUS DECOMPOSITION PRODUCTS:	In the presence of an electrical discharge, carbon dioxide is decomposed to form carbon monoxide and oxygen.
HAZARDOUS POLYMERIZATION:	Will not occur.
CONDITIONS TO AVOID:	None known.
CONDITIONS OF REACTIVITY:	None known.

11. Toxicological Information

ACUTE DOSE EFFECTS: See Section 2.

LC50 = 90,000 ppm, 5 min., human

STUDY RESULTS:

Carbon dioxide is an asphyxiant. It initially stimulates respiration and then causes respiratory depression. High concentrations result in narcosis. Symptoms in humans are as follows:

EFFECTS:

Breathing rate increases slightly.

Breathing rate increases to 50% above normal level. Prolonged exposure can cause headache, tiredness.

Breathing increases to twice normal rate and become labored. Weak narcotic effect. Impaired hearing, headache, increased blood pressure and pulse rate.

Breathing increases to approximately four times normal rate, symptoms of intoxication become evident, and slight choking may be felt.

Characteristic sharp odor noticeable. Very labored breathing, headache, visual impairment, and ringing in the ears. Judgment may be impaired, followed within minutes by loss of consciousness.

Unconsciousness occurs more rapidly above 10% level. Prolonged exposure to high concentrations may eventually result in death from asphyxiation.

REPRODUCTIVE EFFECTS: A single study has shown an increase in heart defects in rats exposed to 6% carbon dioxide in air for 24 hours at different times during gestation. There is no evidence that carbon dioxide is tetragenic in humans.

**CO₂
CONCENTRATION:**

1%

2%

3%

4 - 5%

5 - 10%

50 - 100%

12. Ecological Information

No adverse ecological effects expected. This product does not contain any Class I or Class II ozone-depleting chemicals. The components of this mixture are not listed as marine pollutants by TDG Regulations.

13. Disposal Considerations

WASTE DISPOSAL METHOD: Do not attempt to dispose of residual or unused quantities. Return cylinder to supplier.

14. Transport Information

TDG/IMO SHIPPING NAME: (Gas): Carbon dioxide; (Liquid): Carbon Dioxide, Refrigerated Liquid

HAZARD CLASS: CLASS 2.2: Non-flammable, non-corrosive and non-toxic gas	IDENTIFICATION #: UN 1013 (Gas) UN 2187 (Liquid)	PRODUCT REPORTABLE QUANTITY (PRQ): Any accidental release in a quantity that could pose a danger to the public safety or any sustained release of 10 minutes or more.
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SHIPPING LABEL(s): Non-flammable, non-corrosive and non-toxic gas

PLACARD (When Required): Non-flammable, non-corrosive and non-toxic gas

SPECIAL SHIPPING INFORMATION:

Cylinders should be transported in a secure position, in a well-ventilated vehicle. Cylinders transported in an enclosed, non-ventilated compartment of a vehicle can present serious safety hazards.

15. Regulatory Information

The following selected regulatory requirements may apply to this product. Not all such requirements are identified. Users of this product are solely responsible for compliance with all applicable federal, provincial, and local regulations. This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

WHMIS (Canada): CLASS A: Compressed gas.

This product is on the DSL list.

International Regulations:

EINECS: Not available.

DSCL (EEC): This product is not classified according to the EU regulations.

International Lists: No products were found.

16. Other Information

MIXTURES:

When two or more gases, or liquefied gases are mixed, their hazardous properties may combine to create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an Industrial Hygienist, or other trained person when you make your safety evaluation of the end product. Remember, gases and liquids have properties which can cause serious injury or death.

HAZARD RATING SYSTEM:

HMIS RATINGS:

HEALTH 1

FLAMMABILITY 0

PHYSICAL HAZARD 2

STANDARD VALVE CONNECTIONS FOR U.S. AND CANADA:

THREADED: CGA-320

PIN-INDEXED YOKE: CGA-940

ULTRA-HIGH-INTEGRITY CONNECTION: CGA-716

Use the proper CGA connections. **DO NOT USE ADAPTERS.** Additional limited-standard connections may apply. See CGA pamphlets V-1 and V-7 listed below.

Ask your supplier about free Praxair safety literature as referred to in this MSDS and on the label for this product. Further information about this product can be found in the following pamphlets published by the Compressed Gas Association, Inc. (CGA), 4221 Walney Road, 5th Floor, Chantilly, VA 20151-2923, Telephone (703) 788-2700, Fax (703) 961-1831, website: www.cganet.com.

- AV-1 Safe Handling and Storage of Compressed Gas
- G-6 Carbon Dioxide
- G-6.1 Standard for Low Pressure Carbon Dioxide Systems at Customer Sites
- G-6.2 Commodity Specification for Carbon Dioxide
- P-1 Safe Handling of Compressed Gases in Containers
- P-14 Accident Prevention in Oxygen-Rich, Oxygen-Deficient Atmospheres
- SB-2 Oxygen-Deficient Atmospheres
- V-1 Compressed Gas Cylinder Valve Inlet and Outlet Connections
- V-7 Standard Method of Determining Cylinder Valve Outlet Connections for Industrial Gas Mixtures
- Handbook of Compressed Gases, Fifth Edition

Product Name: Carbon dioxide
Liquid Carbon dioxide

MSDS# E-4574-L

Date: Oct. 15, 2013

Praxair asks users of this product to study this MSDS and become aware of product hazards and safety information. To promote safe use of this product, a user should (1) notify employees, agents, and contractors of the information in this MSDS and of any other known product hazards and safety information, (2) furnish this information to each purchaser of the product, and (3) ask each purchaser to notify its employees and customers of the product hazards and safety information.

PREPARATION INFORMATION:

DATE: October 15, 2013
DEPARTMENT: Safety and Environmental Services
TELEPHONE: 905-803-1600

The opinions expressed herein are those of qualified experts within Praxair Canada Inc. We believe that the information contained herein is current as of the date of this Material Safety Data Sheet. Since the use of this information and the conditions of use of the product are not within the control of Praxair Canada Inc., it is the user's obligation to determine the conditions of safe use of the product.

Praxair Canada Inc. requests the users of this product to study this Material Data Sheet (MSDS) and become aware of product hazards and safety information. To promote safe use of this product, a user should (1) notify its employees, agents and contractors of the information on this MSDS and any product hazards and safety information, (2) furnish this same information to each of its customers for the product, and (3) request such customers to notify their employees and customers for the product of the same product hazards and safety information.

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Praxair Canada Inc.
1 City Centre Drive
Suite 1200
Mississauga, ON L5B 1M2



Safety Data Sheet

Material Name: CARBON MONOXIDE

SDS ID: 00232334

Section 1 - PRODUCT AND COMPANY IDENTIFICATION

Product Identifier: CARBON MONOXIDE

Manufacturer Information

SPECIALTY CHEMICAL PRODUCTS
1407 Pennsylvania Ave.
South Houston, TX 77587

General Information: 713-944-0900
Emergency #: 1-800-424-9300 (CHEMTREC)
Outside the US: 703-527-3887 (Call collect)

Chemical Family

inorganic, gas

Synonyms

MTG MSDS 18; CARBON OXIDE; CARBONIC OXIDE; CARBON OXIDE (CO); FLUE GAS; UN 1016; CO;
RTECS: FG3500000

Section 2 - HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Color: colorless

Physical Form: gas

Odor: odorless

Health Hazards: harmful if inhaled, blood damage, difficulty breathing

Physical Hazards: Flammable gas. May cause flash fire.

POTENTIAL HEALTH EFFECTS

Inhalation

Short Term: changes in body temperature, changes in blood pressure, nausea, vomiting, chest pain, difficulty breathing, irregular heartbeat, headache, drowsiness, fatigue, dizziness, disorientation, hallucinations, pain in extremities, tremors, loss of coordination, hearing loss, visual disturbances, eye damage, bluish skin color, suffocation, blood disorders, convulsions, coma

Long Term: nausea, vomiting, loss of appetite, headache, dizziness, visual disturbances, blood disorders, heart disorders, heart damage, nerve damage, reproductive effects, birth defects, brain damage

Skin

Short Term: blisters, frostbite

Long Term: no information is available

Eye

Short Term: frostbite, blurred vision

Long Term: no information is available

Ingestion

Short Term: ingestion of a gas is unlikely

Long Term: ingestion of a gas is unlikely

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

Safety Data Sheet

Material Name: CARBON MONOXIDE

SDS ID: 00232334

CAS	Component	Percent
630-08-0	CARBON MONOXIDE	100

Section 4 - FIRST AID MEASURES

Inhalation

If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. Get immediate medical attention.

Skin

If frostbite or freezing occur, immediately flush with plenty of lukewarm water (105-115 F; 41-46 C). DO NOT USE HOT WATER. If warm water is not available, gently wrap affected parts in blankets. Get immediate medical attention.

Eyes

Contact with liquid: Immediately flush eyes with plenty of water for at least 15 minutes. Then get immediate medical attention.

Ingestion

If a large amount is swallowed, get medical attention.

Note to Physicians

For inhalation, consider oxygen.

Section 5 - FIRE FIGHTING MEASURES

See Section 9 for Flammability Properties

NFPA Ratings: Health: 3 Fire: 4 Reactivity: 0

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe

Flammable Properties

Severe fire hazard. Vapor/air mixtures are explosive. Containers may rupture or explode if exposed to heat.

Extinguishing Media

carbon dioxide, regular dry chemical

Large fires: Use regular foam or flood with fine water spray.

Fire Fighting Measures

Move container from fire area if it can be done without risk. Cool containers with water spray until well after the fire is out. Stay away from the ends of tanks. For fires in cargo or storage area: Cool containers with water from unmanned hose holder or monitor nozzles until well after fire is out. If this is impossible then take the following precautions: Keep unnecessary people away, isolate hazard area and deny entry. Let the fire burn. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tanks due to fire. For tank, rail car or tank truck: Evacuation radius: 800 meters (1/2 mile). Do not attempt to extinguish fire unless flow of material can be stopped first. Flood with fine water spray. Cool containers with water. Apply water from a protected location or from a safe distance. Avoid inhalation of material or combustion by-products. Stay upwind and keep out of low areas.

Section 6 - ACCIDENTAL RELEASE MEASURES

Water Release

Subject to California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65). Keep out of water supplies and sewers.

Safety Data Sheet

Material Name: CARBON MONOXIDE

SDS ID: 00232334

Occupational spill/release

Avoid heat, flames, sparks and other sources of ignition. Stop leak if possible without personal risk. Reduce vapors with water spray. Keep unnecessary people away, isolate hazard area and deny entry. Remove sources of ignition.

* * *Section 7 - HANDLING AND STORAGE* * *

Storage Procedures

Store and handle in accordance with all current regulations and standards. Store in a cool, dry place. Store in a well-ventilated area. Avoid direct sunlight. Avoid heat, flames, sparks and other sources of ignition. Subject to storage regulations: U.S. OSHA 29 CFR 1910.101. Keep separated from incompatible substances.

* * *Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION* * *

Component Analysis

CARBON MONOXIDE (630-08-0)

ACGIH: 25 ppm TWA

OSHA (final): 50 ppm TWA; 55 mg/m³ TWA

OSHA (vacated): 35 ppm TWA; 40 mg/m³ TWA
200 ppm Ceiling; 229 mg/m³ Ceiling

NIOSH: 35 ppm TWA; 40 mg/m³ TWA
200 ppm Ceiling; 229 mg/m³ Ceiling

Component Biological Limit Values

CARBON MONOXIDE (630-08-0)

ACGIH: 3.5 % of hemoglobin Medium: blood Time: end of shift Parameter: Carboxyhemoglobin
(background, nonspecific); 20 ppm Medium: end-exhaled air Time: end of shift Parameter:
Carbon monoxide (background, nonspecific)

IDLH

1200 ppm

Ventilation

Ventilation equipment should be explosion-resistant if explosive concentrations of material are present. Provide local exhaust or process enclosure ventilation system. Ensure compliance with applicable exposure limits.

PERSONAL PROTECTIVE EQUIPMENT

Eyes/Face

For the gas: Eye protection not required, but recommended. For the liquid: Wear splash resistant safety goggles. Contact lenses should not be worn. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

Protective Clothing

For the gas: Protective clothing is not required. For the liquid: Wear appropriate protective, cold insulating clothing.

Glove Recommendations

Wear insulated gloves.

Respiratory Protection

The following respirators and maximum use concentrations are drawn from NIOSH and/or OSHA.
350 ppm
Any supplied-air respirator.
875 ppm
Any supplied-air respirator operated in a continuous-flow mode.

Safety Data Sheet

Material Name: CARBON MONOXIDE

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1200 ppm

Any air-purifying full-facepiece respirator (gas mask) with a chin-style, front-mounted or back-mounted canister providing protection against the compound of concern.

End of service life indicator required (ESLI).

Any self-contained breathing apparatus with a full facepiece.

Any supplied-air respirator with a full facepiece.

Emergency or planned entry into unknown concentrations or IDLH conditions -

Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.

Any supplied-air respirator with a full facepiece that is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive-pressure mode.

Escape -

Any air-purifying full-facepiece respirator (gas mask) with a chin-style, front-mounted or back-mounted canister providing protection against the compound of concern.

End of service life indicator required (ESLI).

Any appropriate escape-type, self-contained breathing apparatus.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Gas	Appearance:	Not available
Color:	colorless	Physical Form:	gas
Odor:	odorless	Odor Threshold:	Not available
Taste:	tasteless	pH:	Not available
Melting/Freezing Point:	-205 °C	Boiling Point:	-191.5 °C
Decomposition:	Not available	Evaporation Rate:	Not available
LEL:	>=12.5 % by volume	UEL:	74 % by volume
Vapor Pressure:	760 mmHg @ -191 °C	Vapor Density (air = 1):	0.968
Density:	1.250 g/L @ 0 °C	Water Solubility:	2.3 % @ 20 °C
Log KOW:	Not available	Auto Ignition:	700 °C
Viscosity:	0.01657 cP @0 °C	Molecular Weight:	28.01
Molecular Formula:	C-O		

Solvent Solubility

Soluble: alcohol, benzene, acetic acid, ethyl acetate, chloroform, cuprous chloride solutions

Section 10 - STABILITY AND REACTIVITY

Chemical Stability

Stable at normal temperatures and pressure.

Conditions to Avoid

Avoid heat, flames, sparks and other sources of ignition. Minimize contact with material. Avoid inhalation of material or combustion by-products. Keep out of water supplies and sewers.

Materials to Avoid

oxidizing materials, halogens, metal oxides, metals, combustible materials, lithium

Decomposition Products

oxides of carbon

Safety Data Sheet

Material Name: CARBON MONOXIDE

SDS ID: 00232334

Possibility of Hazardous Reactions

Will not polymerize.

Section 11 - TOXICOLOGICAL INFORMATION

Component Analysis - LD50/LC50

The components of this material have been reviewed in various sources and the following selected endpoints are published:

CARBON MONOXIDE (630-08-0)

Inhalation LC50 Rat 1807 ppm 4 h

Acute Toxicity Level

CARBON MONOXIDE (630-08-0)

Toxic: inhalation

Component Carcinogenicity

None of this product's components are listed by ACGIH, IARC, NTP, OSHA or DFG.

Target Organs

CARBON MONOXIDE (630-08-0)

blood

Medical Conditions Aggravated by Exposure

blood system disorders, heart or cardiovascular disorders, hormonal disorders, respiratory disorders

Additional Data

Alcohol may enhance the toxic effects. May cross the placenta. Smoking may enhance the toxic effects.

Section 12 - ECOLOGICAL INFORMATION

Component Analysis - Aquatic Toxicity

No LOLI ecotoxicity data are available for this product's components.

Section 13 - DISPOSAL CONSIDERATIONS

Disposal Methods

Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262.

Hazardous Waste Number(s): D001.

Component Waste Numbers

The U.S. EPA has not published waste numbers for this product's components.

Section 14 - TRANSPORT INFORMATION

US DOT Information

Shipping Name: Carbon monoxide, compressed

UN/NA #: UN1016 **Hazard Class:** 2.3

Required Label(s): 2.3, 2.1

Additional Info.: Toxic-Inhalation Hazard Zone D

TDG Information

Shipping Name: Carbon monoxide, compressed

UN #: UN1016 **Hazard Class:** 2.3

Required Label(s): 2.3, (2.1)

Safety Data Sheet

Material Name: CARBON MONOXIDE

SDS ID: 00232334

Section 15 - REGULATORY INFORMATION

U.S. Federal Regulations

None of this products components are listed under SARA Sections 302/304 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65), CERCLA (40 CFR 302.4), TSCA 12(b), or require an OSHA process safety plan.

SARA 311/312

Acute Health: Yes **Chronic Health:** Yes **Fire:** Yes **Pressure:** Yes **Reactive:** No

U.S. State Regulations

The following components appear on one or more of the following state hazardous substances lists:

Component	CAS	CA	MA	MN	NJ	PA
CARBON MONOXIDE	630-08-0	Yes	Yes	Yes	Yes	Yes

The following statement(s) are provided under the California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65):

WARNING! This product contains a chemical known to the state of California to cause reproductive/developmental effects.

Canada WHMIS

The following components are identified under the Canadian Hazardous Products Act Ingredient Disclosure List

CARBON MONOXIDE (630-08-0)

0.1 %

Component Analysis - Inventory

Component	CAS	US	CA	EU	AU	PH	JP	KR	CN	NZ
CARBON MONOXIDE	630-08-0	Yes	DSL	EIN	Yes	Yes	Yes	Yes	Yes	Yes

Section 16 - OTHER INFORMATION

Key / Legend

ACGIH - American Conference of Governmental Industrial Hygienists; ADR - European Road Transport; AU - Australia; BOD - Biochemical Oxygen Demand; C - Celsius; CA - Canada; CAS - Chemical Abstracts Service; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CN - China; CPR - Controlled Products Regulations; DFG - Deutsche Forschungsgemeinschaft; DOT - Department of Transportation; DSL - Domestic Substances List; EEC - European Economic Community; EINECS - European Inventory of Existing Commercial Chemical Substances; EPA - Environmental Protection Agency; EU - European Union; F - Fahrenheit; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; ICAO - International Civil Aviation Organization; IDL - Ingredient Disclosure List; IDLH - Immediately Dangerous to Life and Health; IMDG - International Maritime Dangerous Goods; JP - Japan; Kow - Octanol/water partition coefficient; KR - Korea; LEL - Lower Explosive Limit; LOLI - List Of Lists™ - ChemADVISOR's Regulatory Database; MAK - Maximum Concentration Value in the Workplace; MEL - Maximum Exposure Limits; NFPA - National Fire Protection Agency; NIOSH - National Institute for Occupational Safety and Health; NJTSR - New Jersey Trade Secret Registry; NTP - National Toxicology Program; NZ - New Zealand; OSHA - Occupational Safety and Health Administration; PH - Philippines; RCRA - Resource Conservation and Recovery Act; RID - European Rail Transport; RTECS - Registry of Toxic Effects of Chemical Substances®; SARA - Superfund Amendments and Reauthorization Act; STEL - Short-term Exposure Limit; TDG - Transportation of Dangerous Goods; TSCA - Toxic Substances Control Act; TWA - Time Weighted Average; UEL - Upper Explosive Limit; US - United States

Safety Data Sheet

Material Name: CARBON MONOXIDE

SDS ID: 00232334

Other Information

Specialty Chemical Products makes no express or implied warranties, guarantees or representations regarding the product or the information herein, including but not limited to any implied warranty or merchantability or fitness for use. Specialty Chemical Products shall not be liable for any personal injury, property or other damages of any nature, whether compensatory, consequential, exemplary, or otherwise, resulting from any publication, use or reliance upon the information herein.

End of Sheet 00232334

Section 1. Chemical Product and Company Identification

Product name Blueshield	Classification CSA: LA S-3/LA HI TENSILE; STRAIGHT WELD LA S-3; LA S-6/LA 75G; STRAIGHT WELD LA S-6; Description In case of emergency Supplier	Classification AWS: ER480S-3/ ER49S-3; ER480S-3/ ER49S-3; ER480S-6/ ER49S-6; ER480S-6/ ER49S-6; ER480S-6/ ER49S-6; : GMAW - Carbon Steel Solid Wires. : 1-514-878-1667 : Air Liquide Canada Inc., 1250, René-Lévesque Ouest, Suite 1700, Montréal, QC H3B 5E6	Classification AWS: ER70S-3; ER70S-3; ER70S-6; ER70S-6; ER70S-6; Generic Code : AL-T-007-0 Date of issue : 01/13/2014
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Section 2. Hazards Identification

Physical state and Appearance	: Solid.
Emergency overview	: These hazards relate to welding fumes (electrodes in use) and not to the electrodes as sold. WARNING! ELECTRIC SHOCK can kill. FUMES AND GASES can be dangerous to your health. ARC RAYS can injure eyes and burn skin. MAY BE HARMFUL IF INHALED. MAY CAUSE RESPIRATORY TRACT, EYE AND SKIN IRRITATION. CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA. Use only with adequate ventilation. Do not eat, drink or smoke when using this product. Avoid contact with eyes, skin and clothing. Keep container tightly closed. Wash thoroughly after handling.
Routes of entry	: Dermal contact. Eye contact. Inhalation.
Potential acute health effects	Eyes : Hazardous by the following route of exposure: of eye contact (irritant). Inflammation of the eye is characterized by redness, watering and itching. Skin : Hazardous by the following route of exposure: of skin contact (corrosive). Skin contact may produce burns. Inhalation : Hazardous by the following route of exposure: of inhalation. Ingestion : Since the product (welding fumes) is a gas and that it is mostly probable that it will be inhaled more than ingested, please consider first to look at the preventive measures in case of inhalation.
Potential chronic health effects	:
Carcinogenicity	Not available.
Mutagenic effects	Not available.
Teratogenic effects	Not available.
Medical conditions aggravated by over-exposure	: Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.
(*) See Abbreviations (section 16).	

Section 3. Composition, Information on Ingredients

Name	CAS #	% by weight	UN number
Iron	7439-89-6	95 - 100	Not available.
Manganese	7439-96-5	0.9 - 1.85	Not available.

The fumes emitted by the electrodes, in use, are hazardous. This MSDS is written for workers using these electrodes.

See Section 8 for Exposure Limits of the oxides found in the welding fumes.

Section 4. First Aid Measures

Eye contact	: Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.
Skin contact	: In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.
Inhalation	: Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.
Ingestion	: Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.

Section 5. Fire Fighting Measures

- Flammability of the product** : Non-flammable. Emits toxic fumes when heated.
- Explosibility** : Non-explosive in the presence of the following materials or conditions: open flames, sparks and static discharge, heat and shocks and mechanical impacts.
- Fire-fighting media and instructions** : Use an extinguishing agent suitable for the surrounding fire.

Section 6. Accidental Release Measures

- Small/Large Spill and Leak** : Use appropriate tools to transfer the spilled solid to a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Section 7. Handling and Storage

- Handling** : Avoid contact with eyes. Avoid breathing dust. Do not get on skin or clothing. Keep container closed. Use only with adequate ventilation. Wash thoroughly after handling. Avoid contact of spilled material and runoff with soil and surface waterways.
- Storage** : All filler metals in their original, unopened containers should be kept in a relatively dry storage area at temperatures between 15°C (60°F) and 30°C (80°F) and 50% maximum relative humidity.

Section 8. Exposure Controls, Personal Protection

- Engineering controls** : Use only with adequate ventilation. If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.
- Personal protection**
- Eyes** : Safety glasses with side shields. Face shield with radiation shielding.
 - Body** : Full suit. Fire resistant.
 - Respiratory** : Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear a canister breathing apparatus (respirator) or a supplied-air respirator, when required, to weld in a confined space or when room exhaust or ventilation does not keep exposure below the acceptable values.
 - Hands** : Gloves. Fire resistant.
 - Feet** : Metal cap, safety boots.

Occupational exposure limits		TWA (8 hours)			STEL (15 mins)			Ceiling			
Ingredient	List name	ppm	mg/m³	Other	ppm	mg/m³	Other	ppm	mg/m³	Other	Notations
Manganese, as Mn	US ACGIH 6/2013	-	0.1	-	-	-	-	-	-	-	[a]
		-	0.2	-	-	-	-	-	-	-	[b]
	AB 4/2009	-	0.2	-	-	-	-	-	-	-	
	BC 7/2013	-	0.2	-	-	-	-	-	-	-	
	ON 1/2013	-	0.2	-	-	-	-	-	-	-	
Iron	QC 12/2012	-	1	-	-	3	-	-	-	-	[c]
	US ACGIH	-	10	-	-	-	-	-	-	-	[d]

Form: [a]Inhalable fraction [b]Respirable fraction [c]fume [d]Inhalable particle.

Section 9. Physical and Chemical Properties

- Physical state and Appearance** : Solid.
- Color** : Reddish-brown. Grayish-white.
- Odor** : Odorless.
- Melting/freezing point** : 1540 to 2030°C (2804 to 3686°F)
- Specific gravity** : Only known value: 7.8 (Water = 1) (iron)
- Solubility** : Insoluble in the following materials: cold water and hot water.

Section 10. Stability and Reactivity

- Stability and reactivity** : The product is stable.
- Hazardous decomposition products** : Metallic oxides. carbon oxides (CO, CO₂) Arc radiation can support the production of ozone and nitrogen oxides.
- Hazardous polymerization** : Under normal conditions of storage and use, hazardous polymerization will not occur.

Section 11. Toxicological Information

Product/ingredient name	Result	Species	Dose	Exposure
Manganese	LD50 Oral	Rat	9 g/kg	-

Chronic effects and other toxic effects on humans : **CARCINOGENIC EFFECTS:** Classified A4 (Not classifiable for humans or animals.) by ACGIH [Manganese]. Contains material which may cause damage to the following organs: blood, kidneys, lungs, the nervous system, upper respiratory tract, central nervous system (CNS).

Hazardous by the following route of exposure: of skin contact (corrosive), of eye contact (irritant), of inhalation.

Section 12. Ecological Information

Ecotoxicity data

Product/ingredient name	Result	Species	Exposure
Iron	Acute EC50 3700 µg/l Fresh water Acute LC50 33000 to 100000 µg/l Marine water Acute LC50 6.48 µg/l Marine water	Aquatic plants - Lemna minor Crustaceans - Crangon crangon Fish - Periophthalmus waltoni - Adult	4 days 48 hours 96 hours
Manganese	Chronic NOEC 100 mg/l Marine water Acute EC50 31000 µg/l Fresh water Acute LC50 29000 µg/l Acute LC50 28 mg/l Fresh water	Algae - Glenodinium halli Aquatic plants - Lemna minor Daphnia - Daphnia magna Fish - Pimephales promelas	72 hours 4 days 48 hours 96 hours

Products of degradation : Not applicable.

Section 13. Disposal Considerations

Waste information : Waste must be disposed of in accordance with federal, state and local environmental control regulations. Recycle, if possible.

Consult your local or regional authorities.

Section 14. Transport Information

No transport class is found applicable to this product.

Section 15. Regulatory Information

HCS Classification : These hazards relate to welding fumes (electrodes in use) and not to the electrodes as sold.

Target organ effects

U.S. Federal regulations : **TSCA 8(a) CDR Exempt/Partial exemption:** Not determined
United States inventory (TSCA 8b): All components are listed or exempted.

SARA 302/304: No products were found.

SARA 311/312 Hazards identification: Delayed (chronic) health hazard

Clean Water Act (CWA) 307: Copper

SARA 313

	Product name	CAS number	%
Form R - Reporting requirements	Manganese	7439-96-5	0.9 - 1.85
Supplier notification	Manganese	7439-96-5	0.9 - 1.85

SARA 313 notifications must not be detached from the MSDS and any copying and redistribution of the MSDS shall include copying and redistribution of the notice attached to copies of the MSDS subsequently redistributed.

State regulations : **Massachusetts** : The following components are listed: MANGANESE

New York : None of the components are listed.

New Jersey : The following components are listed: MANGANESE

Pennsylvania : The following components are listed: MANGANESE

None of the components are listed.

WHMIS (Canada) : These hazards relate to welding fumes (electrodes in use) and not to the electrodes as sold.

Class D-2A: Material causing other toxic effects (Very toxic).

Class D-2B: Material causing other toxic effects (Toxic).

CEPA Toxic substances: None of the components are listed.

Canadian ARET: None of the components are listed.

Canadian NPRI: The following components are listed: Manganese (and its compounds)

Alberta Designated Substances: None of the components are listed.

Ontario Designated Substances: None of the components are listed.

Quebec Designated Substances: None of the components are listed.

Section 16. Other Information

Label requirements : See Section 2.

Hazardous Material Information System (U.S.A.) : Health: 2* Fire: 0 Reactivity: 0

National Fire Protection Association (U.S.A.) : Health: 2 Fire: 0 Reactivity: 0 Other: None

References : - 29CFR Part1910.1200 OSHA MSDS Requirements. - 49CFR Table List of Hazardous Materials, UN#, Proper Shipping Names, PG. - Canadian Transport of Dangerous Goods, Regulations and Schedules, Clear Language version 2005. - CRC Handbook of chemistry and physics, 67th edition. CRC Press inc., Boca Raton, Florida. - Manufacturer's Material Safety Data Sheet. ANSI Z400.1, MSDS Standard, 2004. ANSI Z49.1 Safety in Welding and Cutting, The American Welding Society, P.O. Box 351040, Miami, FL 33135. Canadian Standard Association, CSA W117.2, Code for Safety in Welding and Cutting, 2003.

Abbreviations and acronyms : **ACGIH: American Conference of Governmental Industrial Hygiene.**

ACGIH-A1-Confirmed Human Carcinogen.

ACGIH-A2-Suspected Human Carcinogen.

ACGIH-A3-Animal Carcinogen.

ACGIH-A4-Not Classifiable as a Human Carcinogen.

ACGIH-A5-Not suspected as a Human Carcinogen.

IARC: International Agency for Research on Cancer.

IARC 1: Proven.

IARC 2A: Probable for human.

IARC 2B: Possible for human.

IARC 3: Not classifiable for human.

NIOSH: National Institute of Occupational Safety and Health.

NIOSH +: Proven.

NIOSH: None.

EU: European Union

Carc. 1A : May cause cancer (Known)

Carc. 1B : May cause cancer (Presumed)

Carc. 2 : Suspected of causing cancer

NTP: National Toxicology program.

NTP 1: Known to be human carcinogens.

NTP 2: Reasonably Anticipated to be human carcinogens.

Responsible name : IHS

Date of previous issue : 01/15/2011

Version : 5

Notice to reader

THE INFORMATION, RECOMMENDATIONS AND DATA CONTAINED IN THIS DOCUMENT ARE INTENDED TO BE USED BY PROPERLY TRAINED AND QUALIFIED PERSONNEL ONLY AND AT THEIR SOLE RISKS AND DISCRETION. THE INFORMATION, RECOMMENDATIONS AND DATA HEREIN CONTAINED ARE DERIVED FROM SOURCES WHICH WE BELIEVE TO BE RELIABLE. HOWEVER, AIR LIQUIDE CANADA INC. MAKES NO REPRESENTATION AND GIVES NO WARRANTY OF ANY KIND WHATSOEVER WITH RESPECT TO THEIR ACCURACY OR COMPLETENESS AND ASSUMES NO LIABILITY FOR DAMAGES OR LOSS ARISING DIRECTLY OR INDIRECTLY FROM THEIR USE, WHETHER PROPER OR IMPROPER.



SAFETY DATA SHEET

Page: 1(5)
SDS Number: CAN305-C
Date Revised: 04/03/2013

This Safety Data Sheet complies with Regulation (EC) No. 1907/2006, ISO 11014-1 and ANSI Z400.1

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: ESAB SPOOLARC, OK®, AND GLOBAL CARBON STEEL SOLID WIRE ELECTRODES AND ROD
Application: Arc Welding
Classification: AWS A5.17 & A5.18
Supplier: ESAB GROUP CANADA, INC., 6010 Tomken Road, Mississauga, ON L5T 1X9
Telephone No.: (905) 670-0220, 1-877-935-3226
Web site: www.esab.ca

2. HAZARDS IDENTIFICATION

Emergency Overview: Metal wires or rods in varying colors. These products are normally not considered hazardous as shipped. Gloves should be worn when handling to prevent cuts and abrasions.

Skin contact is normally no hazard but should be avoided to prevent possible allergic reactions.

Persons with a pacemaker should not go near welding or cutting operations until they have consulted their doctor and obtained information from the manufacturer of the device.

When these products are used in a welding process, the most important hazards are heat, radiation, electric shock and welding fumes.

Heat: Spatter and melting metal can cause burn injuries and start fires.

Radiation: Arc rays can severely damage eyes or skin.

Electricity: Electric shock can kill.

Fumes: Overexposure to welding fumes may result in symptoms like metal fume fever, dizziness, nausea, dryness or irritation of the nose, throat or eyes. Chronic overexposure to welding fumes may affect pulmonary function. Overexposure to manganese and manganese compounds above safe exposure limits can cause irreversible damage to the central nervous system, including the brain, symptoms of which may include slurred speech, lethargy, tremor, muscular weakness, psychological disturbances and spastic gait.

3. COMPOSITION/INFORMATION ON INGREDIENTS

These products are continuous metal wires and solid metal rods.

Ingredients	REACH Reg. #	CAS#	EINECS#	Hazard classification ⁽¹⁾	IARC ⁽²⁾	NTP ⁽³⁾	OSHA List ⁽⁴⁾
Aluminum	--	7429-90-5	231-072-3	F; R15 R10 stabilized F; R15-17 pyrophoric	--	--	--
Carbon	--	7440-44-0	231-153-3	No	--	--	--
Copper	--	7440-50-8	231-159-6	No	--	--	--
Iron	01-2119462838-24	7439-89-6	231-096-4	No	--	--	--
Manganese	--	7439-96-5	231-105-1	No	--	--	--
Silicon	--	7440-21-3	231-130-8	No	--	--	--
Titanium	--	7440-32-6	231-142-3	No	--	--	--
Zirconium	--	7440-67-7	231-176-9	F; R15-17	--	--	--

⁽¹⁾ Hazard Classification according to European Council Directive 67/548/EEC, for R-phrases, see Section 16.

⁽²⁾ Evaluation according to the International Agency for Research on Cancer.

1 –Carcinogenic to humans. 2A – Probably carcinogenic to humans. 2B – Possibly carcinogenic to humans.

⁽³⁾ Classification according to the 11th Report on Carcinogens, published by the US National Toxicology Program.
K – Known Carcinogen S – Suspect Carcinogen

⁽⁴⁾ Carcinogen listing according to OSHA, Occupational Safety & Health Administration (USA).



APPROXIMATE COMPOSITION (Wt. %)

Product Trade Name	Al	C	Cu	Mn	Si	Ti	Zr	Fe	AWS Classification
Spoolarc									
29S	--	<0.5	<0.5	1-2	0.5	--	--	Bal.	A5.17, EM13K; A5.18, ER70S-3
36	--	<0.5	<0.5	2	<0.1	--	--	Bal.	A5.17, EH14; A5.25, EH14-EW
53	--	<0.5	<0.5	1-2	<0.5	--	--	Bal.	A5.17, EH12K
65	<0.1	<0.5	<0.5	1-2	0.5	<0.1	<0.1	Bal.	A5.18, ER70S-2
66	--	<0.5	<0.5	1-2	0.5	--	--	Bal.	A5.17, EM13K; A5.18, ER70S-3
80	--	<0.5	<0.5	0.5	<0.1	--	--	Bal.	A5.17, EL12; A5.23, EL12
81	--	<0.5	<0.5	1	<0.5	--	--	Bal.	A5.17, EM12K; A5.23, EM12K
82	--	<0.5	<0.5	1-2	0.5	--	--	Bal.	A5.17, EM13K; A5.18, ER70S-3
82 E	--	<0.5	<0.5	1-2	0.5	--	--	Bal.	A5.17, EM13K; A5.18, ER70S-3
85	--	<0.5	<0.5	1-2	<1	--	--	Bal.	A5.18, ER70S-4
86	--	<0.5	<0.5	1-2	<1.2	--	--	Bal.	A5.18, ER70S-6
87HP	--	<0.5	<0.5	1-2	<1	--	--	Bal.	A5.18, ER70S-7
Easy Grind	--	<0.5	<0.5	1-2	0.5	--	--	Bal.	NONE
OK									
Aristorod 12.50	--	<0.5	<0.5	1-2	<1	--	--	Bal.	A5.18, ER70S-6
Autrod 12.51	--	<0.5	<0.5	1-2	<1	--	--	Bal.	A5.18, ER70S-6
Aristorod 12.57	--	<0.5	<0.5	1-2	<1	--	--	Bal.	A5.18, ER70S-3
Aristorod 12.62	<0.1	<0.5	<0.5	1-2	<1	<0.1	<0.1	Bal.	A5.18, ER70S-2
Aristorod 12.63	--	<0.5	<0.5	1-2	<1	--	--	Bal.	A5.18, ER70S-6
ESAB									
MIG-3	--	<0.5	<0.5	<1.5	<1	--	--	Bal.	A5.18, ER70S-3
MIG-6	--	<0.5	<0.5	1-2	<1.2	--	--	Bal.	A5.18, ER70S-6
VDP ER70S-6	--	<0.5	<0.5	1-2	<1.2	--	--	Bal.	A5.18, ER70S-6

4. FIRST AID MEASURES

- Inhalation:** If breathing has stopped, perform artificial respiration and obtain medical assistance immediately! If breathing is difficult, provide fresh air and call physician.
- Eye contact:** For radiation burns due to arc flash, see physician. To remove dusts or fumes flush with water for at least fifteen minutes. If irritation persists, obtain medical assistance.
- Skin contact:** For skin burns from arc radiation, promptly flush with cold water. Get medical attention for burns or irritations that persist. To remove dust or particles wash with mild soap and water.
- Electric shock:** Disconnect and turn off the power. Use a nonconductive material to pull victim away from contact with live parts or wires. If not breathing, begin artificial respiration, preferably mouth-to-mouth. If no detectable pulse, begin Cardio Pulmonary Resuscitation (CPR). Immediately call a physician.
- General:** Move to fresh air and call for medical aid.

5. FIRE FIGHTING MEASURES

No specific recommendations for welding consumables. Welding arcs and sparks can ignite combustible and flammable materials. Use the extinguishing media recommended for the burning materials and fire situation. Wear self-contained breathing apparatus as fumes or vapors may be harmful.

6. ACCIDENTAL RELEASE MEASURES

Solid objects may be picked up and placed into a container. Liquids or pastes should be scooped up and placed into a container. Wear proper protective equipment while handling these materials. Do not discard as refuse.

- Personal precautions:** refer to Section 8.
- Environmental precautions:** refer to Section 13.



7. HANDLING AND STORAGE

Handling:

Handle with care to avoid stings and cuts. Wear gloves when handling welding consumables. Avoid exposure to dust. Do not ingest. Some individuals can develop an allergic reaction to certain materials. Retain all warning and identity labels.

Storage:

Keep separate from chemical substances like acids and strong bases, which could cause chemical reactions.

8. EXPOSURE CONTROL/PERSONAL PROTECTION

Avoid exposure to welding fumes, radiation, spatter, electric shock, heated materials and dust.

Engineering measures:

Ensure sufficient ventilation, local exhaust, or both, to keep welding fumes and gases from breathing zone and general area. Keep working place and protective clothing clean and dry. Train welders to avoid contact with live electrical parts and insulate conductive parts. Check condition of protective clothing and equipment on a regular basis.

Personal protective equipment:

Use respirator or air supplied respirator when welding or brazing in a confined space, or where local exhaust or ventilation is not sufficient to keep exposure values within safe limits. Use special care when welding painted or coated steels since hazardous substances from the coating may be emitted. Wear hand, head, eyes, ear and body protection like welders gloves, helmet or face shield with filter lens, safety boots, apron, arm and shoulder protection. Keep protective clothing clean and dry.

Use industrial hygiene monitoring equipment to ensure that exposure does not exceed applicable national exposure limits. The following limits can be used as guidance. For information about welding fume analysis refer to Section 10.

Substance		CAS#	ACGIH TLV ⁽¹⁾ mg/m ³	OSHA PEL ⁽²⁾ mg/m ³
Aluminum	(metal and insoluble compounds)	7429-90-5	1**	15*, 5**
Carbon		7440-44-0	None	None
Copper	(fume, as Cu)	7440-50-8	0.2	0.1
	(dust and mists, as Cu)		1	1
Iron	(as iron oxide)	7439-89-6	5**	10 (fume)
Manganese and inorganic compounds	(as Mn)	7439-96-5	0.02**, 0.1***	5 Ceiling
Manganese, fume	(as Mn)	7939-96-5	0.2	5 Ceiling
Silicon		7440-21-3	Withdrawn	15*, 5**
Titanium (metal)		7440-32-6	None	None
Zirconium & Zirconium Compounds	(as Zr)	7440-67-7	5, 10 (STEL)	5

⁽¹⁾ Threshold Limit Values according to American Conference of Governmental Hygienists, 2013

⁽²⁾ Permissible Exposure Limits according to the Occupational Safety & Health Administration (USA)

Unless noted, all values are for 8 hour time weighted averages (TWA).

* Total dust, ** Respirable fraction, *** Inhalable fraction.

NOTE: Some of these products may not contain all of the materials listed. For details of composition, refer to the COMPOSITION TABLES in Section 3.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Solid, non-volatile with varying color.

Melting Point: >1000°C/>1800°F

10. STABILITY AND REACTIVITY

General: These products are only intended for normal welding purposes.

Stability: These products are stable under normal conditions.

Reactivity: Contact with chemical substances like acids or strong bases could cause generation of gas.

When these products are used in a welding process, hazardous decomposition products would include those from the volatilization, reaction or oxidation of the materials listed in Section 3 and those from the base metal and coating.



The amount of fumes generated from these products varies with welding parameters and dimensions but is generally no more than 1 to 13 g/kg consumable. Fumes from these products may contain compounds of the following chemical elements: Fe, O, Mn, Zr, Si, Al, Cu, C, and Ti. The rest is not analyzed, according to available standards.

Refer to applicable national exposure limits for fume compounds, including those exposure limits for fume compounds found in Section 8. Manganese has a low exposure limit, in some countries, that may be easily exceeded.

Reasonably expected gaseous products would include carbon oxides, nitrogen oxides and ozone. Air contaminants around the welding area can be affected by the welding process and influence the composition and quantity of fumes and gases produced.

11. TOXICOLOGICAL INFORMATION

Inhalation of welding fumes and gases can be dangerous to your health. Classification of welding fumes is difficult because of varying base materials, coatings, air contamination and processes. The International Agency for Research on Cancer has classified welding fumes as possibly carcinogenic to humans (Group 2B).

Acute toxicity: Overexposure to welding fumes may result in symptoms like metal fume fever, dizziness, nausea, dryness or irritation of the nose, throat or eyes.

Chronic toxicity: Overexposure to welding fumes may affect pulmonary function. Overexposure to manganese and manganese compounds above safe exposure limits can cause irreversible damage to the central nervous system, including the brain, symptoms of which may include slurred speech, lethargy, tremor, muscular weakness, psychological disturbances and spastic gait.

12. ECOLOGICAL INFORMATION

Welding consumables and materials could degrade/weather into components originating from the consumables or from the materials used in the welding process. Avoid exposure to conditions that could lead to accumulation in soils or groundwater.

13. DISPOSAL CONSIDERATIONS

Discard any product, residue, disposable container or liner in an environmentally acceptable manner, in full compliance with federal and local regulations. Use recycling procedures if available.

USA RCRA: These products are not considered hazardous waste if discarded.

Residues from welding consumables and processes could degrade and accumulate in soils and groundwater.

14. TRANSPORT INFORMATION

No international regulations or restrictions are applicable.

15. REGULATORY INFORMATION

Read and understand the manufacturer's instructions, your employer's safety practices and the health and safety instructions on the label. Observe any federal and local regulations. Take precautions when welding and protect yourself and others.

WARNING: Welding fumes and gases are hazardous to your health and may damage lungs and other organs. Use adequate ventilation.

ELECTRIC SHOCK can kill.

ARC RAYS and SPARKS can injure eyes and burn skin.

Wear correct hand, head, eye and body protection.

Canada: WHMIS classification: Class D; Division 2, Subdivision A

Canadian Environmental Protection Act (CEPA): All constituents of these products are on the Domestic Substance List (DSL).

USA: Under the OSHA Hazard Communication Standard, these products are considered hazardous.

These products contain or produce a chemical known to the state of California to cause cancer and birth defects (or other reproductive harm). (California Health & Safety Code § 25249.5 et seq.)

United States EPA Toxic Substance Control Act: All constituents of these products are on the TSCA inventory list or are excluded from listing.

CERCLA/SARA Title III

Reportable Quantities (RQs) and/or Threshold Planning Quantities (TPQs):

Ingredient name	RQ (lb)	TPQ (lb)
Product is a solid solution in the form of a solid article.	--	--

Spills or releases resulting in the loss of any ingredient at or above its RQ require immediate notification to the National Response Center and to your Local Emergency Planning Committee.

Section 311 Hazard Class

As shipped: Immediate In use: Immediate delayed



EPCRA/SARA Title III 313 Toxic Chemicals

The following metallic components are listed as SARA 313 "Toxic Chemicals" and potential subject to annual SARA 313 reporting. See Section 3 for weight percent.

Ingredient name	Disclosure threshold
Copper	1.0% de minimis concentration
Manganese	1.0% de minimis concentration

16. OTHER INFORMATION

This Safety Data Sheet has been revised due to modifications to Section 8. This SDS supersedes CAN305-B.

Refer to ESAB "Welding and Cutting - Risks and Measures", F52-529 "Precautions and Safe Practices for Electric Welding and Cutting" and F2035 "Precautions and Safe Practices for Gas Welding, Cutting and Heating" available from ESAB, and to:

USA: Contact ESAB at www.esabna.com or 1-800-ESAB-123 if you have questions about this SDS.

American National Standard Z49.1 "Safety in Welding and Cutting", ANSI/AWS F1.5 "Methods for Sampling and Analyzing Gases from Welding and Allied Processes", ANSI/AWS F1.1 "Method for Sampling Airborne Particles Generated by Welding and Allied Processes", AWSF3.2M/F3.2 "Ventilation Guide for Weld Fume", American Welding Society, 550 North Le Jeune Road, Miami, Florida, 33135. Safety and Health Fact Sheets available from AWS at www.aws.org.

OSHA Publication 2206 (29 C.F.R. 1910), U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954.

American Conference of Governmental Hygienists (ACGIH), Threshold Limit Values and Biological Exposure Indices, 6500 Glenway Ave., Cincinnati, Ohio 45211, USA.

NFPA 51B "Standard for Fire Prevention During Welding, Cutting and Other Hot Work" published by the National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169.

UK: WMA Publication 236 and 237, "Hazards from Welding Fume", "The arc welder at work, some general aspects of health and safety".

Germany: Unfallverhütungsvorschrift BGV D1, "Schweißen, Schneiden und verwandte Verfahren".

Canada: CSA Standard CAN/CSA-W117.2-01 "Safety in Welding, Cutting and Allied Processes".

These products have been classified according to the hazard criteria of the CPR and the SDS contains all the information required by the CPR.

Explanation of risk phrases mentioned in this SDS:

- R-phrases: R10 – Flammable.
R15 – Contact with water liberates extremely flammable gases.
R17 – Spontaneously flammable in air.

ESAB requests the users of these products to study this Safety Data Sheet (SDS) and become aware of product hazards and safety information. To promote safe use of these products a user should:

- notify its employees, agents and contractors of the information on this SDS and any product hazards/safety information.
- furnish this same information to each of its customers for these products.
- request such customers to notify employees and customers for the same product hazards and safety information.

The information herein is given in good faith and based on technical data that ESAB believes to be reliable. Since the conditions of use are outside our control, we assume no liability in connection with any use of this information and no warranty, expressed or implied is given. Contact ESAB for more information.



MSDS No.: 103
Revision No.: 013
Revision Date: 01-15-2012
Page: 1 of 2

MATERIAL SAFETY DATA SHEET

Product name: CFR-1 Cleaner
Description: Cleaning agent for Hilti CF-DS1 foam dispenser
Supplier: Hilti, Inc. P.O. Box 21148, Tulsa, OK 74121
Emergency # (Chem-Trec.): 1 800 424 9300 (USA, PR, Virgin Islands, Canada); 001 703 527 3887 (other countries)

INGREDIENTS AND EXPOSURE LIMITS

Ingredients:	CAS Number:	TLV:	PEL:	STEL:
Acetone	67-64-1	500 ppm	1000 ppm	750 ppm
Isopropyl alcohol	67-63-0	200 ppm	400 ppm	400 ppm
Isobutane	75-28-5	NE	NE	NE
Propane	74-98-6	1000 ppm	1000 ppm	NE

Abbreviations: PEL = OSHA Permissible Exposure Limit. TLV = ACGIH Threshold Limit Value. STEL = Short Term Exposure Limit. NE = None Established. NA = Not Applicable.

PHYSICAL DATA

Appearance:	Clear aerosol.	Odor:	Sweet pungent odor.
Vapor Density: (air = 1)	Not determined	Vapor Pressure:	Not determined.
Boiling Point:	Not determined	VOC Content:	740 – 760 g/l
Evaporation Rate:	Not determined	Solubility in Water:	Negligible.
Specific Gravity:	0.74 – 0.76	pH:	Not determined.

FIRE AND EXPLOSION HAZARD DATA

Flash Point:	0° F (- 18° C)	Flammable Limits:	1.4 – 13.0%
Extinguishing Media:	Water spray, CO ₂ , Dry Chemical, Foam.		
Special Fire Fighting Procedures:	Contents under pressure. Cool exposed containers with water spray. A self-contained breathing apparatus (SCBA) should be used in fires involving chemicals.		
Unusual Fire and Explosion Hazards:	Extremely flammable liquid and gas under pressure. Containers can explode or be propelled through the air when exposed to extreme heat such as fire. Vapors are heavier than air and can migrate to distant ignition sources where they can be ignited. Keep away from flames or sparking equipment.		

REACTIVITY DATA

Stability:	Stable.	Hazardous Polymerization:	Will not occur.
Incompatibility:	Strong oxidizing agents, acids, and bases. Extreme heat / fire.		
Decomposition Products:	Thermal decomposition can yield CO and CO ₂ .		
Conditions to Avoid:	Exposure to high temperatures, extremely hot surfaces, flames, sparks, etc. Storage above 120° F.		

HEALTH HAZARD DATA

Known Hazards:	Acute: Skin irritation. Eye irritation. Central nervous system (CNS) depressant. Chronic: Dermatitis.
Signs and Symptoms of Exposure:	Eyes: Irritation and corneal burns can occur from direct contact with the eyes. Skin: Prolonged or repeated skin contact can cause irritation and defatting (drying) of the skin. Inhalation: Can be irritating to the respiratory tract if inhaled. Headaches and dizziness can occur from excessive exposure in poorly ventilated areas. Ingestion: Not a likely route of exposure.
Routes of Exposure:	Dermal. Inhalation.
Carcinogenicity:	No ingredients are classified as a carcinogen by IARC, NTP or OSHA.
Medical Conditions Aggravated by Exposure:	Eye, skin, and respiratory conditions.

EMERGENCY AND FIRST AID PROCEDURES

Eyes:	Flush immediately with plenty of clean water for at least 15 minutes. Contact a physician if symptoms occur.
Skin:	Wash with soap and water. Contact a physician if symptoms occur.
Inhalation:	Move victim to fresh air. Contact a physician if symptoms persist.
Ingestion:	Do not induce vomiting unless directed by a physician. Contact a physician immediately.
Other:	Referral to a physician is recommended if there is any question about the seriousness of the injury/exposure.

CONTROL MEASURES AND PERSONAL PROTECTIVE EQUIPMENT

Ventilation:	General (natural or mechanically induced fresh air movements).
Eye Protection:	Splash-proof chemical goggles recommended. Safety glasses with side shields as a minimum.
Skin Protection:	Impermeable (nitrile) gloves recommended.
Respiratory Protection:	Not normally required. Where ventilation is inadequate to control vapors, use a NIOSH-approved respirator with organic vapor cartridges.

PRECAUTIONS FOR SAFE HANDLING AND USE

Handling and Storing Precautions:	Use with adequate ventilation. Extremely flammable liquid and gas under pressure. Vapors are heavier than air and can be ignited by distant ignition sources. Keep vapors and spray away from extremely hot surfaces, sparks and flame. Do not puncture or incinerate container. Do not expose to excessive heat or store at temperatures above 120° F (49° C). Avoid contact with eyes, skin and clothing. Practice good hygiene; i.e. wash after using and before eating or smoking. Store indoors out of direct sunlight. For industrial use only. Keep out of reach of children.
Spill Procedures:	Immediately remove all sources of ignition. Material will rapidly evaporate. If possible, take up with an absorbent material and place in a container for proper disposal in accordance with all applicable local, state, or federal requirements.

REGULATORY INFORMATION

Hazard Communication:	This MSDS has been prepared in accordance with the federal OSHA Hazard Communication Standard 29 CFR 1910.1200.
HMIS Codes:	Health 1, Flammability 3, Reactivity 0, PPE A (Goggles)
DOT Shipping Name:	Consumer commodity, ORM-D
IATA/ICAO Shipping Name:	Aerosols, flammable, n.o.s. Class 2.1, UN 1950, Ltd. Qty.
TSCA Inventory Status:	Chemical components listed on TSCA inventory.
SARA Title III, Section 313:	This product does not contain any ingredients which are subject to reporting under Section 313 of SARA Title III (40 CFR Part 372).
EPA Waste Code(s):	D001
Waste Disposal Methods:	Consult with regulatory agencies or your corporate personnel for disposal methods that comply with local, state, and federal safety, health and environmental regulations.

CONTACTS

Customer Service:	1 800 879 8000	Technical Service:	1 800 879 8000
Health / Safety:	1 800 879 6000	Jerry Metcalf	(x3704)
Emergency # (Chem-Trec):	1 800 424 9300 (USA, PR, Virgin Islands, Canada); 001 703 527 3887 (other countries)		

The information and recommendations contained herein are based upon data believed to be correct; however, no guarantee or warranty of any kind expressed or implied is made with respect to the information provided.

MATERIAL SAFETY DATA SHEET
CLEANER 33

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SLUYTER COMPANY LTD.

375 Steelcase Road East
Markham, Ontario L3R 1G3 Canada
Tel (905) 475-6011 Fax (905) 475-3119

SECTION 01: CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

MANUFACTURER-----SLUYTER COMPANY LTD.
375 Steelcase Road East
Markham, Ontario L3R 1G3
Canada
Tel (905) 475-6011
PRODUCT NAME-----CLEANER 33.
CHEMICAL FAMILY-----Solvent Blend.
PRODUCT USES-----Cleaning solvent.

SECTION 02: COMPOSITION / INFORMATION ON INGREDIENTS

INGREDIENTS / %	CAS / TLV	LD/50, ROUTE, SPECIES	LC/50, ROUTE, SPECIES
TOLUENE 40 - 60	108-88-3 200 ppm	>2 g/kg Skin (Rabbit)	8000 ppm 8 hours Inhalation (Rat)
ACETONE 20 - 30	67-64-1 750 ppm	9750 mg/kg Oral (Rat)	16000 ppm 4 hours Inhalation (Rat)
METHYL ETHYL KETONE 10 - 15	78-93-3 200 ppm	2737 mg/kg Oral (Rat)	23500 mg/m3 8 Hours Inhalation (Rat)

SECTION 03: HAZARDS IDENTIFICATION

ROUTE OF ENTRY:-----
SKIN CONTACT-----Can cause moderate skin irritation,
defatting and dermatitis.
SKIN ABSORPTION-----Not available.
INHALATION-----See "EFFECTS OF CHRONIC EXPOSURE", below.
INHALATION CHRONIC-----Breathing of high vapour concentrations
could cause dizziness, headache or even
unconsciousness. May be anesthetic which
could result in other central nervous system effects.
INGESTION-----Can cause gastro-intestinal irritation,
nausea, vomiting and diarrhea. Small
amounts of liquid aspirated into
respiratory system could cause severe
health effects (e.g. Bronchopneumonia or Pulmonary Edema).
EYE CONTACT-----Contains materials that are moderately
irritating to the eyes.
EFFECTS OF ACUTE EXPOSURE-----Refer to "ROUTE ENTRY" section.
EFFECTS OF CHRONIC EXPOSURE-----Product is believed to have low toxicity
for other chronic exposures. Prolonged or
repeated skin contact may cause drying or
cracking of the skin.

MATERIAL SAFETY DATA SHEET
CLEANER 33

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SECTION 04: FIRST AID MEASURES

EYE CONTACT-----Check for and remove any contact lenses.
Immediately flush with water for a minimum
of 20 minutes and get medical attention.

SKIN CONTACT-----Remove contaminated clothing. Wash
affected area with water and soap. Seek
medical attention if irritation occurs or persists.

INHALATION-----Remove patient to fresh air. If not
breathing, trained personnel should
administer artificial respiration. Get medical attention.

INGESTION-----Get immediate medical attention.

ADDITIONAL INFORMATION-----Contact your local poison control centre.

SECTION 05: FIRE FIGHTING MEASURES

FLAMMABILITY-----Flammable.

UNDER WHAT CONDITIONS-----Flammable liquid. Fire hazard when exposed
to heat, flame or temperatures above the
flash point. Vapours are heavier than air
and may travel to a source of ignition and
flash-back.

SPECIAL PROCEDURES-----A self-contained breathing apparatus is
required for fire fighting personnel. Use
water spray to cool fire exposed surfaces
and to protect personnel. Use water spray
to cool fire exposed surfaces and to
protect personnel.

FLASH POINT (METHOD)----- -5°C TAG Closed Cup.

AUTO IGNITION TEMPERATURE-----321°C.

UPPER FLAMMABLE LIMIT (% VOL)-----11.80.

LOWER FLAMMABLE LIMIT (% VOL)-----2.20.

EXTINGUISHING MEDIA-----Alcohol foam, CO2 or dry chemical.

HAZARDOUS COMBUSTION PRODUCTS-----Oxides of Carbon (CO and CO2). Toxic fumes.

SENSITIVITY TO MECHANICAL-----Not available.

IMPACT

SENSITIVITY TO STATIC-----May be sensitive.

DISCHARGE

SECTION 06: ACCIDENTAL RELEASE MEASURES

LEAK/SPILL-----Ventilate. Remove all sources of ignition,
open flames, sparks and heaters. Wear
protective gear (See SECTION 8). Small
spills can be wiped. Large spills must be
collected for disposal. Use a
non-combustible absorbent inorganic
material. Prevent run-off into drains,
sewers and other waterways.

SECTION 07: HANDLING AND STORAGE

HANDLING PROCEDURES-----Avoid skin and eye contact. Avoid breathing
vapours. Use adequate ventilation. Keep away
from heat, sparks and open flame.

STORAGE NEEDS-----Store in a cool area, away from all
sources of heat and ignition. Keep
container closed and out of reach from
children and pets when not in use. Store in
a dry, well ventilated area.

MATERIAL SAFETY DATA SHEET
CLEANER 33

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SECTION 08: EXPOSURE CONTROLS / PERSONAL PROTECTION

PROTECTIVE EQUIPMENT:-----
EYE/TYPE-----Safety glasses.
RESPIRATORY/TYPE-----If used indoors on a continuous basis or
if the TLV is exceeded, the use of a
cartridge type respirator (NIOSH/MSHA
approved) is recommended.
GLOVES/ TYPE-----Wear impervious gloves (Neoprene or Rubber).
CLOTHING/TYPE-----Not applicable.
FOOTWEAR/TYPE-----Not applicable.
OTHER/TYPE-----Eye bath and safety shower.
VENTILATION REQUIREMENTS-----Natural or mechanical (Explosion Proof)
ventilation to keep vapour levels well below the TLV.

SECTION 09: PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE-----Liquid.
ODOUR-----Solvent odour.
SPECIFIC GRAVITY-----0.80 - 0.90.
ODOUR THRESHOLD (ppm)-----Not available.
VAPOUR PRESSURE-----145 mmHg @ 20°C.
VAPOUR DENSITY (AIR=1)----- >1.00.
EVAPORATION RATE-----6.00 (NBUAC = 1).
BOILING POINT (deg C)-----65°C.
pH-----Not applicable.
SOLUBILITY IN WATER (% W/W)-----Negligible.
COEFFICIENT OF WATER\OIL-----Not available.
DISTRIBUTION
FREEZING POINT----- <0°C.
MELTING POINT (deg C)-----Not applicable.
MOLECULAR WEIGHT-----Not applicable.

SECTION 10: STABILITY AND REACTIVITY

INCOMPATIBILITY-----Strong acids and strong bases. Oxidizing agents.
REACTIVITY CONDITIONS-----Excessive heat, sparks and open flame.
HAZARDOUS PRODUCTS OF-----Oxides of Carbon (CO and CO2). Toxic
DECOMPOSITION fumes. Smoke.

SECTION 11: TOXICOLOGICAL INFORMATION

EXPOSURE LIMIT OF MATERIAL-----See "HAZARDOUS INGREDIENTS" in SECTION 2.
IRRITANCY OF MATERIAL-----Moderate.
SENSITIZING CAPABILITY OF-----Not available.
MATERIAL
CARCINOGENICITY OF MATERIAL-----No information is available and no adverse
carcinogenic effects are anticipated.
TERATOGENICITY-----No information is available and no adverse
teratogenicity effects are anticipated.
MUTAGENICITY-----No information is available and no adverse
mutagenicity effects are anticipated.
REPRODUCTIVE EFFECTS-----No information is available and no adverse
reproductive effects are anticipated.
SYNERGISTIC MATERIALS-----Not available.

MATERIAL SAFETY DATA SHEET
CLEANER 33

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SECTION 12: ECOLOGICAL INFORMATION

ENVIRONMENTAL-----Not available. Can be dangerous if allowed to enter drinking water intakes. Product has an unaesthetic appearance and can be a nuisance. Do not contaminate domestic or irrigation water supplies, lakes, streams, ponds and rivers.

BIODEGRADABILITY-----Not available. The solvent portion of this product is biodegradable and vaporizes rapidly.

VOC INFORMATION-----This product emits VOC's (volatile organic compounds in use. Always ensure that the use of this product complies with local VOC Emission Regulations, where they exist. The VOC level is 508 grams/litre (SCAQMD Test Method 316A)

SECTION 13: DISPOSAL CONSIDERATIONS

WASTE DISPOSAL-----Spilled material and water rinses are classified as chemical waste. To be disposed of in accordance with current Local, Provincial and Federal regulations.

SECTION 14: TRANSPORT INFORMATION

T.D.G. CLASSIFICATION-----

(1)----- (1e) In containers up to 1 litre - shipped as CONSUMER COMMODITY. If the shipment exceeds 500 kg in weight, shipped as CONSUMER COMMODITY - FLAMMABLE LIQUIDS N.O.S. (TOLUENE) Class 3.

(2)----- (2e) In containers over 1 litre - Flammable Liquids N.O.S. (Toluene Class 3 UN1993 P.G. II.

SECTION 15: REGULATORY INFORMATION

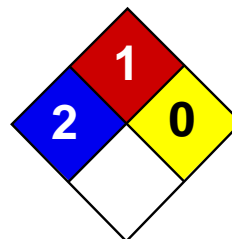
CPR COMPLIANCE-----This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

WHMIS CLASSIFICATION-----Class B Div.2 Flammable Liquid Class D Div.2B Toxic Material.

SECTION 16: OTHER INFORMATION

IMPORTANT:-----The information on this Material Safety Data Sheet is furnished without warranty, expressed or implied. All the information appearing herein is based upon data obtained from manufacturers and/or recognized technical sources. While the information is believed to be accurate, we make no representations for the accuracy or sufficiency.

PREPARED BY:----- Technical Service Department, Sluyter Company Ltd. (905)475-6011



Health	2
Fire	1
Reactivity	0
Personal Protection	E

Material Safety Data Sheet Cobalt MSDS

Section 1: Chemical Product and Company Identification

Product Name: Cobalt

Catalog Codes: SLC1684, SLC3475

CAS#: 7440-48-4

RTECS: GF8750000

TSCA: TSCA 8(b) inventory: Cobalt

CI#: Not available.

Synonym:

Chemical Formula: Co

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Cobalt	7440-48-4	100

Toxicological Data on Ingredients: Cobalt: ORAL (LD50): Acute: 6170 mg/kg [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects: Hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation.

Potential Chronic Health Effects:

Hazardous in case of inhalation. **CARCINOGENIC EFFECTS:** Classified A3 (Proven for animal.) by ACGIH. **MUTAGENIC EFFECTS:** Not available. **TERATOGENIC EFFECTS:** Not available. **DEVELOPMENTAL TOXICITY:** Not available. The substance is toxic to lungs. Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact: Check for and remove any contact lenses. Do not use an eye ointment. Seek medical attention.

Skin Contact:

After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:

Do not induce vomiting. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: Not available.

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances: Not available.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

Flammable solid. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Use appropriate tools to put the spilled solid in a convenient waste disposal container.

Large Spill:

Flammable solid. Stop leak if without risk. Do not touch spilled material. Use water spray curtain to divert vapor drift. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all ignition sources. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep locked up Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe dust. Wear suitable protective clothing In case of insufficient ventilation, wear suitable respiratory equipment If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes

Storage:

Flammable materials should be stored in a separate safety storage cabinet or room. Keep away from heat. Keep away from sources of ignition. Keep container tightly closed. Keep in a cool, well-ventilated place. Ground all equipment containing material. Keep container dry. Keep in a cool place.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection:

Splash goggles. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 0.05 (mg/m³) from OSHA Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid.

Odor: Not available.

Taste: Not available.

Molecular Weight: 58.93 g/mole

Color: Not available.

pH (1% soln/water): Not applicable.

Boiling Point: 3100°C (5612°F)

Melting Point: 1493°C (2719.4°F)

Critical Temperature: Not available.

Specific Gravity: 8.92 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Insoluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Not available.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Eye contact. Inhalation. Ingestion.

Toxicity to Animals: Acute oral toxicity (LD50): 6170 mg/kg [Rat].

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH. The substance is toxic to lungs.

Other Toxic Effects on Humans: Hazardous in case of skin contact (irritant), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are as toxic as the original product.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: CLASS 4.1: Flammable solid.

Identification: : Metal powder, Flammable, n.o.s. (Cobalt metal, powder) : UN3089 PG: III

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Cobalt California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Cobalt Pennsylvania RTK: Cobalt Massachusetts RTK: Cobalt TSCA 8(b) inventory: Cobalt

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada): CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):

R36/38- Irritating to eyes and skin. R40- Possible risks of irreversible effects.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 1

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/09/2005 04:57 PM

Last Updated: 06/09/2012 12:00 PM

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall ScienceLab.com be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if ScienceLab.com has been advised of the possibility of such damages.

Concentrate W2 OP

Print date: 21.02.2012

Product code: 002

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SECTION 1: Identification of the substance/mixture and of the company/undertaking
Product identifier

Concentrate W2 OP

Chemical characterization (Mixture)

Details of the supplier of the safety data sheet

Company name:	Intercon Enterprises Inc.	
Street:	11-7550 River Road	
Place:	CDN Delta BC V4G 1C8	
Telephone:	604 946-6066	Telefax: 604 946-5340
e-mail:	sales@intercononline.com	
Internet:	www.intercononline.com	
Responsible Department:	Manufacturer: Jokisch GmbH, Germany Industriestraße 5, D-33813 Oerlinghausen Phone: +49.5202.9734-0 Fax: +49.5202.9734-49	
Emergency telephone:	Giftnotruf Berlin: +49 (0) 30 / 30 686 790	

SECTION 2: Hazards identification
Route(s) of Entry
Signs and Symptoms of Exposure

Carcinogenicity (NTP):
 Carcinogenicity (IARC):
 Carcinogenicity (OSHA):

SECTION 3: Composition/Information on ingredients
Mixtures
Hazardous components

CAS No	Components	Quantity
68155-20-4	Amide, Tallol-fett-, N,N-Bis(hydroxyethyl)	5 - 10 %
85535-85-9	alkanes, C14-17, chloro; chlorinated paraffins, C14-17	5 - 10 %
68920-66-1	Fettalkoholpolyglykolether	1 - 5 %
111-42-2	2,2'-iminodiethanol, diethanolamine	1 - 5 %
	Fettsäureamid	1 - 5 %
102-71-6	Triethanolamin	1 - 5 %
3302-10-1	3,5,5-Trimethylheransäure	1 - 5 %
112-34-5	2-(2-butoxyethoxy)ethanol, diethylene glycol monobutyl ether	1 - 5 %
10043-35-3	boric acid	< 1 %
110-25-8	Oleoylsarkosin	< 1 %
27458-92-0	Fettalkohol	< 1 %
55406-53-6	Iodpropinylbutylcarbammat	< 1 %

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SECTION 4: First aid measures**Description of first aid measures****General information**

Seek medical attention if problems persist. No administration in cases of unconsciousness or cramps.

After inhalation

Move victim to fresh air. Put victim at rest and keep warm.

After contact with skin

Take off immediately all contaminated clothing. After contact with skin, wash immediately with plenty of water and soap.

After contact with eyes

In case of contact with eyes, rinse immediately with plenty of flowing water for 10 to 15 minutes holding eyelids apart. Consult an ophthalmologist.

After ingestion

Do not induce vomiting. In case of swallowing, keep the patient at rest and contact a doctor.

Indication of any immediate medical attention and special treatment needed

Treat symptomatically

SECTION 5: Firefighting measures**Extinguishing media****Suitable extinguishing media**

Water fog. Foam. Dry extinguishing powder. Carbon dioxide (CO₂).

Unsuitable extinguishing media

High power water jet.

Special hazards arising from the substance or mixture

Can be released in case of fire:

Nitrogen oxides (NO_x).

Carbon monoxide.

Carbon dioxide (CO₂).

Advice for firefighters

In case of fire: Wear self-contained breathing apparatus. Full protective suit.

SECTION 6: Accidental release measures**Personal precautions, protective equipment and emergency procedures**

See protective measures under point 7 and 8.

Environmental precautions

Contain and control the leaks or spills with noncombustible absorbent materials such as sand, earth, vermiculite, diatomaceous earth in drums for waste disposal

Do not empty into drains or the aquatic environment.

Methods and material for containment and cleaning up

Absorb with liquid-binding material (e.g. sand, diatomaceous earth, acid- or universal binding agents). Large quantities remove mechanically

Clean contaminated objects and areas thoroughly observing environmental regulations. Clean with detergents. Avoid solvent cleaners.

SECTION 7: Handling and storage**Precautions for safe handling**

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Product code: 002		

Advice on safe handling

Use only in well-ventilated areas.
 Direct contact with skins avoid.
 When using do not eat, drink or smoke.

Advice on protection against fire and explosion

Prevent access by unauthorised personnel.

Further information on handling

When using do not eat, drink or smoke.
 High slip hazard because of leaking or spilled product.

Conditions for safe storage, including any incompatibilities

Requirements for storage rooms and vessels

Keep the packing dry and well sealed to prevent contamination and absorption of dampness.
 Recommended storage temperature: 5-40 °C
 Maximum period of storage (time): 1 Jahr

Advice on storage compatibility

Keep away from food, drink and animal feedingstuffs.
 Do not store with strong oxidizing agents.

Further information on storage conditions

te regulations relating to storage premises apply to workshops where the product is handled.
 Maximum period of storage (time):

SECTION 8: Exposure controls/personal protection

Control parameters

Exposure limits

CAS No	Components	ppm	mg/m ³	fib/cc	Category	Origin
102-71-6	Triethanolamin	0,5	5		TWA (8 h)	
		0,5	5		TWA (8 h)	
		0,5	5		TWA (8 h)	
111-42-2	Diethanolamine	3	15		TWA (8 h)	REL

Exposure controls

Protective and hygiene measures

Use personal protection equipment as per Directive 89/686/EEC.

Respiratory protection

If technical suction or ventilation measures are not possible or are insufficient, protective breathing apparatus must be worn.

Hand protection

Protect skin by using skin protective cream.
 Wear protective gloves if advisable under safety aspects.
 Wash hands before breaks and at the end of work.
 Gloves of appropriate material (i.e. nitrilic rubber, specification: penetration time: level 6, >480 min., thickness 0,9-1 mm; CE-certified acc. EN 374 cat III)

Eye protection

Use glasses or face shield if there is a risk of splashing.

Skin protection

Chemical resistant safety shoes.
 Take off immediately all contaminated clothing.
 Thorough skin-cleansing after handling the product.

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Set out skin protection guidelines.

SECTION 9: Physical and chemical properties**Information on basic physical and chemical properties**

Physical state: liquid
Color: green
Odor: characteristic

pH-Value (at 20 °C):

Test method
9,7 DIN 51369

Changes in the physical state

Flash point: irrelevant
Ignition temperature: not determined
Vapour pressure: not determined
Density (at 20 °C): 1,05 g/cm³ EN ISO 12185
Viscosity / kinematic:
(at 20 °C) ASTM D 7042
Vapour density:
(at 20 °C) 479 ASTM D 7042

SECTION 10: Stability and reactivity

Stability:

Possibility of Hazardous Reactions:

Conditions to avoid

Protect against: heat.

Incompatible materials

The following must be prevented: Oxidizing agents, strong. acid.

Hazardous decomposition products

Hazardous decomposition products: none/none

SECTION 11: Toxicological information**Information on toxicological effects****Additional information on tests**

No risks worthy of mention. Practical experience.
The statement is derived from the properties of the components.
The classification was undertaken in accordance with the calculation method governed by the Preparations Directive (1999/45/EC).

SECTION 12: Ecological information**Persistence and degradability**

Additional information: none/none

Bioaccumulative potential

Can be concentrated in organisms.

Mobility in soil

in delivery condition: liquid

SECTION 13: Disposal considerations

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Waste treatment methods

Advice on disposal

Completely emptied packings can be re-cycled. Waste disposal according to official state regulations.

SECTION 14: Transport information

Marine transport

Other applicable information

Not restricted

Air transport

Other applicable information

Not restricted

SECTION 15: Regulatory information

U.S. Regulations

SECTION 16: Other information

Hazardous Materials Information Label (HMIS)

Health: 1

Flammability: 0

NFPA Hazard Ratings

Health: 1

Flammability: 0

Reactivity: 0

Unique Hazard:



(The data for the hazardous ingredients were taken respectively from the last version of the sub-contractor's safety data sheet.)

Olin MSDS No.: 00001.0001

Review Date: 1/1/13

Revision No.: 15

Revision Date: 1/1/09

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: COPPER ALLOY
Chemical Name: Mixture - Metal Alloy
Synonyms: Copper, UNS/CDA Alloy Nos. C10000-C15599 (except 15815)
Chemical Family: Copper
Formula: Not applicable - mixture
Product Use: Metallurgical Products

COMPANY ADDRESS	MSDS Control Group Olin Brass 427 North Shamrock St. East Alton, IL 62024-1197 www.olinbrass.com	TECHNICAL INFORMATION:	EMERGENCY TELEPHONE NUMBER:
		618-258-5003	1-618-258-5167

2. COMPOSITION/INFORMATION ON INGREDIENTS

CAS Number	Components	% By Weight	EINECS/ ELINCS #	EU Classification	
				Symbol	R-Phrase
7440-50-8	Copper	99.75 - 100	231-159-6	None	None

OSHA REGULATORY STATUS: In solid form, not hazardous. Dust or fume: irritant

In solid form, this material is not hazardous. Dust and fumes are hazardous materials.

3. HAZARDS IDENTIFICATION

WARNING!

EXPOSURE TO DUST OR FUMES CAN CAUSE EYE AND RESPIRATORY TRACT IRRITATION. USE ONLY WITH ADEQUATE VENTILATION. AVOID CONTACT WITH EYES, SKIN AND CLOTHING. WASH THOROUGHLY AFTER HANDLING.

HAZARD RATINGS (for dust or fume) Degree of hazard (0 = low, 4 = extreme)
Hazardous Materials Identification System (HMIS) Health: 1 Flammability: 0 Physical Hazard: None

National Fire Protection Association (NFPA) Mixture. Not rated.

HUMAN THRESHOLD RESPONSE DATA

Odor Threshold: Unknown
Irritation Threshold: Unknown
Immediately Dangerous to Life or Health (IDLH) Value(s): The IDLH for this product is not known. The IDLH for copper is 100 mg/m³.

*POTENTIAL HEALTH EFFECTS*ACUTE EFFECTS

Eye: Dust or fume can cause irritation consisting of redness, swelling, and pain. May cause conjunctivitis with repeated exposures.

Skin: Material not expected to be absorbed through the skin. Contact with dust may cause mild irritation consisting of redness and/or swelling.

Inhalation: Inhalation of high concentrations of powder, dust, or fume may cause respiratory and nasal irritation, coughing, and difficulty breathing. Inhalation of high concentrations of metallic copper dusts or fumes may cause nasal irritation and/or nausea, vomiting and stomach pain.

Ingestion: Ingestion of large amounts of dust may cause nausea, diarrhea and or stomach pain.

CHRONIC EFFECTS: Prolonged or repeated skin contact with dust may cause more severe irritation or dermatitis. Prolonged or repeated inhalation of dust or fume may cause more severe irritation and possibly lung damage.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Exposure to dust or fume may aggravate an existing dermatitis, asthma, emphysema, or other respiratory disease.

POTENTIAL ENVIRONMENTAL EFFECTS: None known. Product has not been tested for environmental properties.

4. FIRST AID MEASURES

EYE CONTACT: Immediately flush out fume and dust particles with large amounts of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. If eye irritation develops, call a physician at once.

SKIN CONTACT: If exposed to dust or fumes, wash skin with plenty of water. Remove contaminated clothing and shoes and launder before reuse. If skin irritation or rash develops and persists or recurs, get medical attention.

INHALATION: If symptoms of lung irritation occur (coughing, wheezing or breathing difficulty), remove from exposure area to fresh air immediately. If breathing has stopped, perform artificial respiration. Keep affected person warm and at rest. Get medical attention.

INGESTION: Not a likely route of exposure for finished metal alloy. If dust is ingested, immediately drink water to dilute. Consult a physician if symptoms develop.

NOTE TO PHYSICIANS: There is no specific antidote to the active ingredients in this product; use symptomatic treatment.

5. FIRE FIGHTING MEASURES

<i>PROPERTY</i>	<i>VALUE</i>	<i>PROPERTY</i>	<i>VALUE</i>
Explosive	No	Flammable	No
Combustible	No	Pyrophoric	No
Flash Point (°C):	Not applicable	Burning Rate of Material:	Not applicable
Lower Explosive Limit:	Not applicable	Autoignition Temp.:	Not applicable
Upper Explosive Limit:	Not applicable	Flammability Classification: (defined by 29 CFR 1910.1200)	Not applicable

UNUSUAL FIRE AND EXPLOSION HAZARDS: Dust may cause an ignitable and/or an explosive atmosphere.

EXTINGUISHING MEDIA: For localized powder fires, smother with dry sand, dry dolomite, sodium chloride or soda ash. Use fire-extinguishing media appropriate to fight surrounding fire.

SPECIAL FIREFIGHTING PROCEDURES: None required.

6. ACCIDENTAL RELEASE MEASURES

FOR ALL TRANSPORTATION ACCIDENTS, CALL (618)258-5167. In dust form, this product may be an

explosion hazard. Remove all sources of ignition. Dust of fume may be suppressed by the use of a local exhaust system. Dispose of per guidelines under Section 13, WASTE DISPOSAL.

7. HANDLING AND STORAGE

HANDLING: Avoid dispersion of dust in air.
STORAGE: No special requirements.
Shelf Life Limitations: None known
Incompatible Materials for Packaging: None known
Incompatible Materials for Storage or Transport: None known.
OTHER PRECAUTIONS: Do not shake clothing, rags or other items to remove dust. Dust should be removed by washing or HEPA vacuuming.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

CAS #	CHEMICAL NAME	ACGIH TLV	OSHA PEL	INTERNATIONAL OELS
7440-50-8	Copper	0.2 mg/m ³ (fume), 1 mg/m ³ (dusts and mists)	0.1 mg/m ³ (fume) 1 mg/m ³ (dusts and mists)	Austria, Belgium, Canada: 0.2 mg/m ³ (fumes), 1 mg/m ³ (dusts) Denmark: 1.0 mg/m ³ (dust and powder) Germany (MAK): 0.1 mg/m ³ (fume), 1 mg/m ³ (dusts and mists)

ENGINEERING CONTROLS: Local exhaust ventilation is recommended if significant dusting occurs or fumes are generated. Otherwise, use general exhaust ventilation.

EYE / FACE PROTECTION: Use safety glasses.

SKIN PROTECTION: Wear impervious (cut-resistant) gloves and other protective clothing (aprons, coveralls) as appropriate to prevent skin contact when using this product. If generating a dust, wash thoroughly after handling, especially before eating, drinking, or smoking.

RESPIRATORY PROTECTION: Respiratory protection not normally needed. If dusting occurs or fumes are generated above the PEL/TLV, use a NIOSH-approved half-face or full-face respirator equipped with High Efficiency Particulate (HEPA) filter cartridges.

GENERAL HYGIENE CONSIDERATIONS: Do not eat, drink, or smoke while using this product in dust form.

9. PHYSICAL AND CHEMICAL PROPERTIES

PROPERTY	VALUE	PROPERTY	VALUE
Appearance:	Red metallic	Vapor Density (air = 1):	Not applicable
Odor:	None	Boiling Point (°F):	No data
Molecular Weight:	Not applicable - Mixture	Melting point:	L:1080-1090°C (1976-1995°F) S:965-1085°C (1769-1985°F)
Physical State:	Solid	Specific gravity (g/cc):	8.94
pH:	Not applicable	Bulk Density	8.94 g/cc
Vapor Pressure (mm Hg):	Not applicable	Viscosity (cps):	Not applicable
Vapor Density	Not applicable	Decomposition Temperature:	Not applicable
Solubility in Water (20 °C):	Negligible	Evaporation Rate:	Not Applicable
Volatiles, Percent by volume:	Not applicable	Octanol/water partition coefficient:	Unknown

10. STABILITY AND REACTIVITY

STABILITY: Stable under normal temperatures and pressure

CONDITIONS TO AVOID: Not affected by mechanical impact or shock or by electrical discharge.

MATERIALS TO AVOID: Acetylene, chlorine

HAZARDOUS DECOMPOSITION PRODUCTS: When heated to decomposition, may produce metal oxides and fumes. Inhalation of high concentrations of metal fumes may cause a condition known as "metal fume fever" which is characterized by flu-like symptoms.

HAZARDOUS POLYMERIZATION: Will not occur.

11. TOXICOLOGICAL INFORMATION

POTENTIAL EXPOSURE ROUTES: For dust: ingestion, inhalation, and eye contact. For fume: inhalation and eye contact. The finished alloy metal is not hazardous.

ACUTE ANIMAL TOXICITY DATA:

For Product: The toxicological properties of this product have not been thoroughly investigated.		For Components	
		Copper	Boron
Oral LD ₅₀	Believed to be > 5 g/kg	3.5 mg/kg (mouse, intraperitoneal)	650 mg/kg (rat)
Dermal LD ₅₀	Believed to be > 2 g/kg	375 mg/kg (rabbit, subcutaneous)	No data
Inhalation LC ₅₀	Believed to be slightly to moderately toxic	No data	No data
Irritation	Eye and respiratory irritant, sensitizer	Respiratory irritant	No data

SUBCHRONIC/ CHRONIC TOXICITY: No information for product.

CARCINOGENICITY: This product is not known or reported to be carcinogenic by IARC, NTP, OSHA, or EPA.

MUTAGENICITY: This product is not known or reported to be mutagenic.

REPRODUCTIVE, TERATOGENICITY, OR DEVELOPMENTAL EFFECTS: This product is not known or reported to cause reproductive or developmental effects. Boron in the form of boric acid has caused testicular damage and reproductive effects in laboratory animals.

NEUROLOGICAL EFFECTS: This product is not known or reported to cause neurological effects.

INTERACTIONS WITH OTHER CHEMICALS WHICH ENHANCE TOXICITY: None known or reported.

12. ECOLOGICAL INFORMATION

ECOTOXICITY: No data is available on this product. Individual constituents are as follows:

Copper: The toxicity of copper to aquatic organisms varies significantly not only with the species, but also with the physical and chemical characteristics of the water, such as its temperature, hardness, turbidity and carbon dioxide content. Copper concentrations varying from 0.1 to 1.0 mg/l have been found by various investigators to be not toxic for most fish. However, concentrations of 0.015 to 3.0 mg/l have been reported as toxic, particularly in soft water to many kinds of fish, crustaceans, mollusks, insects, and plankton.

MOBILITY: No data

PERSISTANCE/DEGRADABILITY: No data

BIOACCUMULATION: No data

13. DISPOSAL CONSIDERATIONS

If this product becomes a waste, it DOES NOT meet the criteria of a hazardous waste as defined under 40 CFR 261, in that it does not exhibit the characteristics of hazardous waste of Subpart C, nor is it listed as a hazardous waste under Subpart D. Care must be taken to prevent environmental contamination from the use of this material. The user of this material has the responsibility to dispose of unused material, residues and containers in compliance with all relevant local, state and federal laws and regulations regarding treatment, storage and disposal for hazardous and non-hazardous wastes. This product may be a candidate for metal reclamation.

14. TRANSPORT INFORMATION

	U.S. DOT	RID/ADR	IMDG	IATA	IMO	Canada TDG
<i>PROPER SHIPPING NAME:</i>	Not regulated					
<i>HAZARD CLASS:</i>						
<i>UN NO.:</i>						
<i>PACKING GROUP:</i>						
<i>LABEL:</i>						
<i>REPORTABLE QUANTITY:</i>						

15. REGULATORY INFORMATION

US FEDERAL

TSCA	The components of this product are listed on the Toxic Substance Control Act inventory.				
CERCLA:	Copper, R.Q.= 5000 lbs. (No reporting is required if diameter of the pieces of metal is equal to or exceeds 100 micrometers (0.004 inches)).				
SARA 313:	Copper				
SARA 313 Hazard Class:	<u>Health:</u> For dust or fume only	Acute - Yes, Chronic - No	<u>Fire:</u> None	<u>Reactivity:</u> None	<u>Release of Pressure:</u> None
SARA 302 EHS List:	None of the components of this product are listed.				

*RQ = Reportable Quantity

STATE RIGHT-TO-KNOW STATUS

Component	*CA Prop. 65	New Jersey	Pennsylvania	Massachusetts	Michigan
Copper	Not listed	X	X	X	X

EUROPEAN REGULATIONS

This material in its massive solid form is not required to be labeled under EC regulations.

German WGK Classification: Not classified

CANADIAN REGULATIONS

DSL LIST: The components of this product are on the DSL or are exempt from reporting under the New Substances Notification Regulations.

IDL: Copper

WHMIS: This product is considered to be a manufactured article and therefore not subject to WHMIS requirements.

16. OTHER INFORMATION

REVISIONS: Update to composition 1/1/04

PREPARED BY: Olin Brass

NOTICE: THE INFORMATION IN THIS MSDS SHOULD BE PROVIDED TO ALL WHO WILL USE, HANDLE, STORE, TRANSPORT, OR OTHERWISE BE EXPOSED TO THIS PRODUCT. THIS INFORMATION HAS BEEN PREPARED FOR THE GUIDANCE OF PLANT ENGINEERING, OPERATIONS AND MANAGEMENT AND FOR PERSONS WORKING WITH OR HANDLING THIS PRODUCT. OLIN BRASS BELIEVES THIS INFORMATION TO BE RELIABLE AND CURRENT AS OF THE DATE OF PUBLICATION, BUT MAKES NO WARRANTY THAT IT IS.

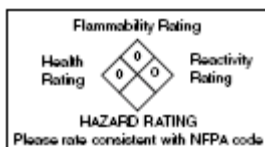
17. Document Review

This document reviewed annually.



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MATERIAL SAFETY DATA SHEET

I. PRODUCT INFORMATION

TRADE NAME (COMMON NAME OR SYNONYM) _____

Copper Tubing (all sizes and wall thicknesses)

CHEMICAL NAME	FORMULA	MOLECULAR WEIGHT
Copper	Cu	63.55

CONTACT	PHONE NUMBER	ISSUED DATE	SUPERCEDES
Safety/Environmental	618/337-6000	October 1, 2011	January 12, 2010

II. COMPOSITION/INFORMATION ON INGREDIENTS

MATERIAL OR COMPONENT	C.A.S. No.	WT. %	PERMISSIBLE AIR CONC. (mg/cu.m)	
			OSHA	ACGIH
Copper	7440-50-8	99.9+	Dust - 1.0 Fume - 0.1	1.0 0.2

III HAZARDS IDENTIFICATION

PRIMARY ROUTES OF ENTRY	INGESTION	INHALATION	SKIN	CARCINGENICITY
		<u>X</u>		Not listed as a carcinogen by NTP, IARC, or OSHA

ACUTE OVER EXPOSURE (SYMPTOMS AND EFFECTS)

A. Fumes are created by heating metallic copper past its melting point. Proper soldering or sweating copper tubes will not produce fumes. Brazing of copper tube may produce fumes. Consult Copper Development Association, Inc. (CDA) "The Copper Tube Handbook" for proper joining methods, and recommended solders, fluxes and filler metals (see CDA link on Cerro Flow Products, LLC website to obtain handbook). Use approved ventilation or respiratory protection if the possibility of fumes exists. Inhalation of fume may cause irritation of the respiratory tract or metal fume fever (chills, fever, aching muscles, dry mouth and throat, headache, nausea, vomiting, and diarrhea). Onset may be delayed several hours.

B. Ingestion of metallic copper is not a primary route of exposure. Metallic copper may be moderately irritating to the gastrointestinal tract.

CHRONIC OVEREXPOSURE (SYMPTOMS AND EFFECTS)

No long term effects. Skin irritation or discoloration of the skin and hair are short term.

MEDICAL CONDITIONS POSSIBLY AGGRAVATED

Wilson's Disease (an abnormal genetic condition) could be aggravated.

IV. FIRST AID MEASURES

Inhalation: Remove from exposure; place individual under care of a physician.

Ingestion: Induce vomiting in conscious individual and call a physician.

Skin or Eyes; Flush with plenty of water. If symptoms develop, consult a physician.

V. FIRE FIGHTING MEASURES

FLASH POINT	AUTO IGNITION TEMPERATURE	FLAMMABLE LIMITS IN AIR (% BY VOL.)
Not Applicable	Not Applicable	Not Applicable

FIRE AND EXPLOSION HAZARDS	FIRE EXTINGUISHING AGENTS RECOMMENDED	FIRE EXTINGUISHING AGENTS TO AVOID
Not Applicable	No specific agents recommended	No specific agents recommended

SPECIAL FIRE FIGHTING PRECAUTIONS

Copper tube will not burn or give off toxic gases in normal fires Use fire fighting methods compatible with surrounding materials.

VI. RELEASE MEASURES

SPILLS OR LEAKS

Proper installation of copper tubes will not produce dust. Consult Copper Development Association, Inc (CDA) "The Copper Tube Handbook" for proper joining methods (See CDA link on Cerro Flow Products, LLC website to obtain handbook) Vacuuming is preferred for dust. Do not use compressed air for cleaning. Recycle unused or scrap copper tube at a local scrap metal dealer.

VII. HANDLING AND STORAGE

NORMAL HANDLING

Avoid conditions which create fumes or fine dust. Use of approved respirators is required where adequate ventilation cannot be provided. Do not use copper tubing where incompatible materials may be present, (see section X).

STORAGE

Avoid storage near incompatible materials, see Section X.

VIII. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS

Local exhaust is recommended for dust and/or fume generating operations where airborne exposure may exceed permissible air concentrations.

PERSONAL HYGIENE

Avoid inhalation or ingestion. Practice good housekeeping and personal hygiene procedures. Showering is recommended if significant dust exposure occurs.

SPECIAL: PRECAUTIONS/PROCEDURES/LABEL INSTRUCTIONS

No special precautions.

LABEL SIGNAL WORD:

CAUTION

RESPIRATORY PROTECTION

Where airborne exposures may exceed OSHA/ACGIH permissible air concentrations, the minimum respiratory protection recommended is a negative pressure air purifying respirator with cartridges that are NIOSH/MSHA approved against dust, fumes, and mists having a TWA not less than 0.05 mg/cu.m.

EYES AND FACE

Safety glasses recommended when dust or shavings may exist.

OTHER CLOTHING AND EQUIPMENT

Protective clothing is recommended to prevent burns during installation of tube or splattering of fluxes, solder or filler metals.

IX. PHYSICAL/CHEMICAL PROPERTIES

MATERIAL IS (AT NORMAL CONDITIONS)

Solid

APPEARANCE AND ODOR

Yellow-red metal, various shapes and sizes.

MELTING POINT (DEGREES C)

1083

BOILING POINT (DEGREES C)

2595

SPECIFIC GRAVITY (H2O = 1)

8.96

VAPOR DENSITY (AIR = 1)

Not applicable

SOLUBILITY IN WATER (% BY WT.)

Insoluble

pH

Not Applicable

VAPOR PRESSURE (mm Hg)

Not Applicable

EVAPORATION RATE

Not Applicable

X. STABILITY AND REACTIVITY

STABILITY

Stable

CONDITIONS TO AVOID

Not Applicable

INCOMPATIBILITY (MATERIALS TO AVOID)

Reacts violently with acetylene, hydrogen peroxides, gaseous chlorine, ammonia nitrate, bromates, chlorates, hydrogen sulfide, lead azide, and hydrazine.

HAZARDOUS DECOMPOSITION PRODUCTS

Copper does not decompose

HAZARDOUS POLYMERIZATION

Will not occur

CONDITIONS TO AVOID

Not Applicable

XI. TOXICOLOGICAL INFORMATION

<u>LD50 (SPECIES, ROUTE)</u>	<u>LC50 (SPECIES)</u>	<u>MUTAGENICITY</u>
Copper: 3.5 mg/kg (mouse, intraperitoneal)	Not Available	Not positive in Ames test

XII. ECOLOGICAL

<u>ECOTOXICITY</u>	<u>ENVIRONMENTAL FATE</u>
The LC50 for copper in the fathead minnow is 12 mg/L.	Acid solutions promote mobility and solubility of copper.

XIII. DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHODS (DISPOSER MUST COMPLY WITH FEDERAL, STATE, AND LOCAL DISPOSAL OR DISCHARGE LAWS).

Recycling or disposal must be in accordance with the appropriate federal, state, or local statutes or regulations.

XIV. TRANSPORT

DOT REGULATION AND ID (OR PIN) NUMBER
Not regulated by DOT.

XV. REGULATORY INFORMATION

WHMIS CLASSIFICATION, SARA REGULATION AND OTHER INFORMATION

WHMIS does not classify this material
TSCA Status ----- On TSCA Inventory
Regulated under SARA Title III:
Sect. 302 ----- None
Sect. 311/312 ----- Immediate and Delayed
Sect. 313 Chemicals ----- Copper
CERCLA Reportable Quantity ----- 5,000 pounds for Copper Powder

XVI. REFERENCES

PERMISSIBLE CONCENTRATION REFERENC

OSHA regulations for airborne contaminants 29 CFR 1910.1000 and 1018; ACGIH Threshold Limit Values for Chemical Substances

HAZARD INFORMATION REFERENCES

Documentation of the Threshold Limit Values, 6th Ed., ACGIH
Patty's *Industrial Hygiene and Toxicology*, Vol. 2A, 3rd Rev. Ed., 1981
NFPA Fire Protection Guide on Hazardous Materials, 10th Ed., 1981
Handbook of Toxic and Hazardous Chemicals, Sittig, Marshall, 1981
TOMES Plus Database, Micromedex, Inc., Vol. 17, 1993
DATATOX Database, Spectrum Research, Inc., Version 2.0, 1992

GENERAL

Handbook of Chemistry and Physics, 57th Ed., 1976-77, Weast, R. C., Editor, CRC Inc.
American Welding Society, *Welding Handbook* Volume 2., 1995.
Copper Development Association, *The Copper Tube Handbook*, 1999

XVII. ADDITIONAL INFORMATION

INFORMATION (HAZARDS, FIRST AID, ETC.) IS ABBREVIATED. MORE INFORMATION IS CONTAINED IN REFERENCES FOUND IN SECTION XVII .

No additional information.

THE INFORMATION AND RECOMMENDATIONS SET FORTH HEREIN ARE TAKEN FROM SOURCES BELIEVED TO BE ACCURATE AS OF THE DATE HEREOF; HOWEVER, CERRO FLOW PRODUCTS LLC. MAKES NO WARRANTY WITH RESPECT TO THE ACCURACY OF THE INFORMATION OR THE SUITABILITY OF THE RECOMMENDATIONS, AND ASSUMES NO LIABILITY TO ANY USER THEREOF.



SAFETY DATA SHEET

CORRSHIELD* MD4102

1. Product and Company Identification

Material name CORRSHIELD MD4102
Version # 2.0
Revision date Jul-01-2014
Supersedes date Jul-29-2011
Prepared by This MSDS has been prepared by GE Water & Process Technologies Regulatory Department (1-215-355-3300).
CAS # Mixture
Product application Water-based corrosion inhibitor

Company/undertaking identification

GE Water & Process Technologies Canada
3239 Dundas Street West
Oakville, Ontario, L6M 4B2
T 905-465-3030

Emergency telephone

(800) 877-1940

2. Hazards Identification

Emergency overview May cause moderate irritation to the skin. Absorbed by skin. Severe irritant to the eyes. Irritating to respiratory system.

Potential health effects

- Eyes** Severe irritant to the eyes.
- Skin** Primary route of exposure May cause moderate irritation to the skin. Absorbed by skin
- Inhalation** Irritating to respiratory system.
- Ingestion** May cause gastrointestinal irritation with possible nausea, vomiting, abdominal discomfort and diarrhea.

Target organs Lungs. Liver. Kidneys.

Signs and symptoms May cause redness or itching of skin.

Medical conditions aggravated by exposure Asthma
Allergies
Skin disorders
Respiratory diseases

3. Composition / Information on Ingredients

Hazardous components	CAS #	Percent (wt/wt)
Morpholine	110-91-8	3 - 7

Non-hazardous components	CAS #	Percent (wt/wt)
Sodium Molybdate	7631-95-0	3 - 7

Composition comments Information for specific product ingredients as required by the WHMIS Regulations is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation.

4. First Aid Measures

First aid procedures

Eye contact	Immediately flush eyes with plenty of low-pressure water for at least 30 minutes while removing contact lenses. Keep eyelids apart. Seek medical attention.
Skin contact	Wash off with soap and water. Get medical attention immediately. Take off contaminated clothing and wash before reuse.
Inhalation	Move to fresh air. If breathing stops, provide artificial respiration. For breathing difficulties, oxygen may be necessary. Get medical attention immediately.
Ingestion	If swallowed, rinse mouth with water (only if the person is conscious). Never give anything by mouth to a victim who is unconscious or is having convulsions. Do not induce vomiting. Get medical attention if symptoms occur.

Notes to physician No specific antidotes are recommended.

5. Fire Fighting Measures

Extinguishing media

Suitable extinguishing media	Dry chemical, CO ₂ , water spray or regular foam.
Unsuitable extinguishing media	None.

Protection of firefighters

Protective equipment for firefighters Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

Fire fighting equipment/instructions

Firefighters should wear full protective clothing including self contained breathing apparatus.

Explosion data

Sensitivity to static discharge	Not available.
Sensitivity to mechanical impact	Not available.

6. Accidental Release Measures

Personal precautions

Wear appropriate protective equipment and clothing during clean-up. See Section 8 of the MSDS for Personal Protective Equipment.

Environmental precautions

Avoid discharge into drains, water courses or onto the ground.

Methods for cleaning up

Ventilate the area. Soak up with inert absorbent material. Place in waste disposal container. Flush area with water. Wet area may be slippery. Spread sand/grit.

7. Handling and Storage

Handling

No special precautions are necessary beyond normal good hygiene practices. See Section 8 of the MSDS for additional personal protection advice when handling this product.

Storage

Keep container tightly closed in a dry and well-ventilated place. Protect from freezing. Preferably stored between 5-38°C

8. Exposure Controls / Personal Protection

Occupational exposure limits

US. ACGIH Threshold Limit Values

Components	Type	Value	Form
Morpholine (CAS 110-91-8)	TWA	20 ppm	
Sodium Molybdate (CAS 7631-95-0)	TWA	0.5 mg/m ³	Respirable fraction.

Canada. Alberta OELs (Occupational Health & Safety Code, Schedule 1, Table 2)

Components	Type	Value	Form
Morpholine (CAS 110-91-8)	TWA	71 mg/m ³	
		20 ppm	
Sodium Molybdate (CAS 7631-95-0)	TWA	0.5 mg/m ³	Respirable.

Canada. British Columbia OELs. (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended)

Components	Type	Value	Form
Morpholine (CAS 110-91-8)	TWA	20 ppm	

Canada. British Columbia OELs. (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended)

Components	Type	Value	Form
Sodium Molybdate (CAS 7631-95-0)	TWA	0.5 mg/m ³	Respirable.

Canada. Manitoba OELs (Reg. 217/2006, The Workplace Safety And Health Act)

Components	Type	Value	Form
Morpholine (CAS 110-91-8)	TWA	20 ppm	
Sodium Molybdate (CAS 7631-95-0)	TWA	0.5 mg/m ³	Respirable fraction.

Canada. Ontario OELs. (Control of Exposure to Biological or Chemical Agents)

Components	Type	Value	Form
Morpholine (CAS 110-91-8)	STEL	105 mg/m ³	
		30 ppm	
		70 mg/m ³	
Sodium Molybdate (CAS 7631-95-0)	TWA	20 ppm	
		0.5 mg/m ³	Respirable fraction.

Canada. Quebec OELs. (Ministry of Labor - Regulation Respecting the Quality of the Work Environment)

Components	Type	Value
Morpholine (CAS 110-91-8)	TWA	71 mg/m ³
		20 ppm
Sodium Molybdate (CAS 7631-95-0)	TWA	5 mg/m ³

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value
Morpholine (CAS 110-91-8)	PEL	70 mg/m ³
		20 ppm
Sodium Molybdate (CAS 7631-95-0)	PEL	5 mg/m ³

Biological limit values No biological exposure limits noted for the ingredient(s).

Exposure guidelines

Canada - Alberta OELs: Skin designation

Morpholine (CAS 110-91-8) Can be absorbed through the skin.

Canada - British Columbia OELs: Skin designation

Morpholine (CAS 110-91-8) Can be absorbed through the skin.

Canada - Manitoba OELs: Skin designation

Morpholine (CAS 110-91-8) Can be absorbed through the skin.

Canada - Ontario OELs: Skin designation

Morpholine (CAS 110-91-8) Can be absorbed through the skin.

Canada - Quebec OELs: Skin designation

Morpholine (CAS 110-91-8) Can be absorbed through the skin.

Canada - Saskatchewan OELs: Skin designation

Morpholine (CAS 110-91-8) Can be absorbed through the skin.

US. ACGIH Threshold Limit Values

Morpholine (CAS 110-91-8) Can be absorbed through the skin.

Engineering controls Provide adequate ventilation.

Personal protective equipment

Eye / face protection Splash proof chemical goggles. Face shield.

Skin protection Gauntlet-type neoprene gloves. Wash off after each use. Replace as necessary. Chemical resistant apron.

Respiratory protection If air-purifying respirator use is appropriate, use organic vapor cartridges and any of the following particulate respirators: R95, R99, R100, P95, P99 or P100.

9. Physical & Chemical Properties

Appearance

Physical state Liquid

Color Colorless to light yellow

Odor	Slight
Odor threshold	Not available.
pH (concentrated product)	10.5
Vapor pressure	18 mm Hg
Vapor pressure temp.	70 °F (21 °C)
Vapor density	< 1 (Air = 1)
Boiling point	212 °F (100 °C)
Melting point/Freezing point	25 °F (-4 °C)
Solubility (water)	100 %
Specific gravity (70°F, 21°C)	1.09
Flash point	> 200 °F (> 93 °C) P-M(CC)
Flammability limits in air, upper, % by volume	Not available.
Flammability limits in air, lower, % by volume	Not available.
Auto-ignition temperature	Not available.
Evaporation rate	< 1 (Ether = 1)
Viscosity	10 cps
Viscosity temperature	70 °F (21 °C)
Percent volatile	5 (Calculated)
Pour point	30 °F (-1 °C)

10. Chemical Stability & Reactivity Information

Chemical stability	Material is stable under normal conditions.
Conditions to avoid	Protect from freezing.
Incompatible materials	Strong oxidizing substances.
Hazardous decomposition products	Not available.
Possibility of hazardous reactions	Hazardous polymerization does not occur.

11. Toxicological Information

Toxicological data

Product	Species	Test Results
CORRSHIELD MD4102 (CAS Mixture)		
Acute		
<i>Dermal</i>		
LD50	Rabbit	> 5000 mg/kg, (Estimated value)
<i>Oral</i>		
LD50	Rat	> 5000 mg/kg, (Estimated value)
Components		
Species		
Test Results		
Morpholine (CAS 110-91-8)		
Acute		
<i>Dermal</i>		
LD50	Rabbit	504 mg/kg
<i>Inhalation</i>		
LC50	Rat	8 mg/l, 4 Hour
<i>Oral</i>		
LD50	Rat	1680 mg/kg
Sodium Molybdate (CAS 7631-95-0)		
Acute		
<i>Inhl</i>		
LC50	Rat	> 2080 mg/m3/4hr

Components	Species	Test Results
Oral LD50	Rat	4000 mg/kg

Carcinogenicity

ACGIH Carcinogens

Morpholine (CAS 110-91-8)

A4 Not classifiable as a human carcinogen.

Sodium Molybdate (CAS 7631-95-0)

A3 Confirmed animal carcinogen with unknown relevance to humans.

IARC Monographs. Overall Evaluation of Carcinogenicity

Morpholine (CAS 110-91-8)

3 Not classifiable as to carcinogenicity to humans.

12. Ecological Information

Ecotoxicity No ecotoxicity data noted for the ingredient(s).

Partition coefficient

Morpholine -0.9

Persistence and degradability

- BOD 5 (mgO2/g) No information available.

13. Disposal Considerations

Disposal instructions Dispose of contents/container in accordance with local/regional/national/international regulations. Via an authorized waste disposal contractor to an approved waste disposal site, observing all local and national regulations.

Waste from residues / unused products Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner.

Contaminated packaging Empty containers should be taken to an approved waste handling site for recycling or disposal. Since emptied containers may retain product residue, follow label warnings even after container is emptied.

14. Transport Information

TDG

Not regulated as dangerous goods.

DOT

Not regulated as a dangerous good.

Some containers may be DOT exempt, please check BOL for exact container classification.

IMDG

Not regulated as dangerous goods.

IATA

Not regulated as dangerous goods.

15. Regulatory Information

WHMIS status Controlled

WHMIS classification D2B - Other Toxic Effects-TOXIC

WHMIS labeling



Inventory status

Country(s) or region	Inventory name	On inventory (yes/no)*
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other Information

List of abbreviations

CAS: Chemical Abstract Service Registration Number
TSRN indicates a Trade Secret Registry Number is used in place of the CAS number.
ACGIH: American Conference of Governmental Industrial Hygienists
NOEL: No Observed Effect Level
STEL: Short Term Exposure Limit
LC50: Lethal Concentration, 50%
TWA: Time Weighted Average
BOD: Biochemical Oxygen Demand
COD: Chemical Oxygen Demand
TOC: Total Organic Carbon
IATA: International Air Transport Association
IMDG: International Maritime Dangerous Goods Code
LD50: Lethal Dose, 50%
NFPA: National Fire Protection Association

HMIS® ratings

Health: 2
Flammability: 1
Physical hazard: 0
Personal protection: D

NFPA ratings

Health: 2
Flammability: 1
Instability: 0
Special hazards: NONE

This data sheet contains changes from the previous version in section(s):


Product and Company Identification: Commercial Names

* Trademark of General Electric Company. May be registered in one or more countries.

**MATERIAL SAFETY
DATA SHEET**

Date of Preparation: January 2, 2013

Use in case of an emergency only (613) 996-6666

SECTION I - PRODUCT AND PREPARATION INFORMATION							10D3
		777 McKay Road Pickering, ON L1W 3A3 (905) 683-0411			TRADE NAME: D3 HB PVC GREY MANUFAC. CODE: 10D3 PRODUCT CLASS: ADHESIVE CLASS 3 UN1133 PACKING GROUP II WHIMIS CLASS: B2 D2B		
		Prepared by: Technical Committee					
SECTION II - HAZARDOUS INGREDIENTS							
INGREDIENT	CAS NO.	%	NATURE OF HEALTH HAZARD AND ROUTE OF ENTRY	TYPE OF HAZARD	EXPOSURE LIMIT	SOURCE	OTHER HAZARDS
METHYL ETHYL KETONE	78-93-3	15-40	HARMFUL IF INHALED, IRRITANT SKIN CONTACT	ACUTE	200 PPM	TLV	
CYCLOHEXANONE	108-94-1	7-13	HARMFUL IF INHALED, IRRITANT SKIN CONTACT	ACUTE	25 PPM	TLV	
TETRAHYDROFURAN	109-99-9	40-70	HARMFUL IF INHALED, IRRITANT SKIN CONTACT	ACUTE	200 PPM	TLV	
SECTION III - PHYSICAL DATA							
ODOUR AND APPEARANCE		PH VALUE	PERCENT VOLATILE BY VOLUME		EVAPORATION RATE		
KETONE			81%		GREATER THAN BUTYL ACETATE		
GREY LIQUID			VOC LEVEL 510 g/L		SPECIFIC GRAVITY		
BOILING POINT			FREEZING POINT		0.946		
66 °C			°C				
SECTION IV - FIRE AND EXPLOSION HAZARDS							
FLAMMABILITY CLASSIFICATION /		FLASHPOINT	HAZARDOUS COMBUSTION PRODUCTS				
Class 3, Division 2		14- °C TAG CUP	WHEN FORCED TO BURN, THIS PRODUCT GIVES OUT CARBON MONOXIDE, CARBON DIOXIDE, HYDROGEN CHLORIDE AND SMOKE				
EXTINGUISHING MEDIA							
Foam, dry chemical, carbon dioxide or any class B extinguishing agent							
UNUSUAL FIRE AND EXPLOSION HAZARDS							
Vapours may ignite explosively. Vapours may spread long distances. Prevent build-up of vapours. Extinguish all pilot lights and turn off heaters, non-explosion-proof electrical equipment and all other sources of ignition. Keep away from and do not store or use near heat, sparks or flames caused by such sources as electricity, static discharge, welding, grinding or flamecutting operation. Ground all equipment. Use spark-proof tools and conductive shoes to avoid sparking hazards.							
SPECIAL FIREFIGHTING PROCEDURES							
Exposure to vapours or products of combustion should be avoided. Self-contained breathing apparatus is recommended. Vapours may form an explosive mixture with air. Closed containers may rupture when exposed to extreme heat.							

**MATERIAL SAFETY
DATA SHEET**

Date of Preparation: January 2, 2013

Use in case of an emergency only (613) 996-6666

SECTION V - HEALTH HAZARD DATA: TOXICOLOGICAL PROPERTIES AND FIRST AID MEASURES		10D3
ACUTE EFFECTS OF OVEREXPOSURE		EMERGENCY AND FIRST AID PROCEDURES
<p>INHALATION: Excessive exposure to vapours or spray mists can result in headache, dizziness, incoordination and loss of consciousness. Irritation of the eyes, nose, throat and lungs can also occur when exposed to high vapour concentrations. Some reports have associated repeated and prolonged occupational overexposure to solvents with permanent nervous system damage.</p> <p>EYE CONTACT: This material can cause eye irritation. The effects are usually reversible.</p> <p>SKIN CONTACT: This material may cause defatting and irritation of skin (Dermatitis) upon prolonged or repeated contact.</p> <p>INGESTION: Swallowing can cause nausea, vomiting, diarrhea and loss of consciousness.</p>	<p>INHALATION: Remove victim to fresh air. Restore breathing. Treat symptomatically. Consult a physician.</p> <p>SPLASH (EYES): Flush immediately with large amounts of water for at least 15 minutes. Take to a physician for medical treatment.</p> <p>SPLASH (SKIN): Wash affected areas with soap and water. Remove contaminated clothing.</p> <p>INGESTION: Drink 1 or 2 glasses of water to dilute. DO NOT INDUCE VOMITING. Consult a physician or Poison Control center immediately. Treat symptomatically.</p>	
CHRONIC EFFECTS OF OVEREXPOSURE		IRRITANT SENSITIZER
n/av		YES: Skin and Eye YES: Skin
SECTION VI - REACTIVITY DATA		
STABILITY:		HAZARDOUS POLYMERIZATIONS:
Stable		Will not occur
INCOMPATIBILITY: (Materials to avoid)		CONDITIONS TO AVOID:
Oxidizing compounds		Vapour concentrations
HAZARDOUS DECOMPOSITION PRODUCTS:		Ignition sources
None known		
SECTION VII - SPILL OR LEAK PROCEDURES		
STEPS TO BE TAKEN in case material is Released or Spilled		WASTE DISPOSAL METHOD
Restrict access to area. Remove all sources of ignition. Ventilate area. Absorb spill with an absorbent material such as vermiculite or sand and place material into a closed container. If a large spill, dike area to prevent this material from entering water systems or sewers. Wear protective equipment during cleanup.		Dispose of this material in accordance with Federal, Provincial, and Municipal regulations.
SECTION VIII - SPECIAL PROTECTION INFORMATION		
PERSONAL PROTECTION EQUIPMENT		
PROTECTIVE GLOVES:		EYE PROTECTION:
Chemical resistant gloves made of Viton should be used. Gloves made of nitrile, neoprene or rubber may be used for exposure of short duration.		Chemical safety goggles should be worn to prevent eye contact. A face shield may also be necessary.
RESPIRATORY PROTECTION:		OTHER PROTECTIVE EQUIPMENT:
An organic vapour cartridge respiratory mask shall be worn to prevent the inhalation of vapours or spray mist when the TLB or PEL is exceeded. If respiratory protection is required, institute a complete respiratory protection program. Refer to the CSA Standard Z94.4 M1982 "Selection, Care and Use of Respirators" available from the Canadian Standard Association, Rexdale, Ontario. M9W 1R3		Eye wash fountain and safety showers must be available in areas where this material is used. Wear protective clothing to prevent skin contact.
		ENGINEERING CONTROLS - VENTILATION:
		General (dilution) ventilation is required during normal use. Local exhaust ventilation may be required during certain operations to keep exposure level below the limit listed in Section II of this data sheet.
SECTION IX - SPECIAL PRECAUTIONS		
PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING		OTHER PRECAUTIONS
<p>STORAGE: Keep storage area separate from populated work areas. Store in a cool, dry, well ventilated area, out of direct sunlight and away from incompatible materials and any source of ignition. Ventilation fans and electrical equipment should be non-sparking.</p> <p>HANDLING: Avoid prolonged or repeated inhalation of vapours or spray mist. Avoid prolonged or repeated skin contact. Ground and bond equipment and container to prevent a static charge build-up.</p> <p>ATTENTION: Emptied containers may retain hazardous residue and explosive vapours. Keep away from heat, sparks and flames. Do not cut puncture or weld near this container. Follow label warning until container is thoroughly cleaned or destroyed.</p>		



Material Safety Data Sheet

An **RPM** Company

24 Hour Emergency Phone Numbers:
Medical/Poison Control:
In U.S.: Call 1-800-222-1222
Outside U.S.: Call your local poison control center
Transportation/National Response Center:
1-800-535-5053
1-352-323-3500

.....
 • NOTE: The National Response Center emergency numbers to
 • be used only in the event of chemical emergencies involving a
 • spill, leak, fire, exposure or accident involving chemicals.

IMPORTANT: Provide this information to employees, customers, and users of this product. Read this MSDS before handling or disposing of this product. This product is covered by the OSHA Hazard Communication Standard and this document has been prepared in accordance with requirements of this standard. All abbreviated terms used in this MSDS are further described in Section 16.

Section 1 - Chemical Product / Company Information

This Material Safety Data Sheet is available in American Spanish upon request.
 Los Datos de Seguridad del Producto pueden obtenerse en Español si lo requiere.

Product Name:	Kwik Seal Tub & Tile Adhesive Caulk - All Colors	Revision Date:	02/08/2012
Product UPC Number:	070798180017,070798180024,070798180130,070798310018	Supersedes:	07/14/2010
Product Use/Class:	Caulk	MSDS Number:	00010009001
Manufacturer:	DAP Products Inc. 2400 Boston Street Suite 200 Baltimore, MD 21224-4723 888-327-8477 (non-emergency matters)		

Section 2 - Hazards Identification

Emergency Overview: A(n) colored paste product with a very slight ammonia odor. **WARNING!** May cause eye, skin, nose, throat and respiratory tract irritation. Harmful if swallowed or absorbed through the skin. This product contains ethylene glycol.

Refer to other MSDS sections for other detailed information.

Effects Of Overexposure - Eye Contact: May cause eye irritation.

Effects Of Overexposure - Skin Contact: Harmful if absorbed through the skin. May cause skin irritation.

Effects Of Overexposure - Inhalation: May be harmful if inhaled. Inhalation may cause irritation to the respiratory tract (nose, mouth, mucous membranes).

Effects Of Overexposure - Ingestion: Harmful or fatal if swallowed. If ingested, may cause depressed respiration. Ingestion may result in obstruction when material hardens. Ingestion of ethylene glycol can cause gastrointestinal irritation, nausea, vomiting, diarrhea and if ingested in sufficient quantities, death.

Effects Of Overexposure - Chronic Hazards: Repeated or prolonged exposure may cause skin, respiratory, kidney and liver damage. Prolonged and repeated skin contact may cause irritation and possibly dermatitis.

The International Agency for Research on Cancer (IARC) has determined that crystalline silica in the form of quartz or

cristobalite that is inhaled from occupational sources is carcinogenic to humans (Group 1- carcinogenic to humans). Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (published in June 1997) in conjunction with the use of these materials. The National Toxicology Program (NTP) classifies respirable crystalline silica as "known to be a human carcinogen". Refer to the 9th Report on Carcinogens (2000). The American Conference of Governmental Industrial Hygienists (ACGIH) classifies crystalline silica, quartz, as a suspected human carcinogen (Group A2).

Breathing dust containing respirable crystalline silica may not cause noticeable injury or illness even though permanent lung damage may be occurring. Inhalation of dust may have the following serious chronic health effects: Excessive inhalation of respirable dust can cause pneumoconiosis, a respiratory disease, which can result in delayed, progressive, disabling and sometimes fatal lung injury. Symptoms include cough, shortness of breath, wheezing, non-specific chest illness and reduced pulmonary function. Smoking exacerbates this disease. Individuals with pneumoconiosis are predisposed to develop tuberculosis. There is some evidence that breathing respirable crystalline silica or the disease silicosis is associated with an increased incidence of significant disease endpoints such as scleroderma (an immune system disorder manifested by fibrosis of the lungs, skin and other internal organs) and kidney disease. Prolonged, repeated, or high exposures may cause weakness and depression of the central nervous system.

Ethylene Glycol may cause kidney and liver damage upon prolonged and repeated overexposures. Studies have shown that repeated inhalation of ethylene glycol has produced adverse cardiovascular changes in laboratory animals. Ethylene glycol has been shown to cause birth defects in laboratory animals.

Primary Route(s) Of Entry: Skin Contact, Inhalation, Eye Contact

Medical Conditions which May be Aggravated by Exposure: None known.

Carcinogenicity:

CAS No.	Chemical Name	ACGIH	OSHA	IARC	NTP
13463-67-7	Titanium dioxide	Not Listed.	Not Listed.	Possibly carcinogenic to humans.	Not Listed.
14808-60-7	Silica, crystalline	Suspected human carcinogen.	Not Listed.	Carcinogenic to humans.	Known carcinogen.

Section 3 - Composition / Information On Ingredients		
Chemical Name	CASRN	Wt%
Limestone	1317-65-3	30-60
Titanium dioxide	13463-67-7	0.5-1.5
Silica, crystalline	14808-60-7	0.1-1.0
Ethylene glycol	107-21-1	0.1-1.0

Section 4 - First Aid Measures

First Aid - Eye Contact: In case of contact, immediately flush eyes with large quantities of water for at least 15 minutes until irritation subsides. Get medical attention immediately.

First Aid - Skin Contact: Remove and wash contaminated clothing. Wash off immediately with soap and plenty of water for at least 15 minutes. Get medical aid if symptoms persist. If skin irritation persists, call a physician.

First Aid - Inhalation: If inhaled, remove to fresh air. If breathing is difficult, leave the area to obtain fresh air. If continued breathing difficulty is experienced, get medical attention immediately.

First Aid - Ingestion: If swallowed, DO NOT INDUCE VOMITING. Get medical attention immediately.

Note to Physician: None.

COMMENTS: If over-exposure occurs, call your poison control center at 1-800-222-1222.

Section 5 - Fire Fighting Measures

Extinguishing Media: Carbon Dioxide, Dry Chemical, Foam, Water Fog

Unusual Fire And Explosion Hazards: No special protective measures against fire required.

Special Firefighting Procedures: Wear self-contained breathing apparatus pressure-demand (NIOSH approved or equivalent) and full protective gear. Use water spray to cool exposed surfaces.

Section 6 - Accidental Release Measures

Steps To Be Taken If Material Is Released Or Spilled: Wear proper protective equipment as specified in Section 8. Contain spilled material and remove with inert absorbent. Dispose of contaminated absorbent, container and unused contents in accordance with local, state and federal regulations.

Section 7 - Handling And Storage

Handling: KEEP OUT OF REACH OF CHILDREN! DO NOT TAKE INTERNALLY. Use only with adequate ventilation. Open all windows and doors or use other means to ensure cross-ventilation and fresh air entry during application and drying. Odor is not an adequate warning for hazardous conditions. Avoid breathing vapor and contact with eyes, skin and clothing. Wash thoroughly after handling.

Storage: Close container after each use. Do not store at temperatures above 120 degrees F. Store containers away from excessive heat and freezing. Store away from caustics and oxidizers.

Section 8 - Exposure Controls / Personal Protection

Chemical Name	CASRN	ACGIH TWA	ACGIH STEL	ACGIH CEIL	OSHA TWA	OSHA STEL	OSHA CEIL	Skin
Limestone	1317-65-3	10 MGM3	N.E.	N.E.	5 MGM3 (respirable fraction)	N.E.	N.E.	No
Titanium dioxide	13463-67-7	10 MGM3	N.E.	N.E.	15 MGM3	N.E.	N.E.	No
Silica, crystalline	14808-60-7	0.025 MGM.	N.E.	N.E.	10/(%SiO ₂ + 2) MGM3	N.E.	N.E.	No
Ethylene glycol	107-21-1	N.E.	N.E.	100 MGM3	N.E.	N.E.	N.E.	No

Exposure Notes:

14808-60-7 The 2002 ACGIH Threshold Limit Values for Chemical Substances and Physical Agents lists the median Respirable Particulate Mass (RPM) point for crystalline silica at 4.0 microns in terms of the particle's aerodynamic diameter.

The TLVs for crystalline silica represent the respirable fraction.

OSHA PEL TWA for Quartz is calculated using the following formula: $10 \text{ mg/m}^3 / (\% \text{ SiO}_2 + 2)$. Both concentration and percent quartz for the application of this limit are to be determined from the fraction passing a size selector with the following characteristics.

Aerodynamic diameter (unit density sphere)	Percent passing selector
2	90
2.5	75
3.5	50
5.0	25
10	0

Precautionary Measures: Contact lenses pose a special hazard; soft lenses may absorb and all lenses concentrate irritants.

Engineering Controls: Good general ventilation should be sufficient to control airborne levels. Ensure adequate

ventilation, especially in confined areas. Local ventilation of emission sources may be necessary to maintain ambient concentrations below recommended exposure limits.

Respiratory Protection: In case of insufficient ventilation, wear suitable respiratory equipment. A NIOSH-approved air purifying respirator with an organic vapor cartridge or canister may be necessary under certain circumstances where airborne concentrations are expected to exceed exposure limits. A respiratory protection program that meets the OSHA 1910.134 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrant a respirator's use. National Institute for Occupational Safety and Health (NIOSH) has recommended that the permissible exposure limit be changed to 50 micrograms respirable free silica per cubic meter of air (0.05 mg/m³) as determined by a full shift sample up to 10-hour work shift.

Skin Protection: Rubber gloves.

Eye Protection: Goggles or safety glasses with side shields.

Other protective equipment: Not required under normal use.

Hygienic Practices: Wash hands before breaks and at the end of workday. Remove and wash contaminated clothing before re-use.

Important: Listed Permissible Exposure Levels (PEL) are from the U.S. Dept. of Labor OSHA Final Rule Limits (CFR 29 1910.1000); these limits may vary between states.

Note: An employee's skin exposure to substances having a "YES" in the "SKIN" column in the table above shall be prevented or reduced to the extent necessary under the circumstances through the use of gloves, coveralls, goggles or other appropriate personal protective equipment, engineering controls or work practices.

Section 9 - Physical And Chemical Properties

Boiling Range:	Not Established	Vapor Density:	Heavier Than Air
Odor:	Very Slight Ammonia	Odor Threshold:	Not Established
Color:	Colored	Evaporation Rate:	Slower Than n-Butyl Acetate
Solubility in H₂O:	Not Established	Specific Gravity:	1.57 - 1.59
Freeze Point:	Not Established	pH:	Between 7.0 and 12.0
Vapor Pressure:	Not Established	Viscosity:	Not Established
Physical State:	Paste	Flammability:	Non-Flammable
Flash Point, F:	Greater than 200	Method:	(Seta Closed Cup)
Lower Explosive Limit, %:	Not Determined	Upper Explosive Limit, %:	Not Determined

When reported, vapor pressure of this product has been calculated theoretically based on its constituent makeup and has not been determined experimentally.

(See section 16 for abbreviation legend)

Section 10 - Stability And Reactivity

Conditions To Avoid: Excessive heat and freezing.

Incompatibility: Incompatible with strong bases and oxidizing agents.

Hazardous Decomposition Products: Normal decomposition products, i.e., CO_x, NO_x.

Hazardous Polymerization: Hazardous polymerization will not occur under normal conditions.

Stability: Stable under recommended storage conditions.

Section 11 - Toxicological Information

Product LD50: Not Established

Product LC50: Not Established

CASRN	Chemical Name	LD50	LC50
107-21-1	Ethylene glycol	Rat:4700 mg/kg	Rat:10876 mg/kg

Significant Data with Possible Relevance to Humans: None.

Section 12 - Ecological Information

Ecological Information: Ecological injuries are not known or expected under normal use.

Section 13 - Disposal Information

Disposal Information: Dispose of material in accordance with all federal, state and local regulations. State and Local regulations/restrictions are complex and may differ from Federal regulations. Responsibility for proper waste disposal is with the owner of the waste.

EPA Waste Code if Discarded (40 CFR Section 261): None.

Section 14 - Transportation Information

DOT Proper Shipping Name:	Not Regulated.	Packing Group:	N.A.
DOT Technical Name:	N.A.	Hazard Subclass:	N.A.
DOT Hazard Class:	N.A.	DOT UN/NA Number:	N.A.

Note: The shipping information provided is applicable for domestic ground transport only. Different categorization may apply if shipped via other modes of transportation and/or to non-domestic destinations.

Section 15 - Regulatory Information

CERCLA - SARA Hazard Category:

This product has been reviewed according to the EPA 'Hazard Categories' promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

Immediate Health Hazard, Chronic Health Hazard

SARA Section 313:

This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendment and Reauthorization Act of 1986 and 40 CFR part 372:

None

Toxic Substances Control Act:

All ingredients in this product are either on TSCA inventory list, or otherwise exempt.

This product contains the following chemical substances subject to the reporting requirements of TSCA 12(B) if exported from the United States:

None

New Jersey Right-to-Know:

The following materials are non-hazardous, but are among the top five components in this product:

Chemical Name	CAS Number
Water	7732-18-5
Non-Hazardous Polymer	Proprietary
Acrylic polymer	Proprietary
Non-Hazardous Oil / Wax	Proprietary

Pennsylvania Right-to-Know:

The following non-hazardous ingredients are present in the product at greater than 3%:

Chemical Name	CAS Number
Water	7732-18-5
Non-Hazardous Polymer	Proprietary
Acrylic polymer	Proprietary
Non-Hazardous Oil / Wax	Proprietary

California Proposition 65: WARNING: This product contains chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

Section 16 - Other Information

HMIS Ratings:

Health: 1 Flammability: 0 Reactivity: 0 Personal Protection: X

Volatile Organic Compounds (VOC), less water less exempts: g/L: 32.7 lb/gal: 0.27 wt:wt%: 1.4

Volatile Organic Compounds (VOC), less water less exempts, less LVP-VOCs: wt:wt%: 0.6

REASON FOR REVISION: Periodic Update

Legend:

N.A. – Not Applicable	ACGIH – American Conference of Governmental Industrial Hygienists
N.E. – Not Established	SARA – Superfund Amendments and Reauthorization Act of 1986
N.D. – Not Determined	NJRTK – New Jersey Right-to-Know Law
VOC – Volatile Organic Compound	OSHA – Occupational Safety and Health Administration
PEL – Permissible Exposure Limit	HMIS – Hazardous Materials Identification System
TLV – Threshold Limit Value	NTP – National Toxicology Program
CEIL – Ceiling Exposure Limit	STEL – Short Term Exposure Limit
LD50 – Lethal Dose 50	LC50 – Lethal Concentration 50
F – Degree Fahrenheit	MSDS – Material Safety Data Sheet
C – Degree Celsius	CASRN – The Chemical Abstracts Service Registry Number

DAP believes the data and statements contained herein are accurate as of the date hereof. They are offered in good faith as typical values and not as a product specification. **NO WARRANTY OF MERCHANTABILITY, WARRANTY OF FITNESS FOR ANY PARTICULAR PURPOSE OR ANY OTHER WARRANTY, EXPRESS OR IMPLIED, IS MADE WITH REGARD TO THE INFORMATION HEREIN PROVIDED OR THE PRODUCT TO WHICH THE INFORMATION REFERS.** Since this document is intended only as a guide to the appropriate use and precautionary handling of the referenced product by a properly trained person, it is therefore the responsibility of the user to (i) review the recommendations with due consideration for the specific context of the intended use and (ii) determine if they are appropriate.

<End of MSDS>



MATERIAL SAFETY DATA SHEET

SECTION 1 – CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Company Name Nu-Calgon Wholesaler, Inc.	Phone Number (314) 469-7000 / (800) 554-5499	CHEMTREC (800) 424-9300		
Street Address 2008 Altom Court	City St. Louis	State MO	Postal Code 63146-4151	Last Update 10/20/12
Product Name Degreasing Solvent of	Product Number 4162	Product Use Chlorinated Hydrocarbon Solvent		EPA Registration # N/A

SECTION 2 – COMPOSITION/INFORMATION ON INGREDIENTS

<u>Hazardous Ingredients</u>	<u>% By Wt.</u>	<u>CAS Number</u>	<u>TLV</u>	<u>PEL</u>
Stoddard Solvent* (ORAL LD50 > 10mg/kg)	50-70%	8052-41-3	100ppm	100ppm
p-Chlorobenzotrifluoride(a)	5-15%	98-56-6	No Data.	No Data.
o-Chlorotoluene	15-30%	95-49-8	50ppm	250ppm
Perchloroethylene(b,c,d,e,f)	10-20%	127-18-4	25ppm	170ppm

*STEL=200ppm

- a) This item is not identified in the available haz. chemicals guides. However, its characteristics parallel hazards of material that is identified; therefore, it will be so identified until further identification.
 - b) Ingredient subject to reporting under Sec. 313 of Title III (SARA) and 40 CFR 372.
 - c) RCRA has determined that the waste for this chemical is listed as hazardous and must be handled in accordance with 40 CFR 260-281.
 - d) CERCLA has notification requirements for releases or spills to the environment of the Reportable Quantity (RQ 100lbs) or greater amounts (40CFR302).
 - e) Material is on the NTP list of possible carcinogens, IRAC's list of possible carcinogens, OR is regulated by OSHA as a possible carcinogen.
 - f) Indicates listing in Table Z-2, 29 CFR 1910.1000, detailing acceptable ceiling concentration limits and acceptable maximum peak above ceiling concentration for an 8-hour shift.
- All ingredients are TSCA listed.

SECTION 3 – HAZARD IDENTIFICATION

Emergency Overview: Vapors are heavier than air and will collect in low areas. Use only in well-ventilated areas that will maintain air levels below limits established by federal, state, and local regulations.

Potential Health Effects

Eyes: High vapor concentration or contact may cause irritation, discomfort or pain. May cause slight transient corneal injury.

Skin: Brief contact may cause slight irritation; prolonged contact may cause moderate irritation or dermatitis. Problem may be accentuated by liquid becoming trapped against the skin by contaminated clothing and shoes.

Ingestion: Swallowing this material may result in irritation of the mouth and GI tract. Vomiting and subsequent aspiration into the lungs may lead to chemical pneumonia and pulmonary edema which is a potentially fatal condition.

Inhalation: High concentrations are irritating to the respiratory tract; may cause headache, dizziness, nausea, vomiting or even death in confined or poorly ventilated areas. The primary effect of inhalation is narcosis.

Chronic Exposure: chronic exposure may cause liver, kidney or central nervous system damage. Perchloroethylene is a suspected cancer risk from animal studies, and is listed under IRAC as Group 28, possibly carcinogenic to humans.

Carcinogenicity: Perchloroethylene is a suspected cancer risk from animal studies, and is listed under IRAC as Group 28, possibly carcinogenic to humans.

Medical Conditions Aggravated by Exposure: ACUTE (Primary Route of Exposure) Acute effects are possible irritation and discomfort

SECTION 4 – FIRST AID MEASURES

Eyes: Flush with water for 15 minutes, holding eyelids open; if irritation persists, seek medical attention.

Skin: Remove contaminated clothing; wash effected area with soap and water; launder contaminated clothing before reuse; if irritation persists, seek medical attention.

Ingestion: If conscious, drink large amounts of water; DO NOT INDUCE VOMITING; take immediately to hospital. Do not give anything by mouth to an unconscious person.

Inhalation: Remove victim to fresh air; provide oxygen if breathing is difficult; administer CPR if victim is not breathing; seek medical attention.

SECTION 5 – FIREFIGHTING MEASURES

Flash Point: >60°C / >140°F

Autoignition Temp: No Data.°C/No Data.°F

Hazardous Products of Combustion: No Data.

Flammable Limits in Air: LEL: 1.0; UEL 7.0

Extinguishing Media: Dry Chemical, foam, CO2, water, water fog

Fire and Explosion Hazards: Closed containers can explode due to buildup of pressure when exposed to extreme heat. Do not use direct stream of water. Caution: material is combustible.

Special Firefighting Procedures: Must wear full facepiece, self-contained breathing apparatus in positive pressure mode. Do not use solid stream of water; use fine water spray.

SECTION 6 – ACCIDENTAL RELEASE MEASURES

Spill or Leak: COMBUSTIBLE Evacuate and ventilate area; confine and absorb into absorbent; place material into approved containers for disposal; for spills in excess of allowable limits (RQ) notify the National Response Center at (800) 424-8802; refer to CERCLA 40 CFR 302 and SARA Title III, Section 313 40 CFR 372 for detailed instructions concerning reporting requirements.

SECTION 7 – HANDLING AND STORAGE

Handling Procedures and Equipment: minimize body contact with this product as well as all chemicals. Avoid inhaling concentrated fumes or vapors.

Storage Requirements: Material is combustible. Should be stored in tightly closed containers in cool, well ventilated area. Vapor may form explosive mixtures in air. All Sources of ignition should be controlled. Keep this and other chemicals out of reach of children

SECTION 8 – EXPOSURE CONTROLS/PERSONAL PROTECTION

Respiratory Protection: NIOSH-approved respirator must be worn if OSHA threshold limits exceeded.

Eye Protection: goggles with side shield. Glove: Solvent- resistant rubber or neoprene.

Protective Clothing: Safety eye bath nearby.

Exposure Guidelines: No Data.

Specific Engineering Controls (such as ventilation, enclosed process): Local and mechanical exhaust is required.

SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES

Physical Form: Liquid	Freezing Point: No Data.°C/No Data.°F	% Volatile by Weight: No Data.%
Color: Clear	Vapor Density [air =1]: 60-90 F: >1	Evaporation Rate: (ether=1): <1
Odor: Hydrocarbon odor	Vapor Pressure: mm Hg: 10 @ 20°C	Specific Gravity: H2O=1 @25 C: 0.9834
Boiling Point: 127-193°C/260-380°F	Solubility in Water: Negligible	pH (concentrate): N/A

SECTION 10 – STABILITY AND REACTIVITY

Chemical Stability: No Data.

Hazardous Polymerization: Will not occur.

Incompatibilities: Strong oxidizers, strong acids.

Reactive Conditions to avoid: Stable/Extreme temperatures, open flame, sparks

Decomposition Products: Thermal decomposition may yield CO, CO2, HCL fumes

SECTION 11 – TOXICOLOGICAL INFORMATION

Hazardous Ingredients	CAS #	EINECS #	LD 50 of Ingredient (Specify Species)	LC50 of Ingredient (Specify Species)
No Data.				

SECTION 12 – ECOLOGICAL INFORMATION

<u>Hazardous Ingredients</u>	<u>Aquatic Toxicity Data</u>
No Data.	

SECTION 13 – DISPOSAL CONSIDERATIONS

Waste Disposal: N/A

SECTION 14 – TRANSPORTATION INFORMATION

Special Shipping Information: Flash point: >140°F / >60°C

<u>Purview</u>	<u>Proper Shipping Name</u>	<u>UN Number</u>	<u>Packing Group</u>	<u>Hazard Class</u>
DOT (Land)	Not Regulated			
IMO (Water)	Not Regulated			
ICAO (Air)	Not Regulated			

SECTION 15 – REGULATORY INFORMATION

WHMIS Classification: (Workplace Hazardous Material Information System)	No Data.
SARA Title III: (Superfund Amendments & Reauthorization Act)	No Data.
OSHA: (Occupational Safety & Health Administration)	No Data.
TSCA: (Toxic Substance Control Act)	No Data.
VOC: (volatile Organic Compounds)	No Data.
CPR: (Canadian Controlled Products Regulations)	This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations.
EINECS: (European Inventory of Existing Commercial Chemical Substances)	No Data.
DSL / NDSL: (Canadian Domestic Substance List)(Non-Domestic Substance List)	No Data.
CERCLA: (Comprehensive Response Compensation & Liability Act)	No Data.
IDL: (Canadian Ingredient Disclosure List)	No Data.
NFPA (HMIS) Rating: (Hazardous Materials Identification System)	Health Hazard 1; Fire Hazard 2; Reactivity 0

SECTION 16 – OTHER INFORMATION

Vapors are heavier than air and will collect in low areas. Use only in well-ventilated areas that will maintain air levels below limits established by federal, state, and local regulations. VOC Content (% by wt.): 100; Volatile Organic Comp (VOC's): 8.2 lbs/gal

The information contained herein is based on the data available to us and is believed to be correct. However, Nu-Calgon Wholesaler Inc. makes no warranty, expressed, or implied, regarding the accuracy of this data or the results to be obtained from the use thereof. Nu-Calgon Wholesaler Inc. assumes no liability for injury from the use of the product described herein.



Material Safety Data Sheet

Issue Date: 26-SEP-2011
Supercedes: 18-JUN-2009

DEPOSITROL PY5201

1 Identification

Identification of substance or preparation
DEPOSITROL PY5201

Product Application Area
Water-based corrosion inhibitor/deposit control agent.

Company/Undertaking Identification
GE Water & Process Technologies Canada
3239 Dundas Street West
Oakville, Ontario, L6M 4B2
T 905-465-3030

Emergency Telephone
(800) 877-1940

Prepared by Product Stewardship Group: T 215-355-3300 Prepared on: 26-SEP-2011

2 Hazard(s) identification

EMERGENCY OVERVIEW

Non-hazardous to skin. May cause slight irritation to the eyes.
Mists/aerosols may cause irritation to upper respiratory tract.

Odor: Mild; Appearance: Yellow, Liquid

Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type). Proper fire-extinguishing media: dry chemical, carbon dioxide, foam or water

POTENTIAL HEALTH EFFECTS

ACUTE SKIN EFFECTS:
Primary route of exposure; Non-hazardous to skin.

ACUTE EYE EFFECTS:
May cause slight irritation to the eyes.

ACUTE RESPIRATORY EFFECTS:
Mists/aerosols may cause irritation to upper respiratory tract.

INGESTION EFFECTS:
May cause slight gastrointestinal irritation.

TARGET ORGANS:

No evidence of potential chronic effects.

MEDICAL CONDITIONS AGGRAVATED:

Not known.

SYMPTOMS OF EXPOSURE:

May cause redness or itching of skin, irritation, and/or tearing of eyes (direct contact).

3 Composition / information on ingredients

Information for specific product ingredients as required by the WHMIS Regulations is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation.

HAZARDOUS INGREDIENTS:

Product contains no hazardous ingredients reportable under WHMIS regulation

No component is considered to be a carcinogen by the U.S. National Toxicology Program (NTP), the International Agency for Research on Cancer (IARC), the American Conference of Governmental Industrial Hygienists (ACGIH), or under WHMIS.

4 First-aid measures

SKIN CONTACT:

Wash thoroughly with soap and water. Remove contaminated clothing. Get medical attention if irritation develops or persists.

EYE CONTACT:

Remove contact lenses. Hold eyelids apart. Immediately flush eyes with plenty of low-pressure water for at least 15 minutes. Get immediate medical attention.

INHALATION:

If nasal, throat or lung irritation develops - remove to fresh air and get medical attention.

INGESTION:

Do not feed anything by mouth to an unconscious or convulsive victim. Do not induce vomiting. Immediately contact physician. Dilute contents of stomach using 2-8 fluid ounces (60-240 mL) of milk or water.

NOTES TO PHYSICIANS:

No special instructions

5 Fire-fighting measures

FIRE FIGHTING INSTRUCTIONS:

Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).

EXTINGUISHING MEDIA:

dry chemical, carbon dioxide, foam or water

HAZARDOUS DECOMPOSITION PRODUCTS:

oxides of carbon and sulfur

FLASH POINT:

> 200F > 93C P-M(CC)

6 Accidental release measures

PROTECTION AND SPILL CONTAINMENT:

Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container. Flush area with water. Wet area may be slippery. Spread sand/grit.

DISPOSAL INSTRUCTIONS:

The waste characteristics of the absorbed material, or any contaminated soil, should be determined in accordance with provincial regulations. Water contaminated with this product may be sent to a sanitary sewer treatment facility, in accordance with any local agreement or discharged under provincial regulations. Incinerate or land dispose in an approved landfill.

7 Handling and storage

HANDLING:

Normal chemical handling.

STORAGE:

Keep containers closed when not in use. Protect from freezing. If frozen, thaw and mix completely prior to use. Shelf life 360 days.

8 Exposure controls / personal protection

EXPOSURE LIMITS

Consult local authorities for acceptable provincial values.

Product contains no hazardous ingredients reportable under WHMIS regulation

ENGINEERING CONTROLS:

adequate ventilation

RESPIRATORY PROTECTION:

If air-purifying respirator use is appropriate, use any of the following particulate respirators: N95, N99, N100, R95, R99, R100, P95, P99 or P100.

SKIN PROTECTION:

rubber, butyl, viton or neoprene gloves -- Wash off after each use. Replace as necessary.

EYE PROTECTION:

splash proof chemical goggles

9 Physical and chemical properties

Spec. Grav. (70F, 21C)	1.112	Vapor Pressure (mmHG)	~ 18.0
Freeze Point (F)	28	Vapor Density (air=1)	< 1.00
Freeze Point (C)	-2		
Viscosity (cps 70F, 21C)	25	% Solubility (water)	100.0

Odor	Mild
Appearance	Yellow
Physical State	Liquid
Flash Point	P-M(CC) > 200F > 93C
pH As Is (approx.)	5.5
Evaporation Rate (Ether=1)	< 1.00
Percent VOC:	0.0

NA = not applicable ND = not determined

10 Stability and reactivity

CHEMICAL STABILITY:

Stable under normal storage conditions.

POSSIBILITY OF HAZARDOUS REACTIONS:

No known hazardous reactions.

INCOMPATIBILITIES:

May react with strong oxidizers.

DECOMPOSITION PRODUCTS:

oxides of carbon and sulfur

11 Toxicological information

Oral LD50 RAT: >5000 mg/kg
NOTE - Calculated value according to GHS additivity formula

Dermal LD50 RABBIT: >5000 mg/kg
NOTE - Calculated value according to GHS additivity formula

Skin Irritation Score RABBIT: 0.0
NOTE - Value is for testing of material at higher concentration

Eye Irritation Score RABBIT: 2.0
NOTE - Value is for testing of material at higher concentration;
completely reversible.

12 Ecological information

AQUATIC TOXICOLOGY

Daphnia magna 48 Hour Static Renewal Bioassay (pH adjusted)
LC50= 2640; No Effect Level= 1860 mg/L

Fathead Minnow 96 Hour Static Renewal Bioassay (pH adjusted)
LC50= 2940; No Effect Level= 470 mg/L

Mysid Shrimp 48 Hour Static Renewal Bioassay (pH adjusted)
10% Mortality= 24000; 0% Mortality= 12000 mg/L

Rainbow Trout 96 Hour Static Acute Bioassay
0% Mortality= 10000 mg/L

Sheepshead Minnow 96 Hour Static Renewal Bioassay (pH adjusted)
0% Mortality= 24000 mg/L

BIODEGRADATION

BOD-28 (mg/g): 22
 BOD-5 (mg/g): 7
 COD (mg/g): 246
 TOC (mg/g): 96

13 Disposal considerations

Incinerate or bury in approved landfill. Please be advised that there may be additional local or provincial requirements relating to the disposal of waste. Consult provincial and local regulations regarding the proper disposal of this material.

14 Transport information

Transportation of Dangerous Goods:

Not Regulated

DOT EMERGENCY RESPONSE GUIDE #: Not applicable

15 Regulatory information

This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

CEPA:

All components of this product comply with substance notification requirements under CEPA.

WHMIS CLASSIFICATION:

NOT REGULATED

FOOD AND DRUG ADMINISTRATION:

FDA APPROVED FOR MILL SUPPLY WATER

16 Other information

HMIS VII		CODE TRANSLATION
Health	1	Slight Hazard
Fire	1	Slight Hazard
Reactivity	0	Minimal Hazard
Special	NONE	No special Hazard
(1) Protective Equipment	B	Goggles, Gloves

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

CHANGE LOG

	EFFECTIVE DATE	REVISIONS TO SECTION:	SUPERCEDES
	-----	-----	-----
MSDS status:	29-JAN-1997		** NEW **
	10-SEP-1997	3, 8, 11, 16; EDIT: 4	29-JAN-1997
	11-AUG-1998	15	10-SEP-1997
	16-JUL-2001		11-AUG-1998
	12-JUN-2003	12	16-JUL-2001
	16-MAY-2006	16	12-JUN-2003

22-APR-2009 4, 5, 7, 8, 10
18-JUN-2009 4, 5, 7, 8, 10
26-SEP-2011 11

16-MAY-2006
22-APR-2009
18-JUN-2009

Material Safety Data Sheet



DIESEL FUEL



1 . Product and company identification

- Product name** : DIESEL FUEL
- Synonym** : Seasonal Diesel, #1 Diesel, #2 Heating Oil, #1 Heating Oil, D50, D60, P40, P50, Arctic Diesel, Farm Diesel, Marine Diesel, Low Sulphur Diesel, LSD, Ultra Low Sulphur Diesel, ULSD, Mining Diesel, Naval Distillate, Dyed Diesel, Marked Diesel, Coloured Diesel, Furnace special, Biodiesel blend, B1, B2, B5, Diesel Low Cloud (LC).
- Code** : W104, W293
- Material uses** : Diesel fuels are distillate fuels suitable for use in high and medium speed internal combustion engines of the compression ignition type. Mining diesels, marine diesels, MDO and naval distillates may have a higher flash point requirement.
- Manufacturer** : PETRO-CANADA
P.O. Box 2844
150 – 6th Avenue South-West
Calgary, Alberta
T2P 3E3
- In case of emergency** : Petro-Canada: 403-296-3000
Canotec Transportation: 613-996-6666
Poison Control Centre: Consult local telephone directory for emergency number(s).

2 . Hazards identification

- Physical state** : Bright oily liquid.
- Odour** : Mild petroleum oil like.
- WHMIS (Canada)** :  
Class B-3: Combustible liquid with a flash point between 37.8°C (100°F) and 93.3°C (200°F).
Class D-2A: Material causing other toxic effects (Very toxic).
Class D-2B: Material causing other toxic effects (Toxic).
- OSHA/HCS status** : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
- Emergency overview** : WARNING!
COMBUSTIBLE LIQUID AND VAPOUR. CAUSES EYE AND SKIN IRRITATION.
Combustible liquid. Severely irritating to the skin. Irritating to eyes. Keep away from heat, sparks and flame. Do not get in eyes. Avoid breathing vapour or mist. Avoid contact with skin and clothing. Use only with adequate ventilation. Wash thoroughly after handling.
- Routes of entry** : Dermal contact. Eye contact. Inhalation. Ingestion.
- Potential acute health effects**
- Inhalation** : Inhalation of this product may cause respiratory tract irritation and Central Nervous System (CNS) Depression, symptoms of which may include; weakness, dizziness, slurred speech, drowsiness, unconsciousness and in cases of severe overexposure; coma and death.
- Ingestion** : Ingestion of this product may cause gastro-intestinal irritation. Aspiration of this product may result in severe irritation or burns to the respiratory tract.
- Skin** : Severely irritating to the skin.
- Eyes** : Irritating to eyes.
- Potential chronic health effects**
- Chronic effects** : No known significant effects or critical hazards.
- Carcinogenicity** : Diesel engine exhaust particulate is probably carcinogenic to humans (IARC Group 2A).
- Mutagenicity** : No known significant effects or critical hazards.
- Teratogenicity** : No known significant effects or critical hazards.

2. Hazards identification

- Developmental effects** : No known significant effects or critical hazards.
- Fertility effects** : No known significant effects or critical hazards.
- Medical conditions aggravated by over-exposure** : Avoid prolonged or repeated skin contact to diesel fuels which can lead to dermal irritation and may be associated with an increased risk of skin cancer.

See toxicological information (Section 11)

3. Composition/information on ingredients

<u>Name</u>	<u>CAS number</u>	<u>%</u>
Hydrotreated Renewable Diesel/ Fuels, diesel/ Fuel Oil No. 1/ Fuel Oil No. 2	64742-81-0/ 68334-30-5/ 8008-20-6/ 68476-30-2	95 - 100
Alkanes, C10 – 20 Branched and Linear (R100)	928771-01-1	10 - 20
Fatty acids methyl esters	61788-61-2 / 67784-80-9 / 73891-99-3	0 - 5

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

4. First-aid measures

- Eye contact** : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.
- Skin contact** : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash skin thoroughly with soap and water or use recognised skin cleanser. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.
- Inhalation** : Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.
- Ingestion** : Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.
- Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.
- Notes to physician** : No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

5. Fire-fighting measures

- Flammability of the product** : Combustible liquid
- Extinguishing media**
- Suitable** : Use dry chemical, CO₂, water spray (fog) or foam.
- Not suitable** : Do not use water jet.
- Special exposure hazards** : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.
- Products of combustion** : Carbon oxides (CO, CO₂), nitrogen oxides (NO_x), sulphur oxides (SO_x), sulphur compounds (H₂S), smoke and irritating vapours as products of incomplete combustion.
- Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

5 . Fire-fighting measures

- Special remarks on fire hazards** : Flammable in presence of open flames, sparks and heat. Vapours are heavier than air and may travel considerable distance to sources of ignition and flash back. This product can accumulate static charge and ignite.
- Special remarks on explosion hazards** : Do not pressurise, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Runoff to sewer may create fire or explosion hazard.

6 . Accidental release measures

- Personal precautions** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilt material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing vapour or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see Section 8).
- Environmental precautions** : Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).
- Methods for cleaning up**
- Small spill** : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor.
- Large spill** : Stop leak if without risk. Move containers from spill area. Approach the release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilt product. Note: see section 1 for emergency contact information and section 13 for waste disposal.

7 . Handling and storage

- Handling** : Put on appropriate personal protective equipment (see Section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing vapour or mist. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use non-sparking tools. Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by earthing and bonding containers and equipment before transferring material. Empty containers retain product residue and can be hazardous. Do not reuse container.
- Storage** : Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabelled containers. Use appropriate containment to avoid environmental contamination. Ensure the storage containers are grounded/bonded.

8 . Exposure controls/personal protection

Ingredient	Exposure limits
Fuels, diesel	ACGIH TLV (United States). Absorbed through skin. TWA: 100 mg/m ³ , (Inhalable fraction and vapour) 8 hour(s).
Fuel oil No. 2	ACGIH TLV (United States). Absorbed through skin. TWA: 100 mg/m ³ , (Inhalable fraction and vapour) 8 hour(s).
Hydrotreated Renewable Diesel	ACGIH TLV (United States). Absorbed through skin. TWA: 200 mg/m ³ 8 hour(s).
Fuel oil No. 1	ACGIH TLV (United States). Absorbed through skin. TWA: 200 mg/m ³ 8 hour(s).

Consult local authorities for acceptable exposure limits.

Recommended monitoring procedures : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.

Engineering measures : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapour or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal protection

Respiratory

: Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator. Recommended: organic vapour cartridge or canister may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits. Protection provided by air-purifying respirators is limited. Use a positive-pressure, air-supplied respirator if there is any potential for uncontrolled release, exposure levels are unknown, or any other circumstances where air-purifying respirators may not provide adequate protection.

Hands

: Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.
Recommended: nitrile, neoprene, polyvinyl alcohol (PVA), Viton®. Consult your PPE provider for breakthrough times and the specific glove that is best for you based on your use patterns. It should be realized that eventually any material regardless of their imperviousness, will get permeated by chemicals. Therefore, protective gloves should be regularly checked for wear and tear. At the first signs of hardening and cracks, they should be changed.

Eyes

: Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts.

Skin

: Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Environmental exposure controls

: Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

9 . Physical and chemical properties

Physical state	: Bright oily liquid.
Flash point	: Diesel fuel and other distillate fuels: Closed cup: $\geq 40^{\circ}\text{C}$ ($\geq 104^{\circ}\text{F}$) Marine Diesel/MDO/Naval Distillate: Closed Cup: $\geq 60^{\circ}\text{C}$ ($\geq 140^{\circ}\text{F}$) Mining Diesel: Closed Cup: $\geq 52^{\circ}\text{C}$ ($\geq 126^{\circ}\text{F}$)
Auto-ignition temperature	: 225°C (437°F)
Flammable limits	: Lower: 0.7% Upper: 6%
Colour	: Clear to yellow (This product may be dyed red for taxation purposes).
Odour	: Mild petroleum oil like.
Odour threshold	: Not available.
pH	: Not available.
Boiling/condensation point	: 150 to 371°C (302 to 699.8°F)
Melting/freezing point	: Not available.
Relative density	: 0.80 to 0.88 kg/L @ 15°C (59°F)
Vapour pressure	: 1 kPa (7.5 mm Hg) @ 20°C (68°F).
Vapour density	: 4.5 [Air = 1]
Volatility	: Not available.
Evaporation rate	: Not available.
Viscosity	: Diesel fuel: 1.3 - 4.1 cSt @ 40°C (104°F) Marine Diesel Fuel: 1.3 - 4.4 cSt @ 40°C (104°F)
Pour point	: Not available.
Solubility	: Insoluble in cold water, soluble in non-polar hydrocarbon solvents.

10 . Stability and reactivity

Chemical stability	: The product is stable.
Hazardous polymerisation	: Under normal conditions of storage and use, hazardous polymerisation will not occur.
Materials to avoid	: Reactive with oxidising agents and acids.
Hazardous decomposition products	: May release CO _x , NO _x , SO _x , H ₂ S, smoke and irritating vapours when heated to decomposition.

11 . Toxicological information

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Fuels, diesel	LD50 Dermal	Mouse	24500 mg/kg	-
	LD50 Oral	Rat	7500 mg/kg	-
Fuel oil No. 2	LD50 Oral	Rat	12000 mg/kg	-
Fuel oil No. 1	LD50 Dermal	Rabbit	>2000 mg/kg	-
	LD50 Oral	Rat	>5000 mg/kg	-
	LC50 Inhalation Vapour	Rat	>5000 mg/m ³	4 hours
Hydrotreated Renewable Diesel	LD50 Dermal	Rabbit	>2000 mg/kg	-
	LD50 Oral	Rat	>5000 mg/kg	-
	LC50 Inhalation Vapour	Rat	>5200 mg/m ³	4 hours

Conclusion/Summary : Not available.

Chronic toxicity

Conclusion/Summary : Not available.

Irritation/Corrosion

Conclusion/Summary : Not available.

Sensitiser

11 . Toxicological information

Conclusion/Summary : Not available.

Carcinogenicity

Conclusion/Summary : Diesel engine exhaust particulate is probably carcinogenic to humans (IARC Group 2A).

Classification

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA
Fuels, diesel	A3	3	-	-	-	-
Fuel oil No. 1	A3	3	-	-	-	-
Fuel oil No. 2	A3	3	-	-	-	-
Hydrotreated Renewable Diesel	A3	3	-	-	-	-

Mutagenicity

Conclusion/Summary : Not available.

Teratogenicity

Conclusion/Summary : Not available.

Reproductive toxicity

Conclusion/Summary : Not available.

12 . Ecological information

Environmental effects : No known significant effects or critical hazards.

Aquatic ecotoxicity

Conclusion/Summary : Not available.

Biodegradability

Conclusion/Summary : Not available.


13 . Disposal considerations

Waste disposal : The generation of waste should be avoided or minimised wherever possible. Significant quantities of waste product residues should not be disposed of via the foul sewer but processed in a suitable effluent treatment plant. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Vapor from product residues may create a highly flammable or explosive atmosphere inside the container. Do not cut, weld or grind used containers unless they have been cleaned thoroughly internally. Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

14 . Transport information

Regulatory information	UN number	Proper shipping name	Classes	PG*	Label	Additional information
TDG Classification	UN1202	DIESEL FUEL	3	III		-
DOT Classification	Not available.	Not available.	Not available.	-		-

14 . Transport information

PG* : Packing group

15 . Regulatory information

United States

HCS Classification : Combustible liquid
Irritating material

Canada

WHMIS (Canada) : Class B-3: Combustible liquid with a flash point between 37.8°C (100°F) and 93.3°C (200°F).
Class D-2A: Material causing other toxic effects (Very toxic).
Class D-2B: Material causing other toxic effects (Toxic).

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

International regulations

Canada inventory : All components are listed or exempted.

United States inventory (TSCA 8b) : All components are listed or exempted.

Europe inventory : All components are listed or exempted.

16 . Other information

Label requirements : COMBUSTIBLE LIQUID AND VAPOUR. CAUSES EYE AND SKIN IRRITATION.

Hazardous Material Information System (U.S.A.) :

Health	2
Flammability	2
Physical hazards	0
Personal protection	H

National Fire Protection Association (U.S.A.) :



References : Available upon request.
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Date of printing : 6/28/2013.

Date of issue : 28 June 2013

Date of previous issue : 6/28/2013.

Responsible name : Sécurité de produit - KKB

▣ Indicates information that has changed from previously issued version.

For Copy of (M)SDS : Internet: www.petro-canada.ca/msds

Canada-wide: telephone: 1-800-668-0220; fax: 1-800-837-1228

For Product Safety Information: (905) 804-4752

Notice to reader

16 . Other information

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.



SAFETY DATA SHEET

Page: 1(8)
SDS Number: CAN310-D
Date Revised: 04/03/2013

This Safety Data Sheet complies with Regulation (EC) No. 1907/2006, ISO 11014-1 and ANSI Z400.1

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: DUAL SHIELD MILD STEEL AWS A5.20 T-1, T-2, T-9 & T-12 FLUX CORED WELDING ELECTRODES
Application: Arc Welding
Classification: AWS A5.20
Supplier: ESAB GROUP CANADA, INC., 6010 Tomken Road, Mississauga, ON L5T 1X9
Telephone No.: (905) 670-0220, 1-877-935-3226
Web site: www.esab.ca

2. HAZARDS IDENTIFICATION

Emergency Overview: Metal wires in varying colors. These products are normally not considered hazardous as shipped. Gloves should be worn when handling to prevent cuts and abrasions.

Some of products contain nickel, which is classified as toxic by prolonged inhalation, a skin sensitizer and a suspect carcinogen. Nickel powder is harmful for the environment. Some of these products contain cryolite. Cryolite is classified as toxic and dangerous for the environment. Some of these products contain potassium fluorosilicate which is classified as toxic by inhalation, skin contact, and ingestion. In the form that these substances are present in these products, they do not contribute to a hazard classification of the products. These products contain titanium dioxide which is possibly carcinogenic. These products contain quartz, but normally not in an inhalable fraction. Quartz can cause silicosis and may cause cancer.

Skin contact is normally no hazard but should be avoided to prevent possible allergic reactions.

Persons with a pacemaker should not go near welding or cutting operations until they have consulted their doctor and obtained information from the manufacturer of the device.

When these products are used in a welding process, the most important hazards are heat, radiation, electric shock and welding fumes.

Heat: Spatter and melting metal can cause burn injuries and start fires.

Radiation: Arc rays can severely damage eyes or skin.

Electricity: Electric shock can kill.

Fumes: Overexposure to welding fumes may result in symptoms like metal fume fever, dizziness, nausea, dryness or irritation of the nose, throat or eyes. Chronic overexposure to welding fumes may affect pulmonary function. Prolonged inhalation of nickel compounds above safe exposure limits can cause cancer. Overexposure to manganese and manganese compounds above safe exposure limits can cause irreversible damage to the central nervous system, including the brain, symptoms of which may include slurred speech, lethargy, tremor, muscular weakness, psychological disturbances and spastic gait.

3. COMPOSITION/INFORMATION ON INGREDIENTS

These products are preparations of flux cored wire.

Ingredients	REACH Reg. #	CAS#	EINECS#	Hazard classification ⁽¹⁾	IARC ⁽²⁾	NTP ⁽³⁾	OSHA List ⁽⁴⁾
Aluminum	--	7429-90-5	231-072-3	F; R15 R10 stablized F; R15-17 pyrophoric	--	--	--
Aluminum Oxide	--	1344-28-1	215-691-6	No	--	--	--
Carbon	--	7440-44-0	231-153-3	No	--	--	--
Cryolite	01-2119511565-43	15096-52-3	239-148-8	T; R48/23/25 Xn; R20/22 N; R51-53	--	--	--
Iron	01-2119462838-24	7439-89-6	231-096-4	No	--	--	--
Iron Oxide	--	1309-37-1	215-168-2	No	--	--	--
Lithium Fluoride	--	7789-24-4	232-152-0	No	--	--	--
Magnesium	--	7439-95-4	231-104-6	No	--	--	--
Manganese	--	7439-96-5	231-105-1	No	--	--	--



Ingredients	REACH Reg. #	CAS#	EINECS#	Hazard classification ⁽¹⁾	IARC ⁽²⁾	NTP ⁽³⁾	OSHA List ⁽⁴⁾
Nickel Powder	--	7440-02-0	231-111-4	Carc. Cat. 3; R40 T; R48/23 R43 R52/53	2B	S	--
Potassium Fused Flux							
Titanium Oxide	--	13463-67-7	236-675-5	No	2B	--	--
Manganese Oxide	--	1344-43-0	215-695-8	No	--	--	--
Potassium Oxide	--	12136-45-7	235-227-6	No	--	--	--
Silicon Dioxide (amorphous)	--	60676-86-0	262-373-8	No	--	--	--
Potassium Silicofluoride	--	16871-90-2	240-896-2	T; R23/24/25	--	--	--
Silicon	--	7440-21-3	231-130-8	No	--	--	--
Silicon Dioxide	--	14808-60-7	238-878-4	T; R45	1	K	--
Sodium Fluoride	--	7681-49-4	231-667-8	T; R25 Xi; R36/38, R32	--	--	--
Sodium Fused Flux							
Titanium Oxide	--	13463-67-7	236-675-5	No	2B	--	--
Manganese Oxide	--	1344-43-0	215-695-8	No	--	--	--
Sodium Oxide	--	12401-86-4	215-208-9	No	--	--	--
Silicon Dioxide (amorphous)	--	60676-86-0	262-373-8	No	--	--	--
Titanium Oxide	--	13463-67-7	236-675-5	No	2B	--	--
Zirconium	--	7440-67-7	231-176-9	F; R15-17	--	--	--
Zirconium Dioxide	--	1314-23-4	215-227-2	No	--	--	--

⁽¹⁾ Hazard Classification according to European Council Directive 67/548/EEC, for R-phrases, see Section 16.

⁽²⁾ Evaluation according to the International Agency for Research on Cancer.

1 –Carcinogenic to humans. 2A – Probably carcinogenic to humans. 2B – Possibly carcinogenic to humans.

⁽³⁾ Classification according to the 11th Report on Carcinogens, published by the US National Toxicology Program.

K – Known Carcinogen S – Suspect Carcinogen

⁽⁴⁾ Carcinogen listing according to OSHA, Occupational Safety & Health Administration (USA).

APPROXIMATE COMPOSITION (Wt. %)

“All Position” T-1, T-9 & T 12 Electrodes

Product Trade Name	Dual Shield 70 Ultra Plus	Dual Shield 71 RC	Dual Shield 7100 LC	Dual Shield 7100 Ultra	ESAB 71	Dual Shield II 70 Ultra	Dual Shield II 70 HYN
Aluminum	--	<0.5	<0.5	<0.5	<0.5	--	--
Aluminum Oxide	<0.5	<1	<0.5	<0.5	<0.5	0.2-1	0.2-1
Carbon	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Fluoride Compounds	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Iron Oxide	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Magnesium	0.2-1	0.2-1	0.2-1	0.2-1	0.2-1	0.2-1	0.2-1
Manganese	1.5-3.5	1.5-3.5	1.5-3.5	1.5-3.5	1.5-3.5	1.5-3.5	1.5-3.5
Nickel	--	--	--	--	--	--	<0.5
Potassium Oxide	--	<0.5	<0.5	<0.5	<0.5	<0.3	<0.3
Silicon	0.5-1.5	0.5-1.5	0.5-1.5	0.5-1.5	0.5-1.5	0.5-1.5	0.5-1.5
Silicon Dioxide	0.2-1	0.5-1.5	0.5-1.5	0.5-1.5	0.5-1.5	<0.5	0.5-1.5
Sodium Oxide	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Titanium Oxide	8-11	8-11	8-11	6-9	6-9	5-8	6-9
Zirconium Dioxide	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Iron	Bal (>80)	Bal (>80)	Bal (>80)	Bal (>80)	Bal (>80)	Bal (>80)	Bal (>80)
AWS Classification	E71T-1M/T-9M	E71T-1C/T-9C	E71T-1C-DH8/ T-1M/T-9C-DH8/ T-9M	E71T-1C-DH8/ T-1M-D/ T-9C-DH8/ T-9M-D	E71T-1C/T-1M/ T-9C/T-9M	E71T-1M/T-12M	E71T-1M/T-12M



Product Trade Name	Dual Shield II 70LC	Dual Shield II 70LF	Dual Shield II 70T-12	Dual Shield II 70T-12H4	Dual Shield II 71 ULTRA	Dual Shield 700X	Dual Shield 710X
Aluminum	<0.5	--	--	--	<0.5	--	<0.5
Aluminum Oxide	0.2-1	0.2-1	0.2-1	0.2-1	<0.5	<0.5	<0.5
Carbon	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Fluoride Compounds	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Iron Oxide	<0.5	<0.5	<0.5	0.5-2	<0.5	<0.5	<0.5
Magnesium	0.2-1	0.2-1	0.2-1	0.2-1	0.2-1	--	0.2-1
Manganese	1.5-3.5	1.5-3.5	1.5-3.5	1.5-3.5	1.5-3.5	2.5-4	1.5-3.5
Manganese Oxide	--	--	--	--	--	0.2-1.0	--
Nickel	--	<0.5	--	--	0.1-0.5	--	0.1-0.5
Potassium Oxide	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.5
Silicon	0.5-1.5	0.5-1.5	0.5-1.5	0.5-1.5	0.5-1.5	1-2.5	0.5-1.5
Silicon Dioxide	0.5-1.5	0.5-1.5	0.5-2	0.5-1.5	0.5-1.5	0.5-2	0.5-1.5
Sodium Oxide	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Titanium Oxide	6-9	6-9	6-9	6-9	6-9	4.5-6.5	8-11
Zirconium Dioxide	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Iron	Bal (>80)	Bal (>80)	Bal (>80)	Bal (>80)	Bal (>80)	Bal (>80)	Bal (>80)
AWS Classification	E70T-1C/T-9C	E71T-1M/T-12M	E71T-1MJ/T-12MJ	E71T-1M-JH4/T-12M-JH4	E71T-1C-J/T-12C-J	E70T-1C	E71T-1C-DH8/T-1M/T-9C-DH8/T-9M

Product Trade Name	Dual Shield 710X-M	Dual Shield II 711X	Dual Shield II 712X	Dual Shield II 71 HYD	Dual Shield 7210
Aluminum	<0.5	<0.5	--	<0.5	<0.5
Aluminum Oxide	<0.5	<0.5	0.2-1	<0.5	<0.5
Carbon	<0.2	<0.2	<0.2	<0.2	<0.2
Fluoride Compounds	<0.5	<0.5	<0.5	<0.5	<0.5
Iron Oxide	<0.5	<0.5	<0.5	<0.5	<0.5
Magnesium	0.2-1	0.2-1	0.2-1	0.2-1	0.2-1
Manganese	1.5-3.5	1.5-3.5	1.5-3.5	1.5-3.5	1.5-3.5
Nickel	--	0.1-0.5	--	0.1-0.5	0.1-0.5
Potassium Oxide	<0.5	<0.3	<0.3	<0.3	<0.5
Silicon	0.5-1.5	0.5-1.5	0.5-1.5	0.5-1.5	0.5-1.5
Silicon Dioxide	0.5-1.5	0.5-1.5	0.5-2	0.5-1.5	0.5-1.5
Sodium Oxide	<0.5	<0.5	<0.5	<0.5	<0.5
Titanium Oxide	8-11	6-9	6-9	6-9	8-11
Zirconium Dioxide	<0.5	<0.5	<0.5	<0.5	<0.5
Iron	Bal (>80)	Bal (>80)	Bal (>80)	Bal (>80)	Bal (>80)
AWS Classification	E71T-1C/T-1M-DH8/T-9C/T-9M-DH8	E71T-1C-JDH8/T-12C-JDH8	E71T-1M-JH8/T-12M-JH8	E71T-1C/T-12C	E71T-1C/T-9C



“Downhand” T-1 & T-9 Electrodes

Product Trade Name	Dual Shield 111-RB	Dual Shield 70-GB	Dual Shield 78	Dual Shield R-70 ULTRA
Aluminum	0.1-0.5	--	--	--
Aluminum Oxide	<0.5	<0.5	<0.5	<0.5
Carbon	<0.2	<0.2	<0.2	<0.2
Fluoride Compounds	<0.5	<0.5	<0.5	<0.5
Iron Oxide	<0.5	<0.5	<0.5	0.5-2
Magnesium	0.1-0.5	0.1-0.5	--	--
Manganese	1.5-3.0	1.5-3.0	3-4.5	3-4.5
Manganese Oxide	0.2-1.0	--	0.2-1.0	0.2-1.0
Nickel	--	--	--	0.1-0.5
Potassium Oxide	<0.3	<0.3	<0.3	<0.3
Silicon	0.5-2.0	<0.5	--	<0.5
Silicon Dioxide	0.5-1.5	0.5-1.5	1-3	0.5-1.5
Sodium Oxide	<0.5	<0.5	<0.5	<0.5
Titanium Oxide	2.5-4.5	5.5-7.5	4.5-6.5	5.0-7.0
Zirconium	0.1-0.5	--	0.1-0.5	--
Zirconium Dioxide	<0.5	<0.5	<0.5	<0.5
Iron	Bal (>80)	Bal (>80)	Bal (>80)	Bal (>80)
AWS Classification	E70T-1C	E70T-GM	E70T-1C	E70T-1C-DH8/ T-1M/T-9C-DH8/T-9M

“Downhand” T-2 Electrodes

Product Trade Name	Dual Shield T-63
Aluminum	--
Aluminum Oxide	<0.5
Carbon	<0.2
Iron Oxide	1-3
Manganese	2.5-5
Manganese Oxide	0.2-1
Silicon	0.5-3
Silicon Dioxide	0.5-1.5
Sodium Oxide	<1
Titanium Oxide	4.5-6.5
Zirconium Dioxide	<0.5
Iron	Bal. (>80)
AWS Classification	E70T-2C

4. FIRST AID MEASURES

- Inhalation: If breathing has stopped, perform artificial respiration and obtain medical assistance immediately! If breathing is difficult, provide fresh air and call physician.
- Eye contact: For radiation burns due to arc flash, see physician. To remove dusts or fumes flush with water for at least fifteen minutes. If irritation persists, obtain medical assistance.
- Skin contact: For skin burns from arc radiation, promptly flush with cold water. Get medical attention for burns or irritations that persist. To remove dust or particles wash with mild soap and water.



Electric shock: Disconnect and turn off the power. Use a nonconductive material to pull victim away from contact with live parts or wires. If not breathing, begin artificial respiration, preferably mouth-to-mouth. If no detectable pulse, begin Cardio Pulmonary Resuscitation (CPR). Immediately call a physician.

General: Move to fresh air and call for medical aid.

5. FIRE FIGHTING MEASURES

No specific recommendations for welding consumables. Welding arcs and sparks can ignite combustible and flammable materials. Use the extinguishing media recommended for the burning materials and fire situation. Wear self-contained breathing apparatus as fumes or vapors may be harmful.

6. ACCIDENTAL RELEASE MEASURES

Solid objects may be picked up and placed into a container. Liquids or pastes should be scooped up and placed into a container. Wear proper protective equipment while handling these materials. Do not discard as refuse.

Personal precautions: refer to Section 8.

Environmental precautions: refer to Section 13.

7. HANDLING AND STORAGE

Handling:

Handle with care to avoid stings and cuts. Wear gloves when handling welding consumables. Avoid exposure to dust. Do not ingest.

Some individuals can develop an allergic reaction to certain materials. Retain all warning and identity labels.

Storage:

Keep separate from chemical substances like acids and strong bases, which could cause chemical reactions.

8. EXPOSURE CONTROL/PERSONAL PROTECTION

Avoid exposure to welding fumes, radiation, spatter, electric shock, heated materials and dust.

Engineering measures:

Ensure sufficient ventilation, local exhaust, or both, to keep welding fumes and gases from breathing zone and general area. Keep working place and protective clothing clean and dry. Train welders to avoid contact with live electrical parts and insulate conductive parts. Check condition of protective clothing and equipment on a regular basis.

Personal protective equipment:

Use respirator or air supplied respirator when welding or brazing in a confined space, or where local exhaust or ventilation is not sufficient to keep exposure values within safe limits. Use special care when welding painted or coated steels since hazardous substances from the coating may be emitted. Wear hand, head, eyes, ear and body protection like welders gloves, helmet or face shield with filter lens, safety boots, apron, arm and shoulder protection. Keep protective clothing clean and dry.

Use industrial hygiene monitoring equipment to ensure that exposure does not exceed applicable national exposure limits. The following limits can be used as guidance. For information about welding fume analysis refer to Section 10.

Substance	CAS#	ACGIH TLV ⁽¹⁾ mg/m ³	OSHA PEL ⁽²⁾ mg/m ³
Aluminum (metal and insoluble compounds)	7429-90-5	1**	15*, 5**
Aluminum Oxide	1344-28-1	1** (as Al)	15*, 5**
Carbon	7440-44-0	None	None
Cryolite (as F)	15096-52-3	2.5	2.5
Iron and Iron Oxides	7439-89-6	5**	10 (fume)
Iron Oxide	1309-37-1	5**	10 (fume)
Lithium Fluoride (as F)	7789-24-4	2.5	2.5
Magnesium	7439-95-4	None	None
Manganese and inorganic compounds (as Mn)	7439-96-5	0.02**, 0.1***	5 Ceiling
Manganese, fume (as Mn)	7939-96-5	0.2	5 Ceiling
Nickel, elemental	7440-02-0	1.5***	1
Potassium Fused Flux			
Titanium Oxide	13463-67-7	10	15*
Manganese Oxide (as Mn)	1344-43-0	0.02**, 0.1***	5 Ceiling
Potassium Oxide	12136-45-7	None	None
Silicon Dioxide (amorphous)	60676-86-0	Withdrawn	10 mg/m ³ ### %SiO ₂ +2



Substance		CAS#	ACGIH TLV ⁽¹⁾ mg/m ³	OSHA PEL ⁽²⁾ mg/m ³
Potassium Silicofluoride	(as F)	16871-90-2	2.5	2.5
Silicon		7440-21-3	Withdrawn	15*, 5**
Silicon Dioxide (quartz)		14808-60-7	0.025**	<u>10 mg/m³ ###</u> %SiO ₂ +2
Sodium Fluoride	(as F)	7681-49-4	2.5	2.5
Sodium Fused Flux				
Titanium Oxide		13463-67-7	10	15*
Manganese Oxide	(as Mn)	1344-43-0	0.02**, 0.1***	5 Ceiling
Sodium Oxide		12401-86-4	None	None
Silicon Dioxide (amorphous, fused)		60676-86-0	Withdrawn	<u>10 mg/m³ ###</u> %SiO ₂ +2
Titanium Oxide		13463-67-7	10	15*
Zirconium & Zirconium Compounds	(as Zr)	7440-67-7	5, 10 (STEL)	5
Zirconium Dioxide	(as Zr)	1314-23-4	5, 10 (STEL)	5

⁽¹⁾ Threshold Limit Values according to American Conference of Governmental Hygienists, 2013

⁽²⁾ Permissible Exposure Limits according to the Occupational Safety & Health Administration (USA)

Unless noted, all values are for 8 hour time weighted averages (TWA).

* Total dust, ** Respirable fraction, *** Inhalable fraction.

Respirable dust

NOTE: Some of these products may not contain all of the materials listed. For details of composition, refer to the COMPOSITION TABLES in Section 3.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Solid, non-volatile with varying color.

Melting Point: >1000°C/>1800°F

10. STABILITY AND REACTIVITY

General: These products are only intended for normal welding purposes.

Stability: These products are stable under normal conditions.

Reactivity: Contact with chemical substances like acids or strong bases could cause generation of gas.

When these products are used in a welding process, hazardous decomposition products would include those from the volatilization, reaction or oxidation of the materials listed in Section 3 and those from the base metal and coating.

The amount of fumes generated from these products varies with welding parameters and dimensions but is generally no more than 5 to 15 g/kg consumable. Fumes from these products may contain compounds of the following chemical elements: Fe, O, Mn, Zr, Ni, F, Na, Si, K, Al, Li, Mg and Ti. The rest is not analyzed, according to available standards.

Refer to applicable national exposure limits for fume compounds, including those exposure limits for fume compounds found in Section 8. Manganese and nickel have low exposure limits, in some countries, that may be easily exceeded.

Reasonably expected gaseous products would include carbon oxides, nitrogen oxides and ozone. Air contaminants around the welding area can be affected by the welding process and influence the composition and quantity of fumes and gases produced.

11. TOXICOLOGICAL INFORMATION

Inhalation of welding fumes and gases can be dangerous to your health. Classification of welding fumes is difficult because of varying base materials, coatings, air contamination and processes. The International Agency for Research on Cancer has classified welding fumes as possibly carcinogenic to humans (Group 2B).

Acute toxicity: Overexposure to welding fumes may result in symptoms like metal fume fever, dizziness, nausea, dryness or irritation of the nose, throat or eyes.

Chronic toxicity: Overexposure to welding fumes may affect pulmonary function. Prolonged inhalation of nickel compounds above safe exposure limits can cause cancer. Overexposure to manganese and manganese compounds above safe exposure limits can cause irreversible damage to the central nervous system, including the brain, symptoms of which may include slurred speech, lethargy, tremor, muscular weakness, psychological disturbances and spastic gait. Prolonged inhalation of titanium dioxide above safe exposure limits can cause cancer. Inhalable quartz is a respiratory carcinogen; however, the process of welding converts crystalline quartz to the amorphous form which is not considered to be a carcinogen.



12. ECOLOGICAL INFORMATION

Welding consumables and materials could degrade/weather into components originating from the consumables or from the materials used in the welding process. Avoid exposure to conditions that could lead to accumulation in soils or groundwater.

Nickel powder is harmful for the environment. Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Some of these products contain cryolite, which is classified by European Council Directive 67/548/EEC, as toxic to aquatic organisms and may cause long-term adverse effects in the aquatic environment.

13. DISPOSAL CONSIDERATIONS

Discard any product, residue, disposable container or liner in an environmentally acceptable manner, in full compliance with federal and local regulations. Use recycling procedures if available.

USA RCRA: These products are not considered hazardous waste if discarded.

Residues from welding consumables and processes could degrade and accumulate in soils and groundwater. Welding slag from these products typically contain mainly the following components originating from the powder filling of the flux cored wire: Fe, O, Mn, Zr, Ni, F, Na, Si, K, Al, Li, Mg and Ti.

14. TRANSPORT INFORMATION

No international regulations or restrictions are applicable.

15. REGULATORY INFORMATION

Read and understand the manufacturer's instructions, your employer's safety practices and the health and safety instructions on the label. Observe any federal and local regulations. Take precautions when welding and protect yourself and others.

WARNING: Welding fumes and gases are hazardous to your health and may damage lungs and other organs. Use adequate ventilation.

ELECTRIC SHOCK can kill.

ARC RAYS and SPARKS can injure eyes and burn skin.

Wear correct hand, head, eye and body protection.

Canada: WHMIS classification: Class D; Division 2, Subdivision A

Canadian Environmental Protection Act (CEPA): All constituents of these products are on the Domestic Substance List (DSL).

USA: Under the OSHA Hazard Communication Standard, these products are considered hazardous.

These products contain or produce a chemical known to the state of California to cause cancer and birth defects (or other reproductive harm). (California Health & Safety Code § 25249.5 et seq.)

United States EPA Toxic Substance Control Act: All constituents of these products are on the TSCA inventory list or are excluded from listing.

CERCLA/SARA Title III

Reportable Quantities (RQs) and/or Threshold Planning Quantities (TPQs):

Ingredient name	RQ (lb)	TPQ (lb)
Product is a solid solution in the form of a solid article.	--	--

Spills or releases resulting in the loss of any ingredient at or above its RQ require immediate notification to the National Response Center and to your Local Emergency Planning Committee.

Section 311 Hazard Class

As shipped: Immediate In use: Immediate delayed

EPCRA/SARA Title III 313 Toxic Chemicals

The following metallic components are listed as SARA 313 "Toxic Chemicals" and potential subject to annual SARA 313 reporting. See Section 3 for weight percent.

Ingredient name	Disclosure threshold
Manganese	1.0% de minimis concentration
Nickel	0.1% de minimis concentration



16. OTHER INFORMATION

This Safety Data Sheet has been revised due to modifications to Sections 3 and 8. This SDS supersedes CAN310-C.

Refer to ESAB "Welding and Cutting - Risks and Measures", F52-529 "Precautions and Safe Practices for Electric Welding and Cutting" and F2035 "Precautions and Safe Practices for Gas Welding, Cutting and Heating" available from ESAB, and to:

USA: Contact ESAB at www.esabna.com or 1-800-ESAB-123 if you have questions about this SDS.

American National Standard Z49.1 "Safety in Welding and Cutting", ANSI/AWS F1.5 "Methods for Sampling and Analyzing Gases from Welding and Allied Processes", ANSI/AWS F1.1 "Method for Sampling Airborne Particles Generated by Welding and Allied Processes", AWSF3.2M/F3.2 "Ventilation Guide for Weld Fume", American Welding Society, 550 North Le Jeune Road, Miami, Florida, 33135. Safety and Health Fact Sheets available from AWS at www.aws.org.

OSHA Publication 2206 (29 C.F.R. 1910), U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954.

American Conference of Governmental Hygienists (ACGIH), Threshold Limit Values and Biological Exposure Indices, 6500 Glenway Ave., Cincinnati, Ohio 45211, USA.

NFPA 51B "Standard for Fire Prevention During Welding, Cutting and Other Hot Work" published by the National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169.

UK: WMA Publication 236 and 237, "Hazards from Welding Fume", "The arc welder at work, some general aspects of health and safety".

Germany: Unfallverhütungsvorschrift BGV D1, "Schweißen, Schneiden und verwandte Verfahren".

Canada: CSA Standard CAN/CSA-W117.2-01 "Safety in Welding, Cutting and Allied Processes".

These products have been classified according to the hazard criteria of the CPR and the SDS contains all the information required by the CPR.

Explanation of risk phrases mentioned in this SDS:

R-phrases: R10 – Flammable.

R15 – Contact with water liberates extremely flammable gases.

R17 – Spontaneously flammable in air.

R20/22 – Harmful by inhalation and if swallowed.

R23/24/25 – Toxic by inhalation, in contact with skin and if swallowed.

R25 – Toxic if swallowed.

R32 – Contact with acids liberates very toxic gas.

R36/38 – Irritating to eyes and skin.

R40 – Limited evidence of a carcinogenic effect.

R43 – May cause sensitization by skin contact.

R45 – May cause cancer.

R48/23 – Toxic: danger of serious damage to health by prolonged exposure through inhalation.

R48/23/25 – Toxic: danger of serious damage to health by prolonged exposure through inhalation and if swallowed.

R51 – Toxic to aquatic organisms.

R52/53 – Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

R53 – May cause long-term adverse effects in the aquatic environment.

ESAB requests the users of these products to study this Safety Data Sheet (SDS) and become aware of product hazards and safety information. To promote safe use of these products a user should:

- notify its employees, agents and contractors of the information on this SDS and any product hazards/safety information.
- furnish this same information to each of its customers for these products.
- request such customers to notify employees and customers for the same product hazards and safety information.

The information herein is given in good faith and based on technical data that ESAB believes to be reliable. Since the conditions of use are outside our control, we assume no liability in connection with any use of this information and no warranty, expressed or implied is given. Contact ESAB for more information.



Multi-Use Duct Tape

3900

Technical Data

February, 2013

Product Description 3M™ Duct Tape 3900 is a general purpose conformable cloth duct tape made with polyethylene film over cloth scrim and a synthetic rubber adhesive. A good choice for general maintenance, bundling, wrapping, attaching, sealing, protecting, and color coding.

Product Construction	Backing	Adhesive	Colors	Standard Roll Length	Standard Width
	Polyethylene film over cloth scrim	Synthetic rubber	Blue, black, olive, red, silver, white, yellow	60 yds. (54.8 m)	1.88 in. (48 mm)

Typical Physical Properties

Note: The following technical information and data should be considered representative or typical only, and should not be used for specification purposes.

		ASTM Test Method
Adhesion to Steel:	72 oz./in. width (79 N/100 mm)	D-3330
Tensile Strength:	32 lbs./in. width (560 N/100 mm)	D-3759
Elongation at Break:	24%	D-3759
Thickness:	8.1 mils (0.21 mm)	D-3652
Temperature Use Range:	Up to 200°F (93°C)	

Features

- Aggressive synthetic rubber adhesive provides instant adhesion to a wide variety of surfaces
- Cloth scrim tears straight in both directions.
- Cloth scrim has high tensile strength, ideal for bundling materials.
- Polyethylene backing resists moisture prolonging the tape bond in moist or humid environments.
- Conformable and can be applied to irregular surfaces.
- Seven colors are available for color coding or to match a surface.

Application Ideas

- General shop and temporary repair activities.
- Sealing, holding, protecting, bundling, color coding.
- Applications requiring moisture resistance.

3M™ Multi-Use Duct Tape

3900

Storage Store under normal conditions of 60° to 80°F (16° to 27°C) and 40 to 60% R.H. in the original carton.

Shelf Life To obtain best performance, use this product within 12 months from date of manufacture.

Technical Information The technical information, recommendations and other statements contained in this document are based upon tests or experience that 3M believes are reliable, but the accuracy or completeness of such information is not guaranteed.

Product Use Many factors beyond 3M's control and uniquely within user's knowledge and control can affect the use and performance of a 3M product in a particular application. Given the variety of factors that can affect the use and performance of a 3M product, user is solely responsible for evaluating the 3M product and determining whether it is fit for a particular purpose and suitable for user's method of application.

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Limitation of Liability Except where prohibited by law, 3M will not be liable for any loss or damage arising from the 3M product, whether direct, indirect, special, incidental or consequential, regardless of the legal theory asserted, including warranty, contract, negligence or strict liability.



This product was manufactured under a quality system registered to ISO 9001 standards.



Industrial Adhesives and Tapes Division

3M Center, Building 225-3S-06
St. Paul, MN 55144-1000
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HEALTH	2
FLAMMABILITY	4
PHYSICAL HAZARD	1

SAFETY DATA SHEET
Prepared by Duro Dyne January 9, 2014

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Trade name: DURO DYNE SOLVENT BASED ADHESIVE
Product Identifier: PBA
Supplier Details: DURO DYNE CORPORATION
81 Spence Street
Bay Shore, NY 11706

Information
Phone No: 800-899-3876
Emergency Phone No: 800-424-9300 (CHEMTREC)

2. HAZARD IDENTIFICATIONS

Emergency Overview: **DANGER! EXTREMELY FLAMMABLE!!**
Breathing vapors may cause drowsiness, dizziness and nausea; intentional misuse or abuse of product may be fatal. May cause respiratory tract, skin, and eye irritation. Harmful if aspirated. May cause liver, spleen, and kidney damage. May cause central nervous system effects. Possible risks of irreversible effects from acute and chronic exposures.

Target Organs: Liver, central nervous system, kidneys, bladder, reproductive system.

Warning: **This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.**

US / Canada Hazard Symbols:



European (GHS) Hazard Symbols:



HMIS Hazard Ratings:

0= Insignificant
1= Slight
2= Moderate
3= High
4= Extreme * Chronic Health Hazard

HEALTH	2
FLAMMABILITY	4
PHYSICAL HAZARD	1

REQUIRED PERSONAL PROTECTIVE EQUIPMENT:

HMIS Personal Protective Equipment

Letter: H



Splash Goggles



Gloves



Apron



Vapor Respirator

RISK PHRASES:

R12: Highly flammable.
R38: Irritating to skin.
R48/20 Harmful: Danger of serious damage to health by prolonged exposure through inhalation.
R62: Possible risk of impaired fertility.
R63: Possible risk of harm to the unborn child.
R65 Harmful: May cause lung damage if swallowed.
R67: Vapors may cause drowsiness and dizziness.

SAFETY PHRASES:

S2: Keep out of reach of children.
S9: Keep container in a well – ventilated place.
S16: Keep away from sources of ignition – No smoking.
S36/37: Wear suitable protective clothing and gloves.
S61: Avoid release to the environment. Refer to special instructions / Safety data sheets.
S62: If swallowed, do not induce vomiting: seek medical advice immediately and show this container or label.

POTENTIAL HEALTH EFFECTS

Acute Exposure Effects:

Inhalation: Respiratory tract irritation may occur from vapors. May cause liver, kidney, and bladder damage. Harmful if inhaled. May cause central nervous system effects. Symptoms of exposure include fatigue, irritability, headache, dizziness and/or drowsiness, gastric

Skin: disturbances, and intolerance to alcohol. Aspiration of product or vomitus and subsequent regurgitation may result in pulmonary edema and/or aspirant pneumonia. May cause moderate skin irritation. Causes redness and pain. May be harmful if absorbed through the skin.

Eyes: May cause moderate to severe mechanical and chemical irritation to eyes with redness and pain; chemical conjunctivitis may occur.

Ingestion: Causes gastrointestinal distress if ingested. May cause liver, bladder and kidney damage; nervous system effects may be seen. Aspiration of vomitus from ingestion and subsequent regurgitation may result in pulmonary edema and/or aspirant pneumonia. Other symptoms are similar to inhalation exposures; see Inhalation Exposure.

Chronic Exposure Effects: Prolonged or repeated skin contact may result in defatting of skin, and dermatitis. Multiple or prolonged exposures may cause liver, kidney, and bladder damage. Nervous system effects including peripheral neuropathy may be seen with multiple/prolonged exposures. Adverse reproductive effects have been reported in animals for components of this product; these adverse effects include possible damage to the fetus and to the reproductive system. A possible risk of irreversible effects exists for this product; this risk is greatly increased with prolonged and/or multiple exposures or with intentional misuse of product. Proper utilization of personal protection equipment is essential to mitigate risks associated with product.

Carcinogenicity: Toluene and hexane are not listed as carcinogenic by the IARC, the NTP, ESIS, OSHA, or the state of California.

3. COMPOSITION/INFORMATION ON INGREDIENTS

HAZARDOUS COMPONENTS	% (BY WEIGHT)	CAS#	EINECS#	HAZARD SYMBOL	RISK PHRASES (Full Legend Section 16)
Hexane	20-30	110-54-3	203-777-6	F, Xn	R11, 38 48/20, 62,65,67
Toluene (a)	10-20	108-88-3	203-625-9	F, Xn	R11, 38 48/20, 63,65,67

Note: This Safety Data Sheet is prepared to comply with the United States Occupational Safety and Health Administration (OSHA) Hazard Communication Standard (29 CFR 1910.1200), the Canadian Workplace Hazardous Materials Information System (WHMIS), and European Union Directive 1997/2006/EC (REACH). Hazard symbols and risk phases are based on maximum listed concentration of each hazardous ingredient. Unlisted ingredients are not “hazardous” per the OSHA Hazard Communication Standard (29 CFR 1910.1200), the Canadian Workplace Hazardous Materials Information System (WHMIS) or the European (GHS) directive 91/155/EEC and are considered trade secrets under US Federal Law (29CFR and 40CFR), Canadian Law (Health Canada Legislation), and European Union Directive 67/548/EEC.

Warning: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.

4. FIRST-AID MEASURES

Inhalation: Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get emergency aid for cases of breathing difficulty or cessation, or where victim is not conscious and alert to surroundings. Do Not use mouth-to-mouth resuscitation.

Eyes: Remove contact lenses if present. Immediately flush eyes with plenty of potable water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get prompt medical assistance.

Skin: Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid if irritation develops or persists. Wash clothing before reuse: severely contaminated clothing may need to be discarded.

Ingestion: **DO NOT INDUCE VOMITING!!!!!!** If victim is conscious and alert to surroundings, rinse mouth thoroughly and drink 1-2 glasses of water. Seek emergency medical attention immediately. If vomiting spontaneously occurs, place victim's head below chest level to minimize aspiration risk.

5. FIRE FIGHTING MEASURES

Flash Point: <0°F/<-18°C TCC

Auto Ignition Temperature: 234°C/453°F*

Flammable Explosive Limits:

Lower: 1.2%

Upper: 6.9%

**Sensitivity to Mechanical Impacts/
Static Charge:** None.
* References to Toluene.

General Hazards: **WARNING! EXTREMELY FLAMMABLE!!**
Product will readily burn under fire conditions with the emission of toxic and/or irritating gases and fumes. Solvent portion of product may float on water and remain ignited.

Suitable Extinguishing Media: Water fog, foam, CO2, dry chemical – water fog for spray may be used to cool fire-exposed containers.

Unsuitable Extinguishing Media: Water Stream – solvent portion of product may separate and float on top of water, remaining ignited and spreading fire.

Fire Fighting Procedures:

Fire fighters must wear a self-contained breathing apparatus and full chemical fire fighting gear when fighting fires involving this product. Water fog or spray may be used to cool off fire-exposed containers to prevent rupture. **DO NOT USE WATER STREAMS!**

Unusual Fire and Explosion Hazards:

Irritating and toxic gases and/or fumes may be generated from heated and/or ignited product; wear full chemical firefighting gear.

Hazardous Combustion Products:

Carbon monoxide, carbon dioxide, small amounts of metal oxides, and sulfur oxides.

6. ACCIDENTAL RELEASE MEASURES**Steps to be taken in case of material is Released or Spilled:**

REMOVE ALL IGNITION SOURCES!!! Evacuate all non-essential personnel and cordon off affected area. Clean-up personnel should wear Personal Protective Equipment. Wipe or shovel up spill; place material in container designed for flammable waste. For large spills, contact authorities; water spray may be judiciously used to reduce ignition hazard. Dispose of used absorbent in a licensed and permitted facility, preferably by incineration with exhaust scrubbers being used. Avoid contamination of waterways, sewers, etc. with this product.

7. HANDLING AND STORAGE**Precautions to be taken in Handling and Storage:**

Handle product while wearing Personal Protective Equipment and provide adequate ventilation to avoid prolonged or repeated breathing of vapors. Avoid prolonged or repeated contact with skin. Avoid contact with eyes. Store only in original container. Avoid ignition sources and excess temperatures. Store in a cool dark place with adequate ventilation; protect product from light. Avoid moisture buildup around containers. Keep out of reach of children. Store in a tightly closed container away from compatible materials. Do Not Freeze!

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Component	CAS#	ACGIH Exposure Limits (mg/m3 unless otherwise noted)	OSHA Exposure Limits (mg/m3 unless otherwise noted)
Hexane	110-54-3	50 ppm 167 mg/m3 TWA	500 ppm/1800 mg/m3 TWA 20 ppm/72 mg/m3 OEL (Europe)
Toluene	108-88-3	50 ppm TWA (skin)	200 ppm TWA, 300 ppm Ceiling, 500 ppm 10 min peak 50 ppm/192 mg/m3 OEL

Personal Protection:	Use approved respirator (e.g. CEN, NIOSH/OSHA, AS) as required to prevent over exposure. Use an air-supplied respirator where high concentrations are expected, or an air-purifying respirator for organic vapors (with combined particulate filter if particulate matter is present). If ventilation is insufficient, supplied-air masks may be necessary.
Protective Gloves:	Wear gloves made of chemically resistant material. Viton or polyvinyl alcohol are suggested materials; DO NOT USE LATEX.
Eye Protection:	Wear safety glasses with splash protective side shields or goggles.
Other Protective Clothing or Equipment:	Wear protective clothing such as an apron to prevent skin contact. Wear gloves made of chemically resistant material. Viton or polyvinyl alcohol are suggested materials; DO NOT USE LATEX.
Engineering Controls:	Provide general ventilation sufficient to control airborne concentration below the TLV/TWA's listed. Forced-air ventilation such as fans may be required.
Work/Hygienic Practices:	Wash hands before eating, drinking, smoking and using the toilet. Launder contaminated clothing before re-use. Dispose of contaminated leather footwear. Treat unwashed contaminated clothing as flammable.

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE AND ODOR Soft gray paste, mild odor.	VAPOR PRESSURE 180 mm Hg
ODOR THRESHOLD Not Established	SPECIFIC GRAVITY (WATER = 1) 1.02
FREEZING/MELTING POINT Not Established	BOILING POINT 150°F/65°C
SOLUBILITY IN WATER Not Soluble	COEFFICIENT OF WATER/OIL DISTRIBUTION Favors Oil
PH Not Determined	SOLUBILITY IN ORGANIC SOLVENTS Variable Solubility dependent upon solvent
FLASH POINT <0°F/<-18°C	VISCOSITY Not Determined
FLAMMABLE LIMITS LEL: 1.2% UEL: 6.9%	VAPOR DENSITY (AIR= 1) 3
AUTO IGNITION TEMPERATURE 234°C/453°F (References Toluene)	EVAPORATION RATE (BuAc = 1) 3.2
VOLATILE ORGANIC COMPOUND (VOC) INFORMATION 3.46 lbs/gallon or 415 g/L NOTES: None	

10. STABILITY AND REACTIVITY

STABILITY Stable under normal conditions	CONDITIONS TO AVOID Excess heat, ignition sources, water, moisture, light, incompatible materials.
INCOMPATIBILITY (MATERIALS TO AVOID): Strong oxidizers, strong reducing agents	
HAZARDOUS DECOMPOSITION OR BYPRODUCTS: Carbon monoxide, carbon dioxide, small amounts of metal oxides, nitrogen oxides, and sulfur oxides under fire conditions.	
HAZAROUS POLYMERIZATION: Will not occur	CONDITIONS TO AVOID: None related to hazardous polymerization

11. TOXICOLOGICAL INFORMATION

Complete Product			
Oral LD 50	Not known – product is harmful by ingestion.		
Dermal LD 50	Not known – product expected to be moderately irritating by contact with skin.		
Inhalation LC 50	Not known – product components are harmful by inhalation.		
Irritation / Sensitization	Chemical and mechanical irritant to eyes, skin and respiratory tract.		
Carcinogenicity	Product contains no components listed by, IARC, NTP, OSHA, ESIS, or the state of California.		
Mutagenicity	Not known.		
Reproductive Toxicity	Known reproductive toxicants (toluene and hexane).		
Teratogenicity	May possess teratogenic effects.		
Product Components			
Component	CAS #	LD50 of Ingredient (Oral, Rat – unless otherwise specified)	LC50 of Ingredient (Inhalation, Rat – unless otherwise specified)
Hexane	110-54-3	25 g / kg	48000 ppm / 4 Hours
Toluene	108-88-3	636 mg / kg	49 g / m ³ / 4 Hours

12. ECOLOGICAL INFORMATION

Ecological Hazards:

Product should be considered as harmful to aquatic environments; do not discard into bodies of water. Solid components of product may bioaccumulate; toluene and hexane are expected to volatilize fairly rapidly and undergo photolytic degradation.

13. DISPOSAL CONSIDERATIONS

Waste Disposal Methods:

If this material becomes a waste, it would be a hazardous waste by RCRA criteria (40 CFR 261). Place in an appropriate disposal facility in compliance with all local, state, and federal regulations. User is responsible for compliance with all laws and regulations.

US EPA Waste Numbers:

D001, U220

14. TRANSPORT INFORMATION

Proper Shipping Name:

Flammable Liquid, N.O.S. (contains Hexane, Toluene), UN 1993

DOT Hazard Class/Pack Group:

Class 3 / PG III

Reference:

49CFR, IATA, IMDG

UN/NA Identification Number:

UN 1993

Label:

Flammable Liquid, 3



Hazard Symbol:
IATA Hazard Class/Pack Group: Class 3/PG III
IMDG Hazard Class: Class 3/PG III
RID/ADR Hazard Class: Class 3/PG III
ADR Classification: F1
ADR Emergency Action Code: 3Y
Hazard Identification Number (HIN): 30
TDG Class/Pack Group: Class 3/PG III
Note: Packing Group assigned per 49CFR173.121(b).
Transportation information provided is for reference only. Client is urged to consult CFR 49 parts 100-177, IMDG, IATA, EU, United Nations TDG, and WHMIS (Canada) TGD information manuals for detailed regulations and exceptions covering specific container sizes, packaging materials and methods of shipping.

15. REGULATORY INFORMATION

TSCA (USA – Toxic Substance Control Act): Components Listed on the TSCA inventory.

Sara Title III (USA – Superfund Amendments and Reauthorization Act):

Acute Health:	Yes
Fire:	Yes
Reactive:	No
Chronic Health:	Yes
Sudden Release of Pressure:	No

Sara 313 Reportable Ingredients: Hexane, Toluene

CERCLA (USA – Comprehensive Response Compensation and Liability Act): 4000lb/181 kg RQ for product as toluene.

State Right to Know Laws: Toluene and Hexane are on the right-to-know list of CA, MA, MN, NJ, and PA.

California Prop 65, Safe Drinking Water and Toxic Enforcement Act of 1986: **WARNING!** This product contains a chemical (toluene) known to the State of California to cause birth defects or other reproductive harm.

CPR (Canadian Controlled Products Regulations): This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the SDS contains all of the information required by those regulations.

WHMIS Classifications: B2, D2A

CIDL (Canadian Ingredient Disclosure List): Hexane (CAS # 110-54-3) and

Toluene (CAS # 108-88-3) are listed on the CIDL.

DSL/NDSL (Canadian Domestic Substances List/Non-Domestic Substance List):

Components are on the DSL.

EINECS (European Inventory of Existing Commercial Chemical Substances):

Referenced

WGK Water Quality Index:

2



EU RISK PHRASES:

R11:

Highly Flammable.

R38:

Irritating to Skin.

R45/20 Harmful:

Danger of serious damage to health by prolonged exposure through inhalation.

R62:

Possible risk of impaired fertility.

R63:

Possible risk of harm to the unborn child.

R65 Harmful:

May cause lung damage if swallowed.

R67:

Vapors may cause drowsiness and dizziness.

EU SAFETY PHRASES:

S2:

Keep out of reach of children.

S9:

Keep container in a well-ventilated place.

S16:

Keep away from sources of ignition – No smoking.

S36/37:

Wear suitable protective clothing and gloves.

S61:

Avoid release to the environment. Refer to special instructions / Safety data sheets.

S62:

If swallowed, do not induce vomiting: seek medical advice immediately and show this container or label.

16. OTHER INFORMATION

LEGEND:

ACGIH:

American Congress of Government Industrial Hygienists

CAS:

Chemical Abstracts Service

EINECS:

European Inventory of Existing Commercial Chemical Substances

HMIS:

Hazardous Materials Identification System

IARC:

International Agency for Research on Cancer

NA:

Not Available

ND:

Not Determined

NE: Not Established
NR: Not Reported
NIOSH: National Institute for Occupational Safety and Health
NTP: National Toxicology Program
OSHA: Occupational Safety and Health Administration

Hazard Rating: Health: 2
Flammability: 4
Physical Hazard: 1
0= Insignificant
1= Slight
2= Moderate
3= High
4= Extreme * Chronic Health Hazard

Date SDS Prepared: 1/31/2014

THE INFORMATION AND RECOMMENDATIONS SET FORTH HEREIN ARE BELIEVED TO BE ACCURATE. BECAUSE SOME OF THE INFORMATION IS DERIVED FROM INFORMATION PROVIDED TO DURO DYNE CORPORATION FROM ITS SUPPLIERS, DURO DYNE CORPORATION MAKES NO WARRANTY, EXPRESSED OR IMPLIED, REGARDING THE ACCURACY OF THE DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF. SINCE THE USE OF THIS INFORMATION AND THE CONDITIONS AND USE OF THIS PRODUCT ARE CONTROLLED BY THE USER, IT IS THE USER'S OBLIGATION TO DETERMINE THE CONDITIONS OF SAFE USE OF THE PRODUCT. THE INFORMATION IS SUPPLIED FOR YOUR INFORMATION AND CONSIDERATION AND DURO DYNE CORPORATION ASSUMES NO RESPONSIBILITY FOR USE OR RELIANCE THEREON. IT IS THE RESPONSIBILITY OF THE USER OF DURO DYNE CORPORATION PRODUCTS TO COMPLY WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL LAWS AND REGULATIONS.



Date:	1/5/2013	MSDS No.:	CAN-M42
Trade Name:	EASY ARC 528 MR		
Sizes:	All		
Supersedes:	1/5/2010		

MATERIAL SAFETY DATA SHEET

For Welding Consumables and Related Products

Conforms to Workplace Hazardous Materials Information System (WHMIS) Rev. November, 1988

Section I & II - Preparation and Product Information

The Lincoln Electric Company of Canada LP
179 Wicksteed Avenue
Toronto, Ontario M4G 2B9 CANADA
Phone: (416) 421-2600

Product Type:	Covered Electrode
Representative Classifications:	AWS E7018-1H4R CSA E4918-1
Prepared by The Lincoln Electric Company, Cleveland, Ohio, USA (216) 481-8100, on the date shown above.	

Section III - Hazardous Ingredients (1)

IMPORTANT!

This section covers the materials from which this product is manufactured. The fumes and gases produced during welding with the normal use of this product are covered by Section VII; see it for industrial hygiene information.

CAS Number shown is representative for the ingredients listed. All ingredients listed may not be present in all sizes.

(1) The term "hazardous" in "Hazardous Ingredients" should be interpreted as a term required and defined in the Hazardous Products Act and does not necessarily imply the existence of any hazard.

Ingredients:	CAS No.	Wt. %	TLV mg/m ³	LD ₅₀ (Route/Species)	LC ₅₀ mg/m ³ (Route/Species)
Barium compounds (as Ba)	513-77-9	5-10	****	11 mg/kg LDLo (oral/human)	Not Available
Fluorides (as F)	7789-75-5	1-5	2.5	4250 mg/kg (oral/rat)	Not Available
Nickel (metal)	7440-02-0	1-5	1.5	50 mg/kg LDLo (intravenous/mouse)	Not Available
Aluminum and/or aluminum alloys (as Al)	7429-90-5	1-5	1.0*	Not Available	Not Available
Magnesite	1309-48-4	1-5	10*	Not Available	Not Available
Magnesium and/or magnesium alloys and compounds (as Mg)	7439-95-4	1-5	10*	230 mg/kg LDLo (oral/dog)	Not Available
Iron oxides	65996-74-9	0.1-1	5	Not Available	Not Available
Rare Earths	68476-89-1	0.1-1	10*	Not Available	Not Available
Manganese and/or manganese alloys and compounds (as Mn)	7439-96-5	0.1-1	0.2	9 g/kg (oral/rat)	2.3 LCLo (inhalation/human)
Aluminum oxide and/or Bauxite	1344-28-1	0.1-1	10*	Not Available	Not Available
Lithium compounds (as Li)	554-13-2	0.1-1	10*	4111 mg/kg LDLo (oral/human)	Not Available
Mineral silicates	1332-58-7	0.1-1	5**	590 g/kg LDLo (oral/rat) reproductive	Not Available
Iron	7439-89-6	0.1-1	10*	Not Available	Not Available
Zirconium alloys and compounds (as Zr)	12004-83-0	0.1-1	5	Not Available	Not Available
Limestone and/or calcium carbonate	1317-65-3	0.1-1	10*	Not Available	Not Available
Quartz	14808-60-7	0.1-1	#0.025**	200 mg/kg LDLo (intratracheal/rat)	300 LCLo (inhalation/human)
Silicon and/or silicon alloys and compounds (as Si)	7440-21-3	0.1-1	10*	Not Available	Not Available
Carbon steel core wire	7439-89-6	30-60	10*	Not Available	Not Available

Notes:

(*) Not listed. The ACGIH guideline for total particulate is 10 milligrams per cubic meter. TLV value for iron oxide is 5 milligrams per cubic meter.

(**) As respirable dust.

(****) There is no listed value for insoluble barium compounds. The TLV for soluble barium compounds is 0.5 mg/m³.

(LDLo, LCLo) Lowest published toxic concentration. Crystalline silica (quartz) is on the IARC (International Agency for Research on Cancer) and NTP (National Toxicology Program) lists as posing a carcinogenic risk to humans.

Section IV - Physical Data

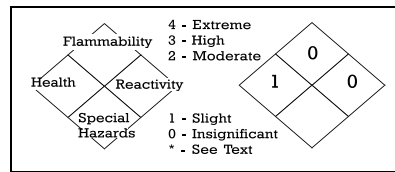
Physical data such as odor, vapor pressure, density, evaporation rate and freezing or boiling points are not listed as they are not applicable to this product and its use.

Section V - Hazard Data

Non Flammable; Welding arc and sparks can ignite combustibles and flammable products. See CSA W117.2 Section 9.7 as referenced in Section VIII. Product is inert, no special handling or spill procedures required.

Product: EASY ARC 528 MR

Date: 1/5/2013



Section VI - Health Hazard Data and Toxicological Properties

Acute Lethality Values: LC₅₀ means the concentration of a substance in air that when administered by means of inhalation over a specified length of time in an animal assay, is expected to cause the death of 50% of a defined animal population.

LD₅₀ means the single dose of a substance that, when administered by a defined route in an animal assay, is expected to cause the death of 50% of a defined animal population.

Threshold Limit Value: The ACGIH recommended general limit for Welding Fume NOS - (Not Otherwise Specified) is 5 mg/m³. The TLV-TWA is the time-weighted average concentration for a normal 8-hour workday and a 40 hour workweek, to which nearly all workers may be repeatedly exposed, day after day, without adverse effect. See Section VII for specific fume constituents which may modify this TLV. Threshold Limit Values are figures published by the American Conference of Government Industrial Hygienists.

Effects of Overexposure: Electric arc welding may create one or more of the following health hazards:

Fumes and Gases can be dangerous to your health. Common entry is by inhalation. Other possible routes are skin contact and ingestion.

Short-term (acute) overexposure to welding fumes may result in discomfort such as metal fume fever, dizziness, nausea, or dryness or irritation of nose, throat, or eyes. May aggravate pre-existing respiratory problems (e.g. asthma, emphysema). Exposure to extremely high levels of fluorides can cause abdominal pain, diarrhea, muscular weakness, and convulsions. In extreme cases it can cause loss of consciousness and death. Soluble barium compounds present in the fumes from this product may also cause severe stomach pain, slow pulse rate, irregular heartbeat, ringing of the ears, convulsions, and muscle spasms. In extreme cases can cause death.

Long-term (chronic) overexposure to welding fumes can lead to siderosis (iron deposits in lung) and may affect pulmonary function. Manganese overexposure can affect the central nervous system, resulting in impaired speech and movement. Bronchitis and some lung fibrosis have been reported. Repeated exposure to fluorides may cause excessive calcification of the bone and calcification of ligaments of the ribs, pelvis and spinal column. Nickel and its compounds are on the IARC (International Agency for Research on Cancer) and NTP (National Toxicology Program) lists as posing a cancer risk to humans. Nickel compounds are skin sensitizers with symptoms usually occurring after repeated exposure - ranging from a slight itch to severe dermatitis. May cause skin rash. Respiratory exposure to the crystalline silica present in this welding electrode is not anticipated during normal use. Respiratory overexposure to airborne crystalline silica is known to cause silicosis, a form of disabling pulmonary fibrosis which can be progressive and may lead to death. Crystalline silica is on the IARC (International Agency for Research on Cancer) and NTP (National Toxicology Program) lists as posing a cancer risk to humans.

Arc Rays can injure eyes and burn skin. *Skin cancer has been reported.*

Electric Shock can kill. If welding must be performed in damp locations or with wet clothing, on metal structures or when in cramped positions such as sitting, kneeling or lying, or if there is a high risk of unavoidable or accidental contact with workpiece, use the following equipment: Semiautomatic DC Welder, DC Manual (Stick) Welder, or AC Welder with Reduced Voltage Control.

Section VII - Reactivity Data

Hazardous Decomposition Products: Welding fumes and gases cannot be classified simply. The composition and quantity of both are dependent upon the metal being welded, the process, procedure and electrodes used.

Other conditions which also influence the composition and quantity of the fumes and gases to which workers may be exposed include: coatings on the metal being welded (such as paint, plating, or galvanizing), the number of welders and the volume of the worker area, the quality and amount of ventilation, the position of the welder's head with respect to the fume plume, as well as the presence of contaminants in the atmosphere (such as chlorinated hydrocarbon vapors from cleaning and degreasing activities.)

When the electrode is consumed, the fume and gas decomposition products generated are different in percent and form from the ingredients listed in Section III. Decomposition products of normal operation include those originating from the volatilization, reaction, or oxidation of the materials shown in Section III, plus those from the base metal and coating, etc., as noted above.

Reasonably expected fume constituents of this product would include: Primarily iron oxide and fluorides; secondarily complex oxides of manganese, potassium, silicon and sodium.

Maximum fume exposure guideline for this product is 2.5 milligrams per cubic meter.

Gaseous reaction products may include carbon monoxide and carbon dioxide. Ozone and nitrogen oxides may be formed by the radiation from the arc. Determine the composition and quantity of fumes and gases to which workers are exposed by taking an air sample from inside the welder's helmet if worn or in the worker's breathing zone. Improve ventilation if exposures are not below limits. See ANSI/AWS F1.1, F1.2, F1.3 and F1.5, available from the American Welding Society, 550 N.W. LeJeune Road, Miami, FL 33126.

Section VIII - Preventive Measures and Precautions for Safe Handling and Use

Read and understand the manufacturer's instruction and the precautionary label on the product. Request Lincoln Safety Publication E205. See Canadian Standards Association Standard CSA-W117.2 "Safety in Welding, Cutting, and Allied Processes" published by the Canadian Standards Association, 178 Rexdale Blvd., Rexdale, Ontario M9W1R3 for more details on many of the following:

Ventilation: Use enough ventilation, local exhaust at the arc, or both to keep the fumes and gases from the worker's breathing zone and the general area. Train the welder to keep his head out of the fumes. *Keep exposure as low as possible.*

Respiratory Protection: Use respirable fume respirator or air supplied respirator when welding in confined space or general work area when local exhaust or ventilation does not keep exposure below TLV.

Eye Protection: Wear helmet or use face shield with filter lens shade number 12 or darker. Shield others by providing screens and flash goggles.

Protective Clothing: Wear hand, head, and body protection which help to prevent injury from radiation, sparks and electrical shock. See W117.2.

At a minimum this includes welder's gloves and a protective face shield, and may include arm protectors, aprons, hats, shoulder protection, as well as dark substantial clothing. Train the welder not to permit electrically live parts or electrodes to contact skin . . . or clothing or gloves if they are wet. Insulate from work and ground.

Disposal Information: Discard any product, residue, disposable container, or liner as ordinary waste in an environmentally acceptable manner according to Federal, State and Local regulations unless otherwise noted. No applicable ecological information available.

Section IX - Emergency and First Aid Procedures

Call for medical aid. Employ first aid techniques recommended by the Canadian Red Cross. IF BREATHING IS DIFFICULT give oxygen. IF NOT BREATHING employ CPR (Cardiopulmonary Resuscitation) techniques. IN CASE OF ELECTRICAL SHOCK, turn off power and follow recommended treatment. In all cases call a physician.



Safety Data Sheet

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Document Group:	25-0157-5	Version Number:	1.06
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SECTION 1: Identification

1.1. Product identifier

3M™ Abrasive Products, 011K, Emery Cloth Sheets, Medium, Coarse

1.2. Recommended use and restrictions on use

Recommended use

Abrasive Product

1.3. Supplier's details

MANUFACTURER:	3M
DIVISION:	Abrasive Systems Division
ADDRESS:	3M Center, St. Paul, MN 55144-1000, USA
Telephone:	1-888-3M HELPS (1-888-364-3577)

1.4. Emergency telephone number

1-800-364-3577 or (651) 737-6501 (24 hours)

SECTION 2: Hazard identification

2.1. Hazard classification

Not classified as hazardous according to OSHA Hazard Communication Standard, 29 CFR 1910.1200.

2.2. Label elements

Signal word

Not applicable.

Symbols

Not applicable.

Pictograms

Not applicable.

Notes to Physician:

Not applicable

2.3. Hazards not otherwise classified

None.

48% of the mixture consists of ingredients of unknown acute oral toxicity.

SECTION 3: Composition/information on ingredients

Ingredient	C.A.S. No.	% by Wt
Aluminum Oxide Mineral (non-fibrous)	1344-28-1	15 - 30
Iron Oxide Mineral	1309-37-1	5 - 15
Limestone	1317-65-3	5 - 15
Silica	7631-86-9	1 - 2
Titanium Dioxide	13463-67-7	0.5 - 1.5
Quartz Silica	14808-60-7	0.001 - 0.25
Cured Resin	Mixture	2 - 15
Cloth Backing	Mixture	15 - 40

SECTION 4: First aid measures

4.1. Description of first aid measures

Inhalation:

Remove person to fresh air. If you feel unwell, get medical attention.

Skin Contact:

Wash with soap and water. If signs/symptoms develop, get medical attention.

Eye Contact:

Flush with large amounts of water. Remove contact lenses if easy to do. Continue rinsing. If signs/symptoms persist, get medical attention.

If Swallowed:

Rinse mouth. If you feel unwell, get medical attention.

4.2. Most important symptoms and effects, both acute and delayed

See Section 11.1. Information on toxicological effects.

4.3. Indication of any immediate medical attention and special treatment required

Not applicable

SECTION 5: Fire-fighting measures

5.1. Suitable extinguishing media

In case of fire: Use a fire fighting agent suitable for ordinary combustible material such as water or foam to extinguish.

5.2. Special hazards arising from the substance or mixture

None inherent in this product.

Hazardous Decomposition or By-Products

Substance

Carbon monoxide

Carbon dioxide

Condition

During Combustion

During Combustion

5.3. Special protective actions for fire-fighters

No unusual fire or explosion hazards are anticipated.

SECTION 6: Accidental release measures**6.1. Personal precautions, protective equipment and emergency procedures**

Observe precautions from other sections.

6.2. Environmental precautions

Not applicable.

6.3. Methods and material for containment and cleaning up

Not applicable.

SECTION 7: Handling and storage**7.1. Precautions for safe handling**

For industrial or professional use only. Avoid breathing of dust created by sanding, grinding or machining. Do not eat, drink or smoke when using this product. Wash thoroughly after handling. Combustible dust may form by action of this product on another material (substrate). Dust generated from the substrate during use of this product may be explosive if in sufficient concentration with an ignition source. Dust deposits should not be allowed to accumulate on surfaces because of the potential for secondary explosions.

7.2. Conditions for safe storage including any incompatibilities

No special storage requirements.

SECTION 8: Exposure controls/personal protection**8.1. Control parameters****Occupational exposure limits**

Ingredient	C.A.S. No.	Agency	Limit type	Additional Comments
Iron Oxide Mineral	1309-37-1	Amer Conf of Gov. Indust. Hyg.	TWA(respirable fraction):5 mg/m ³	
Iron Oxide Mineral	1309-37-1	US Dept of Labor - OSHA	TWA(as fume):10 mg/m ³	
ROUGE	1309-37-1	US Dept of Labor - OSHA	TWA(as total dust):15 mg/m ³ ;TWA(respirable fraction):5 mg/m ³	
Limestone	1317-65-3	US Dept of Labor - OSHA	TWA(as total dust):15 mg/m ³ ;TWA(respirable fraction):5 mg/m ³	
Aluminum Oxide Mineral (non-fibrous)	1344-28-1	Chemical Manufacturer Rec Guid	TWA:1 fiber/cc	
Aluminum Oxide Mineral (non-fibrous)	1344-28-1	US Dept of Labor - OSHA	TWA(as total dust):15 mg/m ³ ;TWA(respirable fraction):5 mg/m ³	
Aluminum, insoluble compounds	1344-28-1	Amer Conf of Gov. Indust. Hyg.	TWA(respirable fraction):1 mg/m ³	
Titanium Dioxide	13463-67-7	Amer Conf of Gov. Indust. Hyg.	TWA:10 mg/m ³	

Titanium Dioxide	13463-67-7	Chemical Manufacturer Rec Guid	TWA(as respirable dust):5 mg/m3	
Titanium Dioxide	13463-67-7	US Dept of Labor - OSHA	TWA(as total dust):15 mg/m3	
Quartz Silica	14808-60-7	Amer Conf of Gov. Indust. Hyg.	TWA(respirable fraction):0.025 mg/m3	
Quartz Silica	14808-60-7	US Dept of Labor - OSHA	TWA concentration(as total dust):0.3 mg/m3;TWA concentration(respirable):0.1 mg/m3(2.4 millions of particles/cu. ft.)	
Silica	7631-86-9	Chemical Manufacturer Rec Guid	TWA(as respirable dust):3 mg/m3	
SILICA, AMORPHOUS	7631-86-9	US Dept of Labor - OSHA	TWA concentration:0.8 mg/m3;TWA:20 millions of particles/cu. ft.	

Amer Conf of Gov. Indust. Hyg. : American Conference of Governmental Industrial Hygienists
 American Indust. Hygiene Assoc : American Industrial Hygiene Association
 Chemical Manufacturer Rec Guid : Chemical Manufacturer's Recommended Guidelines
 US Dept of Labor - OSHA : United States Department of Labor - Occupational Safety and Health Administration
 TWA: Time-Weighted-Average
 STEL: Short Term Exposure Limit
 CEIL: Ceiling

8.2. Exposure controls

8.2.1. Engineering controls

Provide appropriate local exhaust ventilation for sanding, grinding or machining. Use general dilution ventilation and/or local exhaust ventilation to control airborne exposures to below relevant Exposure Limits and/or control dust/fume/gas/mist/vapors/spray. If ventilation is not adequate, use respiratory protection equipment. Provide local exhaust at process emission sources to control exposure near the source and to prevent the escape of dust into the work area. Ensure that dust-handling systems (such as exhaust ducts, dust collectors, vessels, and processing equipment) are designed in a manner to prevent the escape of dust into the work area (i.e., there is no leakage from the equipment).

8.2.2. Personal protective equipment (PPE)

Eye/face protection

To minimize the risk of injury to face and eyes, always wear eye and face protection when working at sanding or grinding operations or when near such operations. Select and use eye/face protection to prevent contact based on the results of an exposure assessment. The following eye/face protection(s) are recommended:
 Safety Glasses with side shields

Skin/hand protection

Wear appropriate gloves to minimize risk of injury to skin from contact with dust or physical abrasion from grinding or sanding.

Respiratory protection

Assess exposure concentrations of all materials involved in the work process. Consider material being abraded when determining the appropriate respiratory protection. Select and use appropriate respirators to prevent inhalation overexposure. An exposure assessment may be needed to decide if a respirator is required. If a respirator is needed, use respirators as part of a full respiratory protection program. Based on the results of the exposure assessment, select from the following respirator

type(s) to reduce inhalation exposure:

Half facepiece or full facepiece air-purifying respirator suitable for particulates

For questions about suitability for a specific application, consult with your respirator manufacturer.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

General Physical Form:	Solid
Odor, Color, Grade:	Solid Abrasive Product
Odor threshold	<i>Not Applicable</i>
pH	<i>Not Applicable</i>
Melting point	<i>Not Applicable</i>
Boiling Point	<i>Not Applicable</i>
Flash Point	<i>Not Applicable</i>
Evaporation rate	<i>Not Applicable</i>
Flammability (solid, gas)	Not Classified
Flammable Limits(LEL)	<i>Not Applicable</i>
Flammable Limits(UEL)	<i>Not Applicable</i>
Vapor Pressure	<i>Not Applicable</i>
Vapor Density	<i>Not Applicable</i>
Specific Gravity	<i>Not Applicable</i>
Solubility In Water	<i>Not Applicable</i>
Solubility- non-water	<i>Not Applicable</i>
Partition coefficient: n-octanol/ water	<i>Not Applicable</i>
Autoignition temperature	<i>Not Applicable</i>
Decomposition temperature	<i>Not Applicable</i>
Viscosity	<i>Not Applicable</i>

SECTION 10: Stability and reactivity

10.1. Reactivity

This material is considered to be non reactive under normal use conditions.

10.2. Chemical stability

Stable.

10.3. Possibility of hazardous reactions

Hazardous polymerization will not occur.

10.4. Conditions to avoid

None known.

10.5. Incompatible materials

None known.

10.6. Hazardous decomposition products**Substance**

None known.

Condition

Refer to section 5.2 for hazardous decomposition products during combustion.

SECTION 11: Toxicological information

The information below may not be consistent with the material classification in Section 2 if specific ingredient classifications are mandated by a competent authority. In addition, toxicological data on ingredients may not be reflected in the material classification and/or the signs and symptoms of exposure, because an ingredient may be present below the threshold for labeling, an ingredient may not be available for exposure, or the data may not be relevant to the material as a whole.

11.1. Information on Toxicological effects**Signs and Symptoms of Exposure**

Based on test data and/or information on the components, this material may produce the following health effects:

Inhalation:

Dust from grinding, sanding or machining may cause irritation of the respiratory system. Signs/symptoms may include cough, sneezing, nasal discharge, headache, hoarseness, and nose and throat pain.

Skin Contact:

Mechanical Skin irritation: Signs/symptoms may include abrasion, redness, pain, and itching.

Eye Contact:

Mechanical eye irritation: Signs/symptoms may include pain, redness, tearing and corneal abrasion.

Dust created by grinding, sanding, or machining may cause eye irritation. Signs/symptoms may include redness, swelling, pain, tearing, and blurred or hazy vision.

Ingestion:

Gastrointestinal Irritation: Signs/symptoms may include abdominal pain, stomach upset, nausea, vomiting and diarrhea.

Carcinogenicity:

<u>Ingredient</u>	<u>C.A.S. No.</u>	<u>Class Description</u>	<u>Regulation</u>
Quartz Silica	14808-60-7	Grp. 1: Carcinogenic to humans	International Agency for Research on Cancer
SILICA, CRYST AIRRESP	14808-60-7	Known human carcinogen	National Toxicology Program Carcinogens
Titanium Dioxide	13463-67-7	Grp. 2B: Possible human carc.	International Agency for Research on Cancer

Additional Information:

This document covers only the 3M product. For complete assessment, when determining the degree of hazard, the material being abraded must also be considered.

This product contains titanium dioxide and quartz (crystalline) silica. Cancer of the lungs has been associated with inhalation of high levels of titanium dioxide in animal studies, and occupational exposure to inhaled quartz silica has been associated with silicosis and lung cancer. No exposure to titanium dioxide or quartz silica is expected during the normal handling and use of this product. Titanium dioxide and quartz silica were not detected when air sampling was conducted during simulated use of similar products containing these substances. Therefore, the health effects associated with titanium dioxide and quartz (crystalline) silica are not expected during the normal use of this product.

Toxicological Data

If a component is disclosed in section 3 but does not appear in a table below, either no data are available for that endpoint or the data are not sufficient for classification.

Acute Toxicity

Name	Route	Species	Value
Overall product	Ingestion		No data available; calculated ATE > 5,000 mg/kg
Aluminum Oxide Mineral (non-fibrous)	Dermal		LD50 estimated to be > 5,000 mg/kg
Aluminum Oxide Mineral (non-fibrous)	Inhalation-Dust/Mist (4 hours)	Rat	LC50 > 2.3 mg/l
Aluminum Oxide Mineral (non-fibrous)	Ingestion	Rat	LD50 > 5,000 mg/kg
Limestone	Dermal	Rat	LD50 > 2,000 mg/kg
Limestone	Inhalation-Dust/Mist (4 hours)	Rat	LC50 3.0 mg/l
Limestone	Ingestion	Rat	LD50 6,450 mg/kg
Iron Oxide Mineral	Dermal	Not available	LD50 3,100 mg/kg
Iron Oxide Mineral	Ingestion	Not available	LD50 3,700 mg/kg
Silica	Dermal	Rabbit	LD50 > 5,000 mg/kg
Silica	Inhalation-Dust/Mist (4 hours)	Rat	LC50 > 0.691 mg/l
Silica	Ingestion	Rat	LD50 > 5,110 mg/kg
Titanium Dioxide	Dermal	Rabbit	LD50 > 10,000 mg/kg
Titanium Dioxide	Inhalation-Dust/Mist (4 hours)	Rat	LC50 > 6.82 mg/l
Titanium Dioxide	Ingestion	Rat	LD50 > 10,000 mg/kg
Quartz Silica	Dermal		LD50 estimated to be > 5,000 mg/kg
Quartz Silica	Ingestion		LD50 estimated to be > 5,000 mg/kg

ATE = acute toxicity estimate

Skin Corrosion/Irritation

Name	Species	Value
Aluminum Oxide Mineral (non-fibrous)	Rabbit	No significant irritation
Limestone	Rabbit	No significant irritation
Iron Oxide Mineral	Rabbit	No significant irritation
Silica	Rabbit	No significant irritation
Titanium Dioxide	Rabbit	No significant irritation
Quartz Silica		No significant irritation

Serious Eye Damage/Irritation

Name	Species	Value
Aluminum Oxide Mineral (non-fibrous)	Rabbit	No significant irritation
Limestone	Rabbit	No significant irritation
Iron Oxide Mineral	Rabbit	No significant irritation
Silica	Rabbit	No significant irritation
Titanium Dioxide	Rabbit	No significant irritation

Skin Sensitization

Name	Species	Value
Iron Oxide Mineral	Human	Some positive data exist, but the data are not sufficient for classification
Silica	Human and animal	Not sensitizing
Titanium Dioxide	Human and animal	Not sensitizing

Respiratory Sensitization

Name	Species	Value
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Germ Cell Mutagenicity

Name	Route	Value
Aluminum Oxide Mineral (non-fibrous)	In Vitro	Not mutagenic
Iron Oxide Mineral	In Vitro	Not mutagenic
Silica	In Vitro	Not mutagenic
Titanium Dioxide	In Vitro	Not mutagenic
Titanium Dioxide	In vivo	Not mutagenic
Quartz Silica	In Vitro	Some positive data exist, but the data are not sufficient for classification
Quartz Silica	In vivo	Some positive data exist, but the data are not sufficient for classification

Carcinogenicity

Name	Route	Species	Value
Aluminum Oxide Mineral (non-fibrous)	Inhalation	Rat	Not carcinogenic
Iron Oxide Mineral	Inhalation	Human	Some positive data exist, but the data are not sufficient for classification
Silica	Not Specified	Mouse	Some positive data exist, but the data are not sufficient for classification
Titanium Dioxide	Ingestion	Multiple animal species	Not carcinogenic
Titanium Dioxide	Inhalation	Rat	Carcinogenic
Quartz Silica	Inhalation	Human and animal	Carcinogenic

Reproductive Toxicity

Reproductive and/or Developmental Effects

Name	Route	Value	Species	Test Result	Exposure Duration
Limestone	Ingestion	Not toxic to development	Rat	NOAEL 625 mg/kg/day	pre mating & during gestation
Silica	Ingestion	Not toxic to female reproduction	Rat	NOAEL 509 mg/kg/day	1 generation
Silica	Ingestion	Not toxic to male reproduction	Rat	NOAEL 497 mg/kg/day	1 generation
Silica	Ingestion	Not toxic to development	Rat	NOAEL 1,350 mg/kg/day	during organogenesis

Target Organ(s)

Specific Target Organ Toxicity - single exposure

Name	Route	Target Organ(s)	Value	Species	Test Result	Exposure Duration
Limestone	Inhalation	respiratory system	All data are negative	Rat	NOAEL 0.812 mg/l	90 minutes

Specific Target Organ Toxicity - repeated exposure

Name	Route	Target Organ(s)	Value	Species	Test Result	Exposure Duration
Aluminum Oxide Mineral (non-fibrous)	Inhalation	pneumoconiosis pulmonary fibrosis	Some positive data exist, but the data are not sufficient for classification	Human	NOAEL Not available	occupational exposure
Limestone	Inhalation	respiratory system	Some positive data exist, but the data are not sufficient for classification	Human	NOAEL Not available	occupational exposure
Iron Oxide Mineral	Inhalation	pulmonary fibrosis pneumoconiosis	Some positive data exist, but the data are not sufficient for	Human	NOAEL Not available	occupational exposure

			classification			
Silica	Inhalation	respiratory system l silicosis	All data are negative	Human	NOAEL Not available	occupational exposure
Titanium Dioxide	Inhalation	respiratory system	Some positive data exist, but the data are not sufficient for classification	Rat	LOAEL 0.010 mg/l	2 years
Titanium Dioxide	Inhalation	pulmonary fibrosis	All data are negative	Human	NOAEL Not available	occupational exposure
Quartz Silica	Inhalation	silicosis	Causes damage to organs through prolonged or repeated exposure	Human	NOAEL Not available	occupational exposure

Aspiration Hazard

Name	Value

Please contact the address or phone number listed on the first page of the SDS for additional toxicological information on this material and/or its components.

SECTION 12: Ecological information

Ecotoxicological information

Please contact the address or phone number listed on the first page of the SDS for additional ecotoxicological information on this material and/or its components.

Chemical fate information

Please contact the address or phone number listed on the first page of the SDS for additional chemical fate information on this material and/or its components.

SECTION 13: Disposal considerations

13.1. Disposal methods

Dispose of contents/ container in accordance with the local/regional/national/international regulations.

Prior to disposal, consult all applicable authorities and regulations to insure proper classification. The substrate that was abraded must be considered as a factor in the disposal method for this product. Dispose of waste product in a permitted industrial waste facility. As a disposal alternative, incinerate in a permitted waste incineration facility. Proper destruction may require the use of additional fuel during incineration processes. If no other disposal options are available, waste product may be placed in a landfill properly designed for industrial waste.

EPA Hazardous Waste Number (RCRA): Not regulated

SECTION 14: Transport Information

Not regulated per U.S. DOT, IATA or IMO.

*These transportation classifications are provided as a customer service. As the shipper YOU remain responsible for complying with all applicable laws and regulations, including proper transportation classification and packaging. 3M transportation classifications are based on product formulation, packaging, 3M policies and 3M understanding of applicable current regulations. 3M does not guarantee the accuracy of this classification information. This information applies only to transportation classification and **not the packaging, labeling, or marking requirements**. The original 3M package is certified for U.S. ground shipment only. If you are shipping by air or ocean, the package may not meet applicable regulatory requirements.*

SECTION 15: Regulatory information

15.1. US Federal Regulations

Contact 3M for more information.

311/312 Hazard Categories:

Fire Hazard - No Pressure Hazard - No Reactivity Hazard - No Immediate Hazard - No Delayed Hazard - No

15.2. State Regulations

Contact 3M for more information.

15.3. Chemical Inventories

This product is an article as defined by TSCA regulations, and is exempt from TSCA Inventory listing requirements.

Contact 3M for more information.

15.4. International Regulations

Contact 3M for more information.

This SDS has been prepared to meet the U.S. OSHA Hazard Communication Standard, 29 CFR 1910.1200.

SECTION 16: Other information

NFPA Hazard Classification

Health: 0 Flammability: 1 Instability: 0 Special Hazards: None

National Fire Protection Association (NFPA) hazard ratings are designed for use by emergency response personnel to address the hazards that are presented by short-term, acute exposure to a material under conditions of fire, spill, or similar emergencies. Hazard ratings are primarily based on the inherent physical and toxic properties of the material but also include the toxic properties of combustion or decomposition products that are known to be generated in significant quantities.

HMIS Hazard Classification

Health: 0 Flammability: 1 Physical Hazard: 0 Personal Protection: X - See PPE section.

Hazardous Material Identification System (HMIS® III) hazard ratings are designed to inform employees of chemical hazards in the workplace. These ratings are based on the inherent properties of the material under expected conditions of normal use and are not intended for use in emergency situations. HMIS® III ratings are to be used with a fully implemented HMIS® III program. HMIS® is a registered mark of the American Coatings Association (ACA).

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SAFETY DATA SHEET

Page: 1(5)
SDS Number: 7989-M
Date Revised: 05/01/2014

This Safety Data Sheet complies with Regulation (EC) No. 1907/2006, ISO 11014-1 and ANSI Z400.1

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: ESAB MILD STEEL COVERED ELECTRODES
Application: Arc Welding
Classification: AWS A5.1
Supplier: THE ESAB GROUP, INC., 801 Wilson Avenue, Hanover, PA 17331
Telephone No.: 1-717-637-8911, 1-800-933-7070
Emergency No.: 1-717-637-8911 and 1-800-424-9300 (CHEMTREC)
Web site: www.esabna.com

2. HAZARDS IDENTIFICATION

Emergency Overview: Coated metal rods in varying colors. These products are normally not considered hazardous as shipped. Gloves should be worn when handling to prevent contaminating hands with product dust.

These products contain titanium dioxide which is possibly carcinogenic. These products contain quartz, but normally not in an inhalable fraction. Quartz can cause silicosis and may cause cancer.

Avoid eye contact or inhalation of dust from these products. Skin contact is normally no hazard but should be avoided to prevent possible allergic reactions.

Persons with a pacemaker should not go near welding or cutting operations until they have consulted their doctor and obtained information from the manufacturer of the device.

When these products are used in a welding process, the most important hazards are heat, radiation, electric shock and welding fumes.

Heat: Spatter and melting metal can cause burn injuries and start fires.

Radiation: Arc rays can severely damage eyes or skin.

Electricity: Electric shock can kill.

Fumes: Overexposure to welding fumes may result in symptoms like metal fume fever, dizziness, nausea, dryness or irritation of the nose, throat or eyes. Chronic overexposure to welding fumes may affect pulmonary function. Overexposure to manganese and manganese compounds above safe exposure limits can cause irreversible damage to the central nervous system, including the brain, symptoms of which may include slurred speech, lethargy, tremor, muscular weakness, psychological disturbances and spastic gait.

3. COMPOSITION/INFORMATION ON INGREDIENTS

These products are preparations of core wire with extruded coating.

Ingredients	REACH Reg. #	CAS#	EINECS#	Hazard classification ⁽¹⁾	IARC ⁽²⁾	NTP ⁽³⁾	OSHA List ⁽⁴⁾
Aluminum Oxide	--	1344-28-1	215-691-6	No	--	--	--
Calcium Carbonate	--	1317-65-3	215-279-6	No	--	--	--
Calcium Fluoride	--	7789-75-5	232-188-7	No	--	--	--
Cellulose	--	9004-34-6	232-674-9	No	--	--	--
Iron and Iron Oxides	01-2119462838-24	7439-89-6	231-096-4	No	--	--	--
Manganese	--	7439-96-5	231-105-1	No	--	--	--
Mineral Silicates	All substances with CAS # of 14808-60-7 are considered to be quartz.						
Bentonite Clays	--	1302-78-9	215-108-5	No	--	--	--
Chlorite	--	14808-60-7	238-878-4	T; R45	1	K	--
Feldspar	--	14808-60-7	238-878-4	T; R45	1	K	--
Hectorite	--	14808-60-7	238-878-4	T; R45	1	K	--
Pyrophyllite	--	14808-60-7	238-878-4	T; R45	1	K	--
Wollanstanite	--	14808-60-7	238-878-4	T; R45	1	K	--
Zircon	--	14808-60-7	238-878-4	T; R45	1	K	--
Potassium Titanate	--	12030-97-6	234-748-6	No	--	--	--
Silicate Binder (Potassium Silicate)	--	1312-76-1	215-199-1	No	--	--	--
Silicate Binder (Sodium Silicate)	--	1344-09-8	215-687-4	No	--	--	--
Silicon	--	7440-21-3	231-130-8	No	--	--	--
Silicon Dioxide	--	14808-60-7	238-878-4	T; R45	1	K	--
Titanium Oxide	--	13463-67-7	236-675-5	No	2B	--	--
Zirconium Compounds	--	--	--	No	--	--	--



- (1) Hazard Classification according to European Council Directive 67/548/EEC, for R-phrases, see Section 16.
- (2) Evaluation according to the International Agency for Research on Cancer.
 1 –Carcinogenic to humans. 2A – Probably carcinogenic to humans. 2B – Possibly carcinogenic to humans.
- (3) Classification according to the 11th Report on Carcinogens, published by the US National Toxicology Program.
 K – Known Carcinogen S – Suspect Carcinogen
- (4) Carcinogen listing according to OSHA, Occupational Safety & Health Administration (USA).

APPROXIMATE COMPOSITION (Wt. %)

Product Trade Name	ESAB 6010	ESAB 6011	ESAB 6013	ESAB 7014	ESAB 7018*	ESAB 7018-AC	ESAB 7018-1*	ESAB 7024
Aluminum Oxide	--	--	--	1-3	--	--	--	0.5-3
Calcium Carbonate	--	--	1-3	<1	5-10	5-10	5-10	<1
Calcium Fluoride	--	--	--	--	5-10	1-5	5-10	--
Cellulose	2-5	2-5	1-3	1-3	--	--	--	1-3
Iron	80-90	80-90	70-80	70-80	70-80	70-80	70-80	70-80
Iron Oxides	0.5-2	<1	--	--	--	--	--	--
Manganese	1-2	1-2	1-2	1-3	1-2	2-3	1-2	2-5
Mineral Silicates	<1	1-3	1-3	1-3	1-3	<1	1-3	1-5
Potassium Titanate	--	1-3	--	--	--	--	--	--
Silicate Binder	1-3	1-3	1-3	1-3	1-3	1-3	1-3	1-3
Silicon	--	--	--	--	<1	<1	<1	<1
Silicon Dioxide	<1	<1	1-2	<1	--	--	<1	--
Titanium Oxide	1-5	1-5	8-12	8-12	1-5	9-14	1-5	9-14
Zirconium Compounds	<1	<1	--	--	--	--	--	--
AWS Classification	E6010	E6011	E6013	E7014	E7018	E7018	E7018-1	E7024

* Also includes H4R designator

4. FIRST AID MEASURES

- Inhalation: If breathing has stopped, perform artificial respiration and obtain medical assistance immediately! If breathing is difficult, provide fresh air and call physician.
- Eye contact: For radiation burns due to arc flash, see physician. To remove dusts or fumes flush with water for at least fifteen minutes. If irritation persists, obtain medical assistance.
- Skin contact: For skin burns from arc radiation, promptly flush with cold water. Get medical attention for burns or irritations that persist. To remove dust or particles wash with mild soap and water.
- Electric shock: Disconnect and turn off the power. Use a nonconductive material to pull victim away from contact with live parts or wires. If not breathing, begin artificial respiration, preferably mouth-to-mouth. If no detectable pulse, begin Cardio Pulmonary Resuscitation (CPR). Immediately call a physician.
- General: Move to fresh air and call for medical aid.

5. FIRE FIGHTING MEASURES

No specific recommendations for welding consumables. Welding arcs and sparks can ignite combustible and flammable materials. Use the extinguishing media recommended for the burning materials and fire situation. Wear self-contained breathing apparatus as fumes or vapors may be harmful.

6. ACCIDENTAL RELEASE MEASURES

Solid objects may be picked up and placed into a container. Liquids or pastes should be scooped up and placed into a container. Wear proper protective equipment while handling these materials. Do not discard as refuse.

- Personal precautions: refer to Section 8.
- Environmental precautions: refer to Section 13.

7. HANDLING AND STORAGE

- Handling: Handle with care to avoid stings and cuts. Wear gloves when handling welding consumables. Avoid exposure to dust. Do not ingest. Some individuals can develop an allergic reaction to certain materials. Retain all warning and identity labels.



Storage:

Keep separate from chemical substances like acids and strong bases, which could cause chemical reactions.

8. EXPOSURE CONTROL/PERSONAL PROTECTION

Avoid exposure to welding fumes, radiation, spatter, electric shock, heated materials and dust.

Engineering measures:

Ensure sufficient ventilation, local exhaust, or both, to keep welding fumes and gases from breathing zone and general area. Keep working place and protective clothing clean and dry. Train welders to avoid contact with live electrical parts and insulate conductive parts. Check condition of protective clothing and equipment on a regular basis.

Personal protective equipment:

Use respirator or air supplied respirator when welding or brazing in a confined space, or where local exhaust or ventilation is not sufficient to keep exposure values within safe limits. Use special care when welding painted or coated steels since hazardous substances from the coating may be emitted. Wear hand, head, eyes, ear and body protection like welders gloves, helmet or face shield with filter lens, safety boots, apron, arm and shoulder protection. Keep protective clothing clean and dry.

Use industrial hygiene monitoring equipment to ensure that exposure does not exceed applicable national exposure limits. The following limits can be used as guidance. For information about welding fume analysis refer to Section 10.

Substance	CAS#	ACGIH TLV ⁽¹⁾ mg/m ³	OSHA PEL ⁽²⁾ mg/m ³
Aluminum Oxide	1344-28-1	1** (as Al)	15*, 5**
Calcium Carbonate	1317-65-3	Withdrawn	15*, 5**
Calcium Fluoride (as F)	7789-75-5	2.5	2.5
Cellulose	9004-34-6	10	15*, 5**
Iron and Iron Oxides	7439-89-6	5**	10 (fume)
Manganese and inorganic compounds (as Mn)	7439-96-5	0.02**, 0.1***	5 Ceiling
Manganese, fume, as Mn	7439-96-5	0.02**, 0.1***	5 Ceiling
Mineral Silicates (no exposure anticipated)			
All substances with CAS # of 14808-60-7 are considered to be quartz.			
Bentonite Clays	1302-78-9	None	None
Chlorite Silica-Crystalline-Quartz	14808-60-7	0.025**	<u>10 mg/m³ ###</u> %SiO ₂ +2
Feldspar Silica-Crystalline-Quartz	14808-60-7	0.025**	<u>10 mg/m³ ###</u> %SiO ₂ +2
Hectorite Silica-Crystalline-Quartz	14808-60-7	0.025**	<u>10 mg/m³ ###</u> %SiO ₂ +2
Pyrophyllite Silica-Crystalline-Quartz	14808-60-7	0.025**	<u>10 mg/m³ ###</u> %SiO ₂ +2
Wollanstanite Silica-Crystalline-Quartz	14808-60-7	0.025**	<u>10 mg/m³ ###</u> %SiO ₂ +2
Zircon Silica-Crystalline-Quartz	14808-60-7	0.025**	<u>10 mg/m³ ###</u> %SiO ₂ +2
Potassium Titanate	12030-97-6	None	None
Silicate Binder (Potassium Silicate & Sodium Silicate)	1312-76-1	None	None
	1344-09-8	None	None
Silicon	7440-21-3	Withdrawn	15*, 5**
Silicon Dioxide (quartz)	14808-60-7	0.025**	<u>10 mg/m³ ###</u> %SiO ₂ +2
Sodium Titanate (powder)	12034-34-3	None	None
Titanium Oxide	13463-67-7	10	15*
Zirconium & Zirconium Compounds (as Zr)	7440-67-7	5, 10 (STEL)	5

(1) Threshold Limit Values according to American Conference of Governmental Industrial Hygienists, 2014

(2) Permissible Exposure Limits according to the Occupational Safety & Health Administration (USA)

Unless noted, all values are for 8 hour time weighted averages (TWA).

* Total dust, ** Respirable fraction, *** Inhalable fraction.

Respirable dust

NOTE: Some of these products may not contain all of the materials listed. For details of composition, refer to the COMPOSITION TABLES in Section 3.



9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Solid, non-volatile with varying color.

Melting Point: >1300°C/>2300°F

10. STABILITY AND REACTIVITY

General: These products are only intended for normal welding purposes.

Stability: These products are stable under normal conditions.

Reactivity: Contact with chemical substances like acids or strong bases could cause generation of gas.

When these products are used in a welding process, hazardous decomposition products would include those from the volatilization, reaction or oxidation of the materials listed in Section 3 and those from the base metal and coating.

The amount of fumes generated from manual metal arc welding varies with welding parameters and dimensions but is generally no more than 5 to 15 g/kg consumable. Fumes from these products may contain compounds of the following chemical elements: Fe, O, Mn, Zr, F, Na, Si, K, Ca, Al, Mg and Ti. The rest is not analyzed, according to available standards.

Refer to applicable national exposure limits for fume compounds, including those exposure limits for fume compounds found in Section 8. Manganese has a low exposure limit, in some countries, that may be easily exceeded.

Reasonably expected gaseous products would include carbon oxides, nitrogen oxides and ozone. Air contaminants around the welding area can be affected by the welding process and influence the composition and quantity of fumes and gases produced.

11. TOXICOLOGICAL INFORMATION

Inhalation of welding fumes and gases can be dangerous to your health. Classification of welding fumes is difficult because of varying base materials, coatings, air contamination and processes. The International Agency for Research on Cancer has classified welding fumes as possibly carcinogenic to humans (Group 2B).

Acute toxicity: Overexposure to welding fumes may result in symptoms like metal fume fever, dizziness, nausea, dryness or irritation of the nose, throat or eyes.

Chronic toxicity: Overexposure to welding fumes may affect pulmonary function. Overexposure to manganese and manganese compounds above safe exposure limits can cause irreversible damage to the central nervous system, including the brain, symptoms of which may include slurred speech, lethargy, tremor, muscular weakness, psychological disturbances and spastic gait. Prolonged inhalation of titanium dioxide above safe exposure limits can cause cancer. Inhalable quartz is a respiratory carcinogen; however, the process of welding converts crystalline quartz to the amorphous form which is not considered to be a carcinogen.

12. ECOLOGICAL INFORMATION

Welding consumables and materials could degrade/weather into components originating from the consumables or from the materials used in the welding process. Avoid exposure to conditions that could lead to accumulation in soils or groundwater.

13. DISPOSAL CONSIDERATIONS

Discard any product, residue, disposable container or liner in an environmentally acceptable manner, in full compliance with federal and local regulations. Use recycling procedures if available.

USA RCRA: These products are not considered hazardous waste if discarded.

Residues from welding consumables and processes could degrade and accumulate in soils and groundwater. Welding slag from these products typically contain mainly the following components originating from the coating of the electrode: Fe, O, Mn, Zr, F, Na, Si, K, Ca, Al, Mg and Ti.

14. TRANSPORT INFORMATION

No international regulations or restrictions are applicable.

15. REGULATORY INFORMATION

Read and understand the manufacturer's instructions, your employer's safety practices and the health and safety instructions on the label. Observe any federal and local regulations. Take precautions when welding and protect yourself and others.

WARNING: Welding fumes and gases are hazardous to your health and may damage lungs and other organs. Use adequate ventilation.

ELECTRIC SHOCK can kill.

ARC RAYS and SPARKS can injure eyes and burn skin.

Wear correct hand, head, eye and body protection.

Canada: WHMIS classification: Class D; Division 2, Subdivision A

Canadian Environmental Protection Act (CEPA): All constituents of these products are on the Domestic Substance List (DSL).



USA: Under the OSHA Hazard Communication Standard, these products are considered hazardous. These products contain or produce a chemical known to the state of California to cause cancer and birth defects (or other reproductive harm). (California Health & Safety Code § 25249.5 et seq.) United States EPA Toxic Substance Control Act: All constituents of these products are on the TSCA inventory list or are excluded from listing.

CERCLA/SARA Title III

Reportable Quantities (RQs) and/or Threshold Planning Quantities (TPQs):

Ingredient name	RQ (lb)	TPQ (lb)
Product is a solid solution in the form of a solid article.	--	--

Spills or releases resulting in the loss of any ingredient at or above its RQ require immediate notification to the National Response Center and to your Local Emergency Planning Committee.

Section 311 Hazard Class

As shipped: Immediate In use: Immediate delayed

EPCRA/SARA Title III 313 Toxic Chemicals

The following metallic components are listed as SARA 313 "Toxic Chemicals" and potential subject to annual SARA 313 reporting. See Section 3 for weight percent.

Ingredient name	Disclosure threshold
Manganese	1.0% de minimis concentration

16. OTHER INFORMATION

This Safety Data Sheet has been revised due to modifications to Section 8. This SDS supersedes 7989-L.

Refer to ESAB "Welding and Cutting - Risks and Measures", F52-529 "Precautions and Safe Practices for Electric Welding and Cutting" and F2035 "Precautions and Safe Practices for Gas Welding, Cutting and Heating" available from ESAB, and to:

- USA:** Contact ESAB at www.esabna.com or 1-800-ESAB-123 if you have questions about this SDS. American National Standard Z49.1 "Safety in Welding and Cutting", ANSI/AWS F1.5 "Methods for Sampling and Analyzing Gases from Welding and Allied Processes", ANSI/AWS F1.1 "Method for Sampling Airborne Particles Generated by Welding and Allied Processes", AWSF3.2M/F3.2 "Ventilation Guide for Weld Fume", American Welding Society, 550 North Le Jeune Road, Miami, Florida, 33135. Safety and Health Fact Sheets available from AWS at www.aws.org. OSHA Publication 2206 (29 C.F.R. 1910), U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954. American Conference of Governmental Hygienists (ACGIH), Threshold Limit Values and Biological Exposure Indices, 6500 Glenway Ave., Cincinnati, Ohio 45211, USA. NFPA 51B "Standard for Fire Prevention During Welding, Cutting and Other Hot Work" published by the National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169.

UK: WMA Publication 236 and 237, "Hazards from Welding Fume", "The arc welder at work, some general aspects of health and safety".

Germany: Unfallverhütungsvorschrift BGV D1, "Schweißen, Schneiden und verwandte Verfahren".

Canada: CSA Standard CAN/CSA-W117.2-01 "Safety in Welding, Cutting and Allied Processes".

These products have been classified according to the hazard criteria of the CPR and the SDS contains all the information required by the CPR.

Explanation of risk phrases mentioned in this SDS:

R-phrases: R45 – May cause cancer.

ESAB requests the users of these products to study this Safety Data Sheet (SDS) and become aware of product hazards and safety information. To promote safe use of these products a user should:

- notify its employees, agents and contractors of the information on this SDS and any product hazards/safety information.
- furnish this same information to each of its customers for these products.
- request such customers to notify employees and customers for the same product hazards and safety information.

The information herein is given in good faith and based on technical data that ESAB believes to be reliable. Since the conditions of use are outside our control, we assume no liability in connection with any use of this information and no warranty, expressed or implied is given. Contact ESAB for more information.



SAFETY DATA SHEET

Page: 1(8)
SDS Number: CAN300-C
Date Revised: 04/03/2013

This Safety Data Sheet complies with Regulation (EC) No. 1907/2006, ISO 11014-1 and ANSI Z400.1

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: SUREWELD AND OK® MILD STEEL AND LOW ALLOY COVERED ELECTRODES
Application: Arc Welding
Classification: AWS A5.1 & A5.5
Supplier: ESAB GROUP CANADA, INC., 6010 Tomken Road, Mississauga, ON L5T 1X9
Telephone No.: (905) 670-0220, 1-877-935-3226
Web site: www.esab.ca

2. HAZARDS IDENTIFICATION

Emergency Overview: Coated metal rods in varying colors. These products are normally not considered hazardous as shipped. Gloves should be worn when handling to prevent contaminating hands with product dust.

Some of these products contain nickel, which is classified as toxic by prolonged inhalation, a skin sensitizer and a suspect carcinogen. Nickel powder is harmful for the environment. These products, however, are not classified as hazardous based on the limited concentration of nickel. These products contain titanium dioxide which is possibly carcinogenic. These products contain quartz, but normally not in an inhalable fraction. Quartz can cause silicosis and may cause cancer.

Avoid eye contact or inhalation of dust from these products. Skin contact is normally no hazard but should be avoided to prevent possible allergic reactions.

Persons with a pacemaker should not go near welding or cutting operations until they have consulted their doctor and obtained information from the manufacturer of the device.

When these products are used in a welding process, the most important hazards are heat, radiation, electric shock and welding fumes.

Heat: Spatter and melting metal can cause burn injuries and start fires.

Radiation: Arc rays can severely damage eyes or skin.

Electricity: Electric shock can kill.

Fumes: Overexposure to welding fumes may result in symptoms like metal fume fever, dizziness, nausea, dryness or irritation of the nose, throat or eyes. Chronic overexposure to welding fumes may affect pulmonary function. Prolonged inhalation of nickel and chromium compounds above safe exposure limits can cause cancer. Overexposure to manganese and manganese compounds above safe exposure limits can cause irreversible damage to the central nervous system, including the brain, symptoms of which may include slurred speech, lethargy, tremor, muscular weakness, psychological disturbances and spastic gait.

3. COMPOSITION/INFORMATION ON INGREDIENTS

These products are preparations of core wire with extruded coating.

Ingredients	REACH Reg. #	CAS#	EINECS#	Hazard classification ⁽¹⁾	IARC ⁽²⁾	NTP ⁽³⁾	OSHA List ⁽⁴⁾
Aluminum Oxide	--	1344-28-1	215-691-6	No	--	--	--
Aluminum Silicate	--	12141-46-7	235-253-8	No	--	--	--
Calcium Carbonate	--	1317-65-3	215-279-6	No	--	--	--
Carbon	--	7440-44-0	231-153-3	No	--	--	--
Cellulose	--	9004-34-6	232-674-9	No	--	--	--
Chromium	--	7440-47-3	231-157-5	No	--	--	--
Graphite	--	7782-42-5	231-955-3	No	--	--	--
Iron	01-2119462838-24	7439-89-6	231-096-4	No	--	--	--
Iron Carbonate	--	10290-71-8	233-647-4	No	--	--	--
Magnesium Carbonate	--	546-93-0	208-915-9	No	--	--	--
Manganese	--	7439-96-5	231-105-1	No	--	--	--



Ingredients	REACH Reg. #	CAS#	EINECS#	Hazard classification ⁽¹⁾	IARC ⁽²⁾	NTP ⁽³⁾	OSHA List ⁽⁴⁾
Mill Scale	--	65996-74-9	266-007-8	No	--	--	--
Iron Oxide		1309-37-1	215-168-2	No	--	--	--
Silicon Dioxide		14808-60-7	238-878-4	T; R45	1	K	--
Mineral Silicates	All substances with CAS # of 14808-60-7 are considered to be quartz.						
Bentonite Clays	--	1302-78-9	215-108-5	No	--	--	--
Chlorite	--	14808-60-7	238-878-4	T; R45	1	K	--
Feldspar	--	14808-60-7	238-878-4	T; R45	1	K	--
Hectorite	--	14808-60-7	238-878-4	T; R45	1	K	--
Pyrrhopolite	--	14808-60-7	238-878-4	T; R45	1	K	--
Wollanstanite	--	14808-60-7	238-878-4	T; R45	1	K	--
Zircon	--	14808-60-7	238-878-4	T; R45	1	K	--
Molybdenum	--	7439-98-7	231-107-2	No	--	--	--
Nickel Powder	--	7440-02-0	231-111-4	Carc. Cat. 3; R40 T; R48/23 R43 R52/53	2B	S	--
Other Silicates							
Kaolinite Clay	--	1332-58-7	310-194-1	No	--	--	--
Mica (2 possible CAS numbers) ^x	--	12001-26-2	Not found	No	--	--	--
		12003-38-2	234-426-5	No	--	--	--
Potassium Titanate	--	12030-97-6	234-748-6	No	--	--	--
Rosin	--	8050-09-7	232-475-7	R43	--	--	--
Silica	--	14808-60-7	238-878-4	T; R45	1	K	--
Silicate Binder (Potassium Silicate)	--	1312-76-1	215-199-1	No	--	--	--
Silicate Binder (Sodium Silicate)	--	1344-09-8	215-687-4	No	--	--	--
Silicon	--	7440-21-3	231-130-8	No	--	--	--
Silicon Dioxide	--	14808-60-7	238-878-4	T; R45	1	K	--
Titanium Oxide	--	13463-67-7	236-675-5	No	2B	--	--
Zirconium Silicate	--	14940-68-2	239-019-6	No	--	--	--

⁽¹⁾ Hazard Classification according to European Council Directive 67/548/EEC, for R-phrases, see Section 16.

⁽²⁾ Evaluation according to the International Agency for Research on Cancer.

1 –Carcinogenic to humans. 2A – Probably carcinogenic to humans. 2B – Possibly carcinogenic to humans.

⁽³⁾ Classification according to the 11th Report on Carcinogens, published by the US National Toxicology Program.

K – Known Carcinogen S – Suspect Carcinogen

⁽⁴⁾ Carcinogen listing according to OSHA, Occupational Safety & Health Administration (USA).



APPROXIMATE COMPOSITION OF ELECTRODE (Wt. %)

Product Trade Name	Sureweld 10P	Sureweld 10P-Plus	Sureweld 6011 (formerly SW-14)	Sureweld 6013 (formerly 6013-LV)	Sureweld 710P
Aluminum Oxide	--	--	--	0.1-1	--
Calcium Carbonate	<0.5	1-2.5	<0.5	1-2.5	<0.5
Carbon	<0.3	<0.3	<0.3	<0.3	<0.3
Cellulose	2-6	2-6	2-6	0.5-2.5	2-6
Chromium & Cmpds	--	--	--	--	--
Graphite	<0.3	<0.3	--	--	--
Iron Carbonate	--	--	--	--	--
Magnesium Carbonate	0.3-1.5	--	0.3-1.5	--	0.3-1.5
Manganese	1-2	1-2	1-2	2-3	1-2
Mill Scale	0.05-1	0.05-1	0.05-1	0.05-1	0.05-1
Mineral Silicates	0.5-2.5	0-1.5	--	1-2.5	0.2-1
Molybdenum	--	--	--	--	<0.5
Nickel	--	--	--	--	<0.5
Other Silicates					
Kaolinite Clay	--	--	--	0.3-2	0.3-2
Mica	--	--	--	0.3-2	--
Potassium Titanate	--	--	2-3	--	--
Silicate Binder (cured)	1-4.5	1-4.5	1-4.5	1-4.5	1-4.5
Silicon	<0.2	<0.2	<0.2	<0.2	<0.2
Silicon Dioxide	0.05-1	0.05-1	0.05-1	0.05-1	0.05-1
Titanium Oxide	1-3	1-3	1-3	8-12	1-3
Iron	Bal >80	Bal >80	Bal >80	Bal >70	Bal >80
AWS Classification	A5.1 E6010	A5.1 E6010	A5.1 E6011	A5.1 E6013	A5.5 E7010-P1

Product Trade Name	Sureweld 7014 (formerly SW-15 IP)	Sureweld 7024	Sureweld 810P
Aluminum Oxide	<0.3	0.3-1.4	--
Aluminum Silicate	--	2-5	--
Calcium Carbonate	0.5-1.5	0.5-1.5	--
Carbon	<0.3	<0.3	<0.3
Cellulose	1-3	1-3	3-6
Chromium & Cmpds	--	--	0.03-0.10
Graphite	--	--	--
Iron Carbonate	--	0.5-1.5	--
Magnesium Carbonate	--	0.3-1.5	0.3-1.5
Manganese	1.5-2.5	3-4	1-2
Mill Scale	<0.3	0.3-1.5	0.3-1.5
Mineral Silicates	1-2.5	1-2.5	0.5-2
Molybdenum	--	--	<0.5
Nickel	--	--	0.5-1
Other Silicates			
Kaolinite Clay	--	0.2-1.5	--
Mica	2-4	--	0.2-1.5
Potassium Titanate	--	--	--
Silicate Binder (cured)	1-4.5	1-4.5	1-4.5
Silicon	<0.5	<0.5	<0.2
Silicon Dioxide	0.05-1	0.05-1	0.05-1
Titanium Oxide	9-13	9-13	1-3
Iron	Bal >70	Bal >70	Bal >80
AWS Classification	A5.1 E7014	A5.1 E7024	A5.5 E8010-P1



APPROXIMATE COMPOSITION OF COATING (Wt. %)

The core wire type is mild steel.

Product Trade Name	OK 33.80
Aluminum Oxide	2-5
Aluminum Silicate	2-5
Calcium Carbonate	2-5
Manganese	5-10
Silicate Binder (cured)	5-10
Silicon Dioxide	5-10
Titanium Oxide	15-20
Zirconium Silicate	1-2
Iron	Bal.>60
AWS Classification	A5.1 E7024

4. FIRST AID MEASURES

- Inhalation: If breathing has stopped, perform artificial respiration and obtain medical assistance immediately! If breathing is difficult, provide fresh air and call physician.
- Eye contact: For radiation burns due to arc flash, see physician. To remove dusts or fumes flush with water for at least fifteen minutes. If irritation persists, obtain medical assistance.
- Skin contact: For skin burns from arc radiation, promptly flush with cold water. Get medical attention for burns or irritations that persist. To remove dust or particles wash with mild soap and water.
- Electric shock: Disconnect and turn off the power. Use a nonconductive material to pull victim away from contact with live parts or wires. If not breathing, begin artificial respiration, preferably mouth-to-mouth. If no detectable pulse, begin Cardio Pulmonary Resuscitation (CPR). Immediately call a physician.
- General: Move to fresh air and call for medical aid.

5. FIRE FIGHTING MEASURES

No specific recommendations for welding consumables. Welding arcs and sparks can ignite combustible and flammable materials. Use the extinguishing media recommended for the burning materials and fire situation. Wear self-contained breathing apparatus as fumes or vapors may be harmful.

6. ACCIDENTAL RELEASE MEASURES

Solid objects may be picked up and placed into a container. Liquids or pastes should be scooped up and placed into a container. Wear proper protective equipment while handling these materials. Do not discard as refuse.

- Personal precautions: refer to Section 8.
- Environmental precautions: refer to Section 13.

7. HANDLING AND STORAGE

- Handling:
Handle with care to avoid stings and cuts. Wear gloves when handling welding consumables. Avoid exposure to dust. Do not ingest. Some individuals can develop an allergic reaction to certain materials. Retain all warning and identity labels.
- Storage:
Keep separate from chemical substances like acids and strong bases, which could cause chemical reactions.

8. EXPOSURE CONTROL/PERSONAL PROTECTION

Avoid exposure to welding fumes, radiation, spatter, electric shock, heated materials and dust.

Engineering measures:

Ensure sufficient ventilation, local exhaust, or both, to keep welding fumes and gases from breathing zone and general area. Keep working place and protective clothing clean and dry. Train welders to avoid contact with live electrical parts and insulate conductive parts. Check condition of protective clothing and equipment on a regular basis.



Personal protective equipment:

Use respirator or air supplied respirator when welding or brazing in a confined space, or where local exhaust or ventilation is not sufficient to keep exposure values within safe limits. Use special care when welding painted or coated steels since hazardous substances from the coating may be emitted. Wear hand, head, eyes, ear and body protection like welders gloves, helmet or face shield with filter lens, safety boots, apron, arm and shoulder protection. Keep protective clothing clean and dry.

Use industrial hygiene monitoring equipment to ensure that exposure does not exceed applicable national exposure limits. The following limits can be used as guidance. For information about welding fume analysis refer to Section 10.

Substance	CAS#	ACGIH TLV ⁽¹⁾ mg/m ³	OSHA PEL ⁽²⁾ mg/m ³
Aluminum Oxide	1344-28-1	1** (as Al)	15*, 5**
Aluminum Silicate (as Al)	12141-46-7	1**	15*, 5**
Calcium Carbonate	1317-65-3	Withdrawn	15*, 5**
Carbon	7440-44-0	None	None
Cellulose	9004-34-6	10	15*, 5**
Chromium Compounds	7440-47-3		
Metal (as Cr)		0.5	1
Cr (VI), inorganic, water insoluble (as Cr)		0.01	0.005
Cr (VI), inorganic, water soluble (as Cr)		0.05	0.005
Graphite	7782-42-5	2**	15*, 5**
Iron Carbonate	10290-71-8	None	None
Iron Oxide	1309-37-1	5**	10 (fume)
Magnesium Carbonate	546-93-0	10***, 3** (PNOS)	15*, 5**
Manganese and inorganic compounds (as Mn)	7439-96-5	0.02**, 0.1***	5 Ceiling
Manganese, fume (as Mn)	7939-96-5	0.2	5 Ceiling
Mill Scale (Ferrous metal)			
Iron Oxide	1309-37-1	5**	10 (fume)
Silicon Dioxide	14808-60-7	0.025**	10 mg/m ³ ### %SiO ₂ +2
Mineral Silicates (no exposure anticipated)			
All substances with CAS # of 14808-60-7 are considered to be quartz.			
Bentonite Clays	1302-78-9	None	None
Chlorite Silica-Crystalline-Quartz	14808-60-7	0.025**	10 mg/m ³ ### %SiO ₂ +2
Feldspar Silica-Crystalline-Quartz	14808-60-7	0.025**	10 mg/m ³ ### %SiO ₂ +2
Hectorite Silica-Crystalline-Quartz	14808-60-7	0.025**	10 mg/m ³ ### %SiO ₂ +2
Pyrrhopolite Silica-Crystalline-Quartz	14808-60-7	0.025**	10 mg/m ³ ### %SiO ₂ +2
Wollanstanite Silica-Crystalline-Quartz	14808-60-7	0.025**	10 mg/m ³ ### %SiO ₂ +2
Zircon Silica-Crystalline-Quartz	14808-60-7	0.025**	10 mg/m ³ ### %SiO ₂ +2
Molybdenum (metal and insoluble compounds, as Mo)	7439-98-7	3 **, 10 ***	15*
(soluble compounds, as Mo)		0.5 **	5
Nickel, elemental	7440-02-0	1.5***	1
Other Silicates			
Kaolin	1332-58-7	2**	15*, 5**
Use Quartz Formula	14808-60-7	0.025**	10 mg/m ³ ### %SiO ₂ +2
Mica	12001-26-2	3**	20 mppcf, quartz < 1%
Potassium Titanate	12030-97-6	None	None



Substance	CAS#	ACGIH TLV ⁽¹⁾ mg/m ³	OSHA PEL ⁽²⁾ mg/m ³
Silicate Binder (Potassium Silicate & Sodium Silicate)	1312-76-1	None	None
	1344-09-8	None	None
Silicon	7440-21-3	Withdrawn	15*, 5**
Silicon Dioxide (quartz)	14808-60-7	0.025**	10 mg/m ³ ### %SiO ₂ +2
Titanium Oxide	13463-67-7	10	15*
Zirconium Silicate (as Zr)	14940-68-2	5, 10 (STEL)	5

⁽¹⁾ Threshold Limit Values according to American Conference of Governmental Hygienists, 2013

⁽²⁾ Permissible Exposure Limits according to the Occupational Safety & Health Administration (USA)

Unless noted, all values are for 8 hour time weighted averages (TWA).

* Total dust, ** Respirable fraction, *** Inhalable fraction.

Respirable dust

NOTE: Some of these products may not contain all of the materials listed. For details of composition, refer to the COMPOSITION TABLES in Section 3.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Solid, non-volatile with varying color.

Melting Point: >1300°C/>2300°F

10. STABILITY AND REACTIVITY

General: These products are only intended for normal welding purposes.

Stability: These products are stable under normal conditions.

Reactivity: Contact with chemical substances like acids or strong bases could cause generation of gas.

When these products are used in a welding process, hazardous decomposition products would include those from the volatilization, reaction or oxidation of the materials listed in Section 3 and those from the base metal and coating.

The amount of fumes generated from manual metal arc welding varies with welding parameters and dimensions but is generally no more than 5 to 15 g/kg consumable. Fumes from these products may contain compounds of the following chemical elements: Fe, O, Mn, Cr, Ni, F, Na, Si, K, Ca, Al, Mg, C, Mo, and Ti. The rest is not analyzed, according to available standards.

Refer to applicable national exposure limits for fume compounds, including those exposure limits for fume compounds found in Section 8. A significant amount of the chromium in the fumes can be hexavalent chromium, which has a very low exposure limit in some countries. Manganese and nickel also have low exposure limits, in some countries, that may be easily exceeded.

Reasonably expected gaseous products would include carbon oxides, nitrogen oxides and ozone. Air contaminants around the welding area can be affected by the welding process and influence the composition and quantity of fumes and gases produced.

11. TOXICOLOGICAL INFORMATION

Inhalation of welding fumes and gases can be dangerous to your health. Classification of welding fumes is difficult because of varying base materials, coatings, air contamination and processes. The International Agency for Research on Cancer has classified welding fumes as possibly carcinogenic to humans (Group 2B).

Acute toxicity: Overexposure to welding fumes may result in symptoms like metal fume fever, dizziness, nausea, dryness or irritation of the nose, throat or eyes.

Chronic toxicity: Overexposure to welding fumes may affect pulmonary function. Prolonged inhalation of nickel and chromium compounds above safe exposure limits can cause cancer. Overexposure to manganese and manganese compounds above safe exposure limits can cause irreversible damage to the central nervous system, including the brain, symptoms of which may include slurred speech, lethargy, tremor, muscular weakness, psychological disturbances and spastic gait. Prolonged inhalation of titanium dioxide above safe exposure limits can cause cancer. Inhalable quartz is a respiratory carcinogen; however, the process of welding converts crystalline quartz to the amorphous form which is not considered to be a carcinogen.

12. ECOLOGICAL INFORMATION

Welding consumables and materials could degrade/weather into components originating from the consumables or from the materials used in the welding process. Avoid exposure to conditions that could lead to accumulation in soils or groundwater.

Nickel powder is harmful for the environment. Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.



13. DISPOSAL CONSIDERATIONS

Discard any product, residue, disposable container or liner in an environmentally acceptable manner, in full compliance with federal and local regulations. Use recycling procedures if available.

USA RCRA: Unused products or product residue containing chromium is considered hazardous waste if discarded, RCRA ID Characteristic Toxic Hazardous Waste D007.

Residues from welding consumables and processes could degrade and accumulate in soils and groundwater. Welding slag from these products typically contain mainly the following components originating from the coating of the electrode: Fe, O, Mn, Cr, Ni, F, Na, Si, K, Ca, Al, Mg, C, Mo, and Ti.

14. TRANSPORT INFORMATION

No international regulations or restrictions are applicable.

15. REGULATORY INFORMATION

Read and understand the manufacturer's instructions, your employer's safety practices and the health and safety instructions on the label. Observe any federal and local regulations. Take precautions when welding and protect yourself and others.

WARNING: Welding fumes and gases are hazardous to your health and may damage lungs and other organs. Use adequate ventilation.

ELECTRIC SHOCK can kill.

ARC RAYS and SPARKS can injure eyes and burn skin.

Wear correct hand, head, eye and body protection.

Canada: WHMIS classification: Class D; Division 2, Subdivision A

Canadian Environmental Protection Act (CEPA): All constituents of these products are on the Domestic Substance List (DSL).

USA: Under the OSHA Hazard Communication Standard, these products are considered hazardous.

These products contain or produce a chemical known to the state of California to cause cancer and birth defects (or other reproductive harm). (California Health & Safety Code § 25249.5 et seq.)

United States EPA Toxic Substance Control Act: All constituents of these products are on the TSCA inventory list or are excluded from listing.

CERCLA/SARA Title III

Reportable Quantities (RQs) and/or Threshold Planning Quantities (TPQs):

Ingredient name	RQ (lb)	TPQ (lb)
Product is a solid solution in the form of a solid article.	--	--

Spills or releases resulting in the loss of any ingredient at or above its RQ require immediate notification to the National Response Center and to your Local Emergency Planning Committee.

Section 311 Hazard Class

As shipped: Immediate In use: Immediate delayed

EPCRA/SARA Title III 313 Toxic Chemicals

The following metallic components are listed as SARA 313 "Toxic Chemicals" and potential subject to annual SARA 313 reporting. See Section 3 for weight percent.

Ingredient name	Disclosure threshold
Chromium	1.0% de minimis concentration
Manganese	1.0% de minimis concentration
Nickel	0.1% de minimis concentration

16. OTHER INFORMATION

This Safety Data Sheet has been revised due to modifications to Section 8. This SDS supersedes CAN300-B.

Refer to ESAB "Welding and Cutting - Risks and Measures", F52-529 "Precautions and Safe Practices for Electric Welding and Cutting" and F2035 "Precautions and Safe Practices for Gas Welding, Cutting and Heating" available from ESAB, and to:



- USA: Contact ESAB at www.esabna.com or 1-800-ESAB-123 if you have questions about this SDS.
- American National Standard Z49.1 "Safety in Welding and Cutting", ANSI/AWS F1.5 "Methods for Sampling and Analyzing Gases from Welding and Allied Processes", ANSI/AWS F1.1 "Method for Sampling Airborne Particles Generated by Welding and Allied Processes", AWSF3.2M/F3.2 "Ventilation Guide for Weld Fume", American Welding Society, 550 North Le Jeune Road, Miami, Florida, 33135. Safety and Health Fact Sheets available from AWS at www.aws.org.
- OSHA Publication 2206 (29 C.F.R. 1910), U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954.
- American Conference of Governmental Hygienists (ACGIH), Threshold Limit Values and Biological Exposure Indices, 6500 Glenway Ave., Cincinnati, Ohio 45211, USA.
- NFPA 51B "Standard for Fire Prevention During Welding, Cutting and Other Hot Work" published by the National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169.
- UK: WMA Publication 236 and 237, "Hazards from Welding Fume", "The arc welder at work, some general aspects of health and safety".
- Germany: Unfallverhütungsvorschrift BGV D1, "Schweißen, Schneiden und verwandte Verfahren".
- Canada: CSA Standard CAN/CSA-W117.2-01 "Safety in Welding, Cutting and Allied Processes".
- These products have been classified according to the hazard criteria of the CPR and the SDS contains all the information required by the CPR.

Explanation of risk phrases mentioned in this SDS:

- R-phrases: R40 – Limited evidence of a carcinogenic effect.
R43 – May cause sensitization by skin contact.
R45 – May cause cancer.
R48/23 – Toxic: danger of serious damage to health by prolonged exposure through inhalation.
R52/53 – Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

ESAB requests the users of these products to study this Safety Data Sheet (SDS) and become aware of product hazards and safety information. To promote safe use of these products a user should:

- notify its employees, agents and contractors of the information on this SDS and any product hazards/safety information.
- furnish this same information to each of its customers for these products.
- request such customers to notify employees and customers for the same product hazards and safety information.

The information herein is given in good faith and based on technical data that ESAB believes to be reliable. Since the conditions of use are outside our control, we assume no liability in connection with any use of this information and no warranty, expressed or implied is given. Contact ESAB for more information.



Material Safety Data Sheet

LA1301
Ethylene glycol

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Id: LA1301

Product Name: Ethylene glycol

Synonyms: None

Chemical Family: Glycols

Application: Used as antifreeze, heat transfer fluid, solvent, and raw material in polyester fiber manufacturing.

Distributed By:

Univar Canada Ltd.
9800 Van Horne Way
Richmond, BC
V6X 1W5

Prepared By: The Safety, Health and Environment Department of Univar Canada Ltd.

Preparation date of MSDS: 13 March 2012

Telephone number of preparer: 1-866-686-4827

24-Hour Emergency Telephone Number (CANUTEC): (613) 996-6666

2. COMPOSITION/INFORMATION ON INGREDIENTS

Ingredients	Percentage (W/W)	LD50s and LC50s Route & Species:
Ethylene Glycol 107-21-1	>99	Oral LD50 (Rat) = 4000 mg/kg Dermal LD50 (Rabbit) = 9530 µL/kg

Note: No additional remark.

3. HAZARDS IDENTIFICATION

Potential Acute Health Effects:

Eye Contact: May cause slight eye irritation. Vapours or mists may cause eye irritation. Corneal injury is unlikely.

Skin Contact: Brief contact is essentially non-irritating to skin. Prolonged contact may cause skin irritation with local redness. Repeated skin exposure to large quantities may result in absorption of harmful amounts. Massive contact with damaged skin or if material sufficiently hot to burn skin may result in absorption of potential lethal amounts.

Inhalation: At room temperature, exposure to vapor is minimal due to low volatility. With good ventilation, single exposure is not expected to cause adverse effects. If material is heated or areas are poorly ventilated, vapor/mist may accumulate and cause respiratory irritation and symptoms such as headache and nausea.

3. HAZARDS IDENTIFICATION

Ingestion: Oral toxicity is expected to be moderate in humans due to ethylene glycol even though tests with animals show a lower degree of toxicity. Excessive exposure may cause central nervous system effects, cardiopulmonary effects (metabolic acidosis), and kidney failure. Swallowing may result in severe effects, even death. The lethal dose in adult humans for ethylene glycol is approximately 3 ounces (100 ml) (1/3 cup). May cause nausea or vomiting. May cause abdominal discomfort or diarrhea. Cardiac failure, pulmonary edema, and severe kidney damage may develop. May be fatal if swallowed.

4. FIRST AID MEASURES

Eye Contact: Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Get medical attention immediately.

Skin Contact: Flush with large amounts of water while removing contaminated clothing. Remove contaminated clothing and launder before reuse. Get medical attention if irritation develops. Discard contaminated leather articles such as shoes and belt.

Inhalation: If inhaled, remove to fresh air. If not breathing give artificial respiration, preferably mouth-to-mouth. If breathing is difficult give oxygen. Get medical attention. Have trained personnel administer oxygen.

Ingestion: If swallowed, do not induce vomiting. Never give anything by mouth to an unconscious person. Obtain medical help immediately.

Notes to Physician: It is estimated that the oral dose to adults is of the order of 1.0 ml/kg. Ethylene glycol is metabolized by alcohol dehydrogenase to various metabolites including glycerinaldehydes, glycolic acid and oxalic acid which cause an elevated anion-gap metabolic acidosis and renal tubular injury. The signs and symptoms in ethylene glycol poisoning are those of metabolic acidosis, CNS depression and kidney injury. Urinalysis may show albuminuria, hematuria and oxaluria. Clinical chemistry may reveal anion-gap metabolic acidosis and uremia. The currently recommended medical management of ethylene glycol poisoning includes elimination of ethylene glycol and metabolites, correction of metabolic acidosis and prevention of kidney injury. It is essential to have immediate and follow up urinalysis and clinical chemistry. There should be particular emphasis on acid-base balance and renal function tests. A continuous infusion of 5% sodium bicarbonate with frequent monitoring of electrolytes and fluid balance is used to achieve correction of metabolic acidosis and forced diuresis. As a competitive substrate for alcohol dehydrogenase, ethanol is antidotal. Given in the early stages of intoxication, it blocks the formulation of nephrotoxic metabolites. A therapeutically effective blood concentration of ethanol is in the range 100 - 150 mg/dl and should be achieved by a rapid loading dose and maintained by intravenous infusion. For severe and /or deteriorating cases, hemodialysis may be required. Dialysis should be considered for patients who are symptomatic, have severe metabolic acidosis, a blood ethylene glycol concentration greater than 25 mg/dl, or compromise of renal functions.

A more effective intravenous antidote for physician use is 4-methylpyrazole, a potent inhibitor of alcohol dehydrogenases which effectively blocks the formation of toxic metabolites of ethylene glycol. It has been used to decrease the metabolic consequences of ethylene glycol poisoning before metabolic acidosis coma, seizures and renal failure have occurred. A generally recommended protocol is a loading dose of 15 mg/kg followed by 10 mg/kg every 12 hours for 4 doses and the 15 mg/kg every 12 hours until the ethylene glycol concentrations are below 20 mg/100ml. Slow intravenous infusion is required. Since 4-methylpyrazole is dialyzable, increased dosage may be necessary during hemodialysis. Additional therapeutic measures may include the administration of cofactors involved in the metabolism of ethylene glycol. Thiamine (100 mg) and pyridoxine (50 mg) should be given every six hours.

Pulmonary edema with hypoxemia has been described in a number of patients following poisoning with ethylene glycol. The mechanism of production has not been elucidated, but it appears to be non-cardiogenic in origin in several cases. Respiratory support with mechanical ventilation and positive end expiratory pressure may be required. There may be cranial nerve involvement in the late stages of toxicity from swallowed ethylene glycol. In particular, effects have been reported involving the seventh, eighth and ninth cranial nerves, presenting with bilateral facial paralysis, diminished hearing, and dysphagia.

5. FIRE FIGHTING MEASURES

Flash Point: 116.1 °C / 241 °F

Flash Point Method: ASTM D56

Autoignition Temperature: 427°C /801°F

Flammable Limits in Air (%): Lower: 3.2% Upper: 15.3%

5. FIRE FIGHTING MEASURES

Extinguishing Media: Water fog or fine spray, carbon dioxide, dry chemical, foam. Alcohol resistant foams (ATC type) are preferred if available. General purpose synthetic foams (including AFFF) or protein foams may function, but much less effectively. Do not use direct water stream, which will spread fire.

Special Exposure Hazards: Isolate and restrict area access. Fight fire from a safe distance and from a protected location. Use water spray to cool fire-exposed containers and structures. Do not direct a solid stream of water or foam into hot, burning pools; this may cause frothing and increase fire intensity. Consider use of unmanned hose holder or monitor nozzles. Container may rupture from gas generation in a fire situation. Violent steam generation or eruption may occur upon application of direct water stream to hot liquids.

Hazardous Decomposition/Combustion Materials (under fire conditions): Oxides of carbon. Oxides of nitrogen.

Special Protective Equipment: Fire fighters should wear full protective clothing, including self-contained breathing equipment.

NFPA RATINGS FOR THIS PRODUCT ARE: HEALTH 1, FLAMMABILITY 1, INSTABILITY 0

HMIS RATINGS FOR THIS PRODUCT ARE: HEALTH 1, FLAMMABILITY 1, REACTIVITY 0

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures: Isolate area. Keep unnecessary and unprotected personnel from entering the area. Wear appropriate protective equipment.

Environmental Precautionary Measures: Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. Consult local authorities.

Procedure for Clean Up: Small spills: soak up with absorbent material and scoop into containers. Large spills : prevent contamination of waterways. Dike and pump into suitable containers. Clean up residual with absorbent material, place in appropriate container and flush with water.

7. HANDLING AND STORAGE

Handling: For industrial use only. Handle and open containers with care. Avoid contact with eyes, skin and clothing. Do not ingest. Avoid inhalation of chemical. Empty containers may contain hazardous product residues. Keep the containers closed when not in use. Protect against physical damage. Use appropriate personnel protective equipment. Spills of these organic liquids on hot fibrous insulations may lead to lowering of the autoignition temperature possibly resulting in spontaneous combustion. Do not consume food, drink or smoke while handling this material.

Storage: Keep containers tightly closed. Keep in a cool, well-ventilated place. Avoid storage with incompatible materials. Do not store near food, foodstuffs, drugs or potable water supplies.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls:

General (mechanical) room ventilation is expected to be satisfactory. Local ventilation recommended where mechanical ventilation is ineffective in controlling airborne concentrations below the recommended occupational exposure limit.

Respiratory Protection: Atmospheric levels should be maintained below the exposure guideline. For most conditions, no respiratory protection is needed; however, if handling at elevated temperatures without sufficient ventilation, use an approved air-purifying respirator.

Gloves:

Use gloves chemically resistant to this material, examples of preferred glove barrier materials include: Butyl rubber gloves. Natural rubber gloves. Neoprene gloves. Nitrile gloves. Polyethylene gloves. Ethyl Vinyl Alcohol Laminate (EVAL). Polyvinyl alcohol gloves. Polyvinylchloride (PVC) gloves.

: The selection of a specific glove for a particular application and duration of use in a workplace should also take into account all relevant workplace factors such as, but not limited to: Other chemicals which may be handled, physical requirements (cut/puncture protection, dexterity, thermal protection), potential body reactions to glove materials as well as the instructions/specifications provided by the glove supplier.

Skin Protection: Skin contact should be prevented through the use of suitable protective clothing, gloves and footwear, selected for conditions of use and exposure potential. Consideration must be given both to durability as well as permeation resistance. Boots. Chemical apron. When handling hot material, protect skin from thermal burns as well as from skin absorption.

Eyes: Chemical goggles; also wear a face shield if splashing hazard exists.

Other Personal Protection Data: Ensure that eyewash stations and safety showers are proximal to the work-station location.

Ingredients	Exposure Limit - ACGIH	Exposure Limit - OSHA	Immediately Dangerous to Life or Health - IDLH
Ethylene Glycol	100 mg/m ³ Ceiling	50 ppm Ceiling 125 mg/m ³ Ceiling	Not Available.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State: Liquid.

Colour: Colourless

Odour: Sweet

pH 9

Specific Gravity: 1.115 @ 20°C

Boiling Point: >197°C />387°F

Freezing/Melting Point: -13°C / 9°F

Vapour Pressure: 0.06 mmHg @ 20°C

Vapour Density: 2.1

% Volatile by Volume: Not Available.

Evaporation Rate: 0.01

Solubility: 100%

VOCs: Not Available.

Viscosity: Not Available.

Molecular Weight: 62 g/mol

Other: Octanol / Water Partition Coefficient : -1.36

10. STABILITY AND REACTIVITY

Chemical Stability: Stable.

Hazardous Polymerization: Will not occur.

Conditions to Avoid: Avoid excessive heat, open flames and all ignition sources. Product can decompose at elevated temperatures. Generation of gas during decomposition can cause pressure in closed systems.

Materials to Avoid: Strong acids and bases. Strong oxidizers.

Hazardous Decomposition Products: Hazardous decomposition products depend upon temperature, air supply, and the presence of other materials. Hazardous decomposition products may include and are not limited to : aldehydes, ketones, organic acids.

10. STABILITY AND REACTIVITY

Additional Information:

No additional remark.

11. TOXICOLOGICAL INFORMATION

Principle Routes of Exposure

Ingestion: Oral toxicity is expected to be moderate in humans due to ethylene glycol even though tests with animals show a lower degree of toxicity. Excessive exposure may cause central nervous system effects, cardiopulmonary effects (metabolic acidosis), and kidney failure. Swallowing may result in severe effects, even death. The lethal dose in adult humans for ethylene glycol is approximately 3 ounces (100 ml) (1/3 cup). May cause nausea or vomiting. May cause abdominal discomfort or diarrhea. Cardiac failure, pulmonary edema, and severe kidney damage may develop. May be fatal if swallowed.

Skin Contact: Brief contact is essentially non-irritating to skin. Prolonged contact may cause skin irritation with local redness. Repeated skin exposure to large quantities may result in absorption of harmful amounts. Massive contact with damaged skin or if material sufficiently hot to burn skin may result in absorption of potential lethal amounts.

Inhalation: At room temperature, exposure to vapor is minimal due to low volatility. With good ventilation, single exposure is not expected to cause adverse effects. If material is heated or areas are poorly ventilated, vapor/mist may accumulate and cause respiratory irritation and symptoms such as headache and nausea.

Eye Contact: May cause slight eye irritation. Vapours or mists may cause eye irritation. Corneal injury is unlikely.

Additional Information: Repeated skin contact with ethylene glycol may, in a very small proportion of cases, cause sensitization with the development of allergic contact dermatitis. The incidence is significantly less than 1% with the undiluted material. Repeated inhalation of ethylene glycol may produce signs of central nervous system involvement, particularly dizziness and nystagmus (involuntary eye movement). Exposure may place individuals with existing heart problems at added risk of potential cardiac irregularities and heart failure. In animals, effects have been reported on the following organs: Kidney, liver.

Acute Test of Product:

Acute Oral LD50: Not Available.

Acute Dermal LD50: Not Available.

Acute Inhalation LC50: Not Available.

Carcinogenicity:

Ingredients	IARC - Carcinogens	ACGIH - Carcinogens
Ethylene Glycol	Not listed.	A4

Carcinogenicity Comment: No additional information available.

Reproductive Toxicity/ Teratogenicity/ Embryotoxicity/ Mutagenicity: Based on animal studies, ingestion of very large amounts of ethylene glycol appears to be the major and possibly only route of exposure to produce birth defects. Exposures by inhalation or skin contact, the primary routes of occupational exposure, had minimal effect on the fetus, in animal studies.

Ethylene glycol has been shown to produce dose-related teratogenic effects in rats and mice when given by gavage or in drinking water at high concentrations or doses. The no-effect doses for developmental toxicity for ethylene glycol given by gavage over the period of organogenesis has been shown to be 150 mg/kg/day for the mouse and 500 mg/kg/day for the rat. Also, in a preliminary study to assess the effects of exposure of pregnant rats and mice to aerosols at concentrations of 150, 1000 and 2500 mg/m³ for 6 hours a day throughout the period of organogenesis, teratogenic effects were produced at the highest concentration, but only in mice. The conditions of these latter experiments did not allow a conclusion as to whether the developmental toxicity was mediated by inhalation of aerosol, percutaneous absorption of ethylene glycol from contaminated skin, or swallowing of ethylene glycol as a result of grooming the wetted coat. In a further study, comparing effects from high aerosol concentration by whole-body or nose-only exposure, it was shown that nose-only exposure resulted in maternal toxicity (1000 and 2500 mg/m³) and developmental toxicity with minimal evidence of teratogenicity (2500 mg/m³). The no-effects concentration (based on maternal toxicity) was 500 mg/m³. In a further study in mice, no teratogenic effects could be produced when ethylene glycol was applied to the skin of pregnant mice over the period of organogenesis. The above observations suggest that ethylene glycol is to be regarded as an animal teratogen. There is currently no available information to suggest that ethylene glycol has caused birth defects in humans. Cutaneous application of ethylene glycol is ineffective in producing developmental toxicity. Exposure to high aerosol concentrations is only minimally effective in producing developmental toxicity. Ingestion of large amounts of ethylene glycol has been shown to interfere with reproduction in animals. Specifically, growth retardation and decreased litter size in rats and mice and decreased mating frequency in mice were observed.

12. ECOLOGICAL INFORMATION

Ecotoxicological Information:

Ingredients	Ecotoxicity - Fish Species Data	Acute Crustaceans Toxicity:	Ecotoxicity - Freshwater Algae Data
Ethylene Glycol	LC50 96 h (Oncorhynchus mykiss) 41000 mg/L LC50 96 h (Oncorhynchus mykiss) 14-18 ml/L static LC50 96 h (Lepomis macrochirus) 27540 mg/L static LC50 96 h (Oncorhynchus mykiss) 40761 mg/L static LC50 96 h (Pimephales promelas) 40000-60000 mg/L static LC50 96 h (Poecilia reticulata) 16000 mg/L static LC50 96 h (Oncorhynchus mykiss) 41000 mg/L	Not Available.	EC50 96 h Pseudokirchneriella subcapitata 6500 - 13000 mg/L

Other Information:

Material is practically non-toxic to aquatic organisms. **MOVEMENT & PARTITIONING:** Bioconcentration potential is low (BCF less than 100 or Log Pow less than 3). Potential for mobility in soil is very high (Koc between 0 and 50). Henry's Law Constant (H) is estimated to be 8.05E-09 atm.m³/mole. Soil organic carbon/water partition coefficient (Koc) is estimated to be 1. Measured log octanol/water partition coefficient (log Pow) is -1.36. Material is readily biodegradable.

13. DISPOSAL CONSIDERATIONS

Disposal of Waste Method: Disposal of all wastes must be done in accordance with municipal, provincial and federal regulations. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste classification and disposal methods in compliance with applicable regulations.
Contaminated Packaging: Empty containers should be recycled or disposed of through an approved waste management facility.

14. TRANSPORT INFORMATION

DOT (U.S.):
DOT Shipping Name: Not Regulated.
DOT Hazardous Class: Not Applicable.
DOT UN Number: Not Applicable.
DOT Packing Group: Not Applicable.
DOT Reportable Quantity (lbs): Not Available.
Note: No additional remark.
Marine Pollutant: No.

TDG (Canada):
TDG Shipping Name: Not Regulated.
Hazard Class: Not Applicable.
UN Number: Not Applicable.
Packing Group: Not Applicable.
Note: No additional remark.
Marine Pollutant: No.

15. REGULATORY INFORMATION

U.S. TSCA Inventory Status: All components of this product are either on the Toxic Substances Control Act (TSCA) Inventory List or exempt.

Canadian DSL Inventory Status: All components of this product are either on the Domestic Substances List (DSL), the Non-Domestic Substances List (NDSL) or exempt.

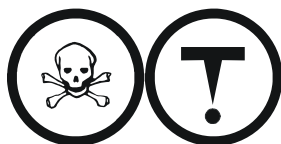
Note: Not available.

U.S. Regulatory Rules

Ingredients	CERCLA/SARA - Section 302:	SARA (311, 312) Hazard Class:	CERCLA/SARA - Section 313:
Ethylene Glycol	Not Listed.	Listed	Listed

California Proposition 65: Not Listed.
MA Right to Know List: Listed.
New Jersey Right-to-Know List: Listed.
Pennsylvania Right to Know List: Listed.

WHMIS Hazardous Class:
D1B TOXIC MATERIALS
D2A VERY TOXIC MATERIALS



16. OTHER INFORMATION

Additional Information:

This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

Disclaimer:

NOTICE TO READER:

Univar, expressly disclaims all express or implied warranties of merchantability and fitness for a particular purpose, with respect to the product or information provided herein, and shall under no circumstances be liable for incidental or consequential damages.

Do not use ingredient information and/or ingredient percentages in this MSDS as a product specification. For product specification information refer to a Product Specification Sheet and/or a Certificate of Analysis. These can be obtained from your local Univar Sales Office.

All information appearing herein is based upon data obtained from the manufacturer and/or recognized technical sources. While the information is believed to be accurate, Univar makes no representations as to its accuracy or sufficiency. Conditions of use are beyond Univar's control and therefore users are responsible to verify this data under their own operating conditions to determine whether the product is suitable for their particular purposes and they assume all risks of their use, handling, and disposal of the product, or from the publication or use of, or reliance upon, information contained herein. This information relates only to the product designated herein, and does not relate to its use in combination with any other material or in any other process.

*****END OF MSDS*****

ITW Permatex
 10 Columbus Blvd.
 Hartford, CT 06106 USA
 Telephone: 1-87-Permatex
 (877) 376-2839
 Emergency: 800-255-3924 (ChemTel)
 International Emergency: +01-813-248-0585

Material Safety Data Sheet

1. PRODUCT IDENTIFICATION

Product Name: FAST ORANGE SMOOTH CREAM HAND CLEANER 14 OZ
Item No: 33013
Product Type: Waterless hand cleaner

2. COMPOSITION/INFORMATION ON INGREDIENTS

Component	Weight%	ACGIH; TLV-TWA	OSHA PEL
WATER 7732-18-5	>75	Not listed	Not listed
ETHOXYLATED C11-C16 ALCOHOL 127036-24-2	<5	Not listed	Not listed
CASTOR OIL 8001-79-4	<5	Not listed	Not listed
POLYMER EMULSION (PROPRIETARY)	<5	Not listed	Not listed
PROPYLENE GLYCOL 57-55-6	<2	Not listed	Not listed
TRIETHANOLAMINE 102-71-6	<2	5 mg/m ³	Not listed
D-LIMONENE 5989-27-5	0.1-1.0	Not listed	Not listed

3. HAZARDS IDENTIFICATION

Toxicity: May irritate the eyes. May cause skin sensitization.
Primary Routes of Entry: Eye and skin contact, ingestion, inhalation
Signs and Symptoms of Exposure: None under normal conditions of use.

Component	Weight%	NTP	ACGIH Carcinogens	IARC Carcinogen
TRIETHANOLAMINE 102-71-6	<2	male rat-equivocal evidence; female rat-no evidence; male mice-inadequate; female mice-inadequate		Group 3; Monograph 77, 2000
D-LIMONENE 5989-27-5	0.1-1.0	male rat-clear evidence; female rat-no evidence; male mice-no evidence; female mice-no evidence		Group 3 Monograph 73, 1999

Aggravated Medical Condition: None known.

4. FIRST AID MEASURES

Ingestion: If swallowed, DO NOT induce vomiting. Keep individual calm. Obtain medical attention.
Inhalation: Immediate medical attention is not required.
Skin Contact: Flush with water
Eye Contact: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.

5. FIRE FIGHTING MEASURES

Flash Point °F(C°): >200°F CC
Recommended Extinguishing Media: Carbon dioxide, Water, dry chemical

5. FIRE FIGHTING MEASURES

Special Fire-Fighting Procedures: No special procedures.
Hazardous Products of Combustion: None anticipated
Unusual Fire/Explosion Hazards: None.

Lower Explosive Limit: n/d
Upper Explosive Limit: n/d

6. ACCIDENTAL RELEASE MEASURES

Spill Procedures: Rinse away with water or wipe up with a towel.

7. HANDLING AND STORAGE

Storage: Hand cleaner should be stored at temperatures between 40 degrees F. and 100 degrees F. Do not allow freezing.
Handling: Follow all general safety precautions.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Eyes: Not required.
Skin: Not required.
Ventilation: Not required under normal use.
Respiratory Protection: Not required under normal use.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: White cream
Odor: Orange
Boiling Point: >200°F / >93°C
pH: 6.0-8.5
Solubility in Water: Soluble
Specific Gravity: 0.977
VOC(Wt.%): <1%
Vapor Pressure: n/d
Vapor Density (Air=1): >1
Evaporation Rate: <1 (butyl acetate = 1)

10. STABILITY AND REACTIVITY

Chemical Stability: Stable at normal conditions
Hazardous Polymerization: Will not occur
Incompatibilities: None known
Conditions to Avoid: Freezing.
Hazardous Products of Combustion: None anticipated

11. TOXICOLOGICAL INFORMATION

See Section 3

12. ECOLOGICAL INFORMATION

No data available

13. DISPOSAL CONSIDERATIONS

Recommended Method of Disposal: Dispose of uncontaminated material through sewer system with permission of the authority responsible for that system.
US EPA Waste Number: NH - Not a RCRA Hazardous Waste Material

14. TRANSPORTATION INFORMATION

DOT (49CFR 172)
U.S. Department of Transportation - DOT - 49 CFR (Ground)
DOT Shipping Name: Not regulated
Hazard Class: None
UN/ID Number: None
IATA (Air)

Product Name: FAST ORANGE SMOOTH CREAM HAND
CLEANER 14 OZ

Item No. 33013

14. TRANSPORTATION INFORMATION

Proper Shipping Name: Not regulated
Class or Division: None
UN/ID Number: None

IMDG (Vessel)

Proper Shipping Name: Not regulated
Hazard Class: None
UN Number: None

Marine Pollutant: None

15. REGULATORY INFORMATION

SARA 313 Chemicals: The following component(s) is listed as a SARA Section 313 Toxic Chemical.

None

California Proposition 65: No California Prop 65 chemicals are known to be present.

TSCA Inventory Status: All components of this product are listed (or exempt) on the EPA TSCA inventory.

16. OTHER INFORMATION

Estimated NFPA Rating: HEALTH 1, FLAMMABILITY 1, REACTIVITY 0.
Estimated HMIS Classification: HEALTH 1, FLAMMABILITY 1, PHYSICAL HAZARD 0
(NFPA is a registered trademark of the National Fire Protection Association)
HMIS is a registered trademark of the National Paint and Coatings Association

Prepared By: Denise Boyd, Manager-Environmental, Health & Safety
Company: ITW Permatex 10 Columbus Blvd. Hartford, CT USA 06106
Telephone No.: 1-87-Permatex (877) 376-2839

Revision Date: June 08, 2012
Revision Number: 1



Date:	7/1/2013	MSDS No.:	CAN-M205
Trade Name:	Fleetweld 5P		
Sizes:	All		
Supersedes:	7/1/2010		

MATERIAL SAFETY DATA SHEET

For Welding Consumables and Related Products

Conforms to Workplace Hazardous Materials Information System (WHMIS) Rev. November, 1988

Section I & II - Preparation and Product Information

The Lincoln Electric Company of Canada LP
 179 Wicksteed Avenue
 Toronto, Ontario M4G 2B9 CANADA
 Phone: (416) 421-2600

Product Type:	Covered Electrode
Representative Classifications:	AWS E6010 CSA E4310

Prepared by The Lincoln Electric Company, Cleveland, Ohio, USA
 (216) 481-8100, on the date shown above.

Section III - Hazardous Ingredients (1)

IMPORTANT!

This section covers the materials from which this product is manufactured. The fumes and gases produced during welding with the normal use of this product are covered by Section VII; see it for industrial hygiene information.

CAS Number shown is representative for the ingredients listed. All ingredients listed may not be present in all sizes.

(1) The term "hazardous" in "Hazardous Ingredients" should be interpreted as a term required and defined in the Hazardous Products Act and does not necessarily imply the existence of any hazard.

Ingredients:	CAS No.	Wt. %	TLV mg/m ³	LD ₅₀ (Route/Species)	LC ₅₀ mg/m ³ (Route/Species)
Cellulose and other carbohydrates	65996-61-4	5-10	10*	Not Available	Not Available
Silicates and other binders	1344-09-8	1-5	10*	1153 mg/kg (oral/rat)	Not Available
Titanium dioxides	13463-67-7	1-5	10	Not Available	Not Available
Iron	7439-89-6	1-5	10*	Not Available	Not Available
Manganese and/or manganese alloys and compounds (as Mn)	7439-96-5	1-5	0.02	9 g/kg (oral/rat)	2.3 LCLo (inhalation/human)
Magnesite	1309-48-4	0.1-1	10*	Not Available	Not Available
Mineral silicates	1332-58-7	0.1-1	5**	590 g/kg LDLo (oral/rat) reproductive	Not Available
Iron oxides	65996-74-9	0.1-1	5	Not Available	Not Available
Limestone and/or calcium carbonate	1317-65-3	0.1-1	10*	Not Available	Not Available
Graphite	7782-42-5	0.1-1	2.0	Not Available	Not Available
Quartz	14808-60-7	0.1-1	#0.025**	200 mg/kg LDLo (intra-tracheal/rat)	300 LCLo (inhalation/human)
Carbon steel core wire	7439-89-6	60-100	10*	Not Available	Not Available

Notes:

(*) Not listed. The ACGIH guideline for total particulate is 10 milligrams per cubic meter. TLV value for iron oxide is 5 milligrams per cubic meter.

(**) As respirable dust.

(LDLo, LCLo) Lowest published toxic concentration.
 (#) Crystalline silica (quartz) is on the IARC (International Agency for Research on Cancer) and NTP (National Toxicology Program) lists as posing a carcinogenic risk to humans.

Section IV - Physical Data

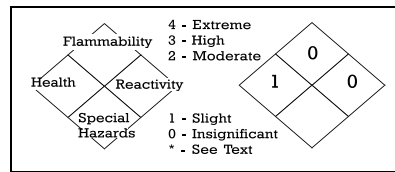
Physical data such as odor, vapor pressure, density, evaporation rate and freezing or boiling points are not listed as they are not applicable to this product and its use.

Section V - Hazard Data

Non Flammable; Welding arc and sparks can ignite combustibles and flammable products. See CSA W117.2 Section 9.7 as referenced in Section VIII. Product is inert, no special handling or spill procedures required.

Product: Fleetweld 5P

Date: 7/1/2013



Section VI - Health Hazard Data and Toxicological Properties

Acute Lethality Values: LC₅₀ means the concentration of a substance in air that when administered by means of inhalation over a specified length of time in an animal assay, is expected to cause the death of 50% of a defined animal population.

LD₅₀ means the single dose of a substance that, when administered by a defined route in an animal assay, is expected to cause the death of 50% of a defined animal population.

Threshold Limit Value: The ACGIH recommended general limit for Welding Fume NOS - (Not Otherwise Specified) is 5 mg/m³. The TLV-TWA is the time-weighted average concentration for a normal 8-hour workday and a 40 hour workweek, to which nearly all workers may be repeatedly exposed, day after day, without adverse effect. See Section VII for specific fume constituents which may modify this TLV. Threshold Limit Values are figures published by the American Conference of Government Industrial Hygienists.

Effects of Overexposure: Electric arc welding may create one or more of the following health hazards:

Fumes and Gases can be dangerous to your health. Common entry is by inhalation. Other possible routes are skin contact and ingestion.

Short-term (acute) overexposure to welding fumes may result in discomfort such as metal fume fever, dizziness, nausea, or dryness or irritation of nose, throat, or eyes. May aggravate pre-existing respiratory problems (e.g. asthma, emphysema).

Long-term (chronic) overexposure to welding fumes can lead to siderosis (iron deposits in lung) and may affect pulmonary function. Manganese overexposure can affect the central nervous system, resulting in impaired speech and movement. Bronchitis and some lung fibrosis have been reported. Respiratory exposure to the crystalline silica present in this welding electrode is not anticipated during normal use. Respiratory overexposure to airborne crystalline silica is known to cause silicosis, a form of disabling pulmonary fibrosis which can be progressive and may lead to death. Crystalline silica is on the IARC (International Agency for Research on Cancer) and NTP (National Toxicology Program) lists as posing a cancer risk to humans. Titanium dioxide is listed by the IARC (International Agency for Research on Cancer) as a Group 2B carcinogen (possibly carcinogenic to humans based on animal studies).

Arc Rays can injure eyes and burn skin. *Skin cancer has been reported.*

Electric Shock can kill. If welding must be performed in damp locations or with wet clothing, on metal structures or when in cramped positions such as sitting, kneeling or lying, or if there is a high risk of unavoidable or accidental contact with workpiece, use the following equipment: Semiautomatic DC Welder, DC Manual (Stick) Welder, or AC Welder with Reduced Voltage Control.

Section VII - Reactivity Data

Hazardous Decomposition Products: Welding fumes and gases cannot be classified simply. The composition and quantity of both are dependent upon the metal being welded, the process, procedure and electrodes used.

Other conditions which also influence the composition and quantity of the fumes and gases to which workers may be exposed include: coatings on the metal being welded (such as paint, plating, or galvanizing), the number of welders and the volume of the worker area, the quality and amount of ventilation, the position of the welder's head with respect to the fume plume, as well as the presence of contaminants in the atmosphere (such as chlorinated hydrocarbon vapors from cleaning and degreasing activities.)

When the electrode is consumed, the fume and gas decomposition products generated are different in percent and form from the ingredients listed in Section III. Decomposition products of normal operation include those originating from the volatilization, reaction, or oxidation of the materials shown in Section III, plus those from the base metal and coating, etc., as noted above.

Reasonably expected fume constituents of this product would include: Primarily iron oxide; secondarily complex oxides of manganese, silicon and sodium.

Maximum fume exposure guideline for this product (based on manganese content) is 0.4 milligrams per cubic meter.

Gaseous reaction products may include carbon monoxide and carbon dioxide. Ozone and nitrogen oxides may be formed by the radiation from the arc.

Determine the composition and quantity of fumes and gases to which workers are exposed by taking an air sample from inside the welder's helmet if worn or in the worker's breathing zone. Improve ventilation if exposures are not below limits. See ANSI/AWS F1.1, F1.2, F1.3 and F1.5, available from the American Welding Society, 550 N.W. LeJeune Road, Miami, FL 33126.

Section VIII - Preventive Measures and Precautions for Safe Handling and Use

Read and understand the manufacturer's instruction and the precautionary label on the product. Request Lincoln Safety Publication E205. See Canadian Standards Association Standard CSA-W117.2 "Safety in Welding, Cutting, and Allied Processes" published by the Canadian Standards Association, 178 Rexdale Blvd., Rexdale, Ontario M9W1R3 for more details on many of the following:

Ventilation: Use enough ventilation, local exhaust at the arc, or both to keep the fumes and gases from the worker's breathing zone and the general area.

Train the welder to keep his head out of the fumes. *Keep exposure as low as possible.*

Respiratory Protection: Use respirable fume respirator or air supplied respirator when welding in confined space or general work area when local exhaust or ventilation does not keep exposure below TLV.

Eye Protection: Wear helmet or use face shield with filter lens shade number 12 or darker. Shield others by providing screens and flash goggles.

Protective Clothing: Wear hand, head, and body protection which help to prevent injury from radiation, sparks and electrical shock. See W117.2.

At a minimum this includes welder's gloves and a protective face shield, and may include arm protectors, aprons, hats, shoulder protection, as well as dark substantial clothing. Train the welder not to permit electrically live parts or electrodes to contact skin . . . or clothing or gloves if they are wet. Insulate from work and ground.

Disposal Information: Discard any product, residue, disposable container, or liner as ordinary waste in an environmentally acceptable manner according to Federal, State and Local regulations unless otherwise noted. No applicable ecological information available.

Section IX - Emergency and First Aid Procedures

Call for medical aid. Employ first aid techniques recommended by the Canadian Red Cross. IF BREATHING IS DIFFICULT give oxygen. IF NOT BREATHING employ CPR (Cardiopulmonary Resuscitation) techniques. IN CASE OF ELECTRICAL SHOCK, turn off power and follow recommended treatment. In all cases call a physician.



Date:	2/15/2014	MSDS No.:	CAN-M210
Trade Name:	Fleetweld 5P+		
Sizes:	All		
Supersedes:	2/15/2011		

MATERIAL SAFETY DATA SHEET

For Welding Consumables and Related Products

Conforms to Workplace Hazardous Materials Information System (WHMIS) Rev. November, 1988

Section I & II - Preparation and Product Information

The Lincoln Electric Company of Canada LP
 179 Wicksteed Avenue
 Toronto, Ontario M4G 2B9 CANADA
 Phone: (416) 421-2600

Product Type: Representative Classifications:	Covered Electrode AWS E6010, CSA E4310
Prepared by The Lincoln Electric Company, Cleveland, Ohio, USA (216) 481-8100, on the date shown above.	

Section III - Hazardous Ingredients (1)

IMPORTANT!

This section covers the materials from which this product is manufactured. The fumes and gases produced during welding with the normal use of this product are covered by Section VII; see it for industrial hygiene information.

CAS Number shown is representative for the ingredients listed. All ingredients listed may not be present in all sizes.

(1) The term "hazardous" in "Hazardous Ingredients" should be interpreted as a term required and defined in the Hazardous Products Act and does not necessarily imply the existence of any hazard.

Ingredients:	CAS No.	Wt. %	TLV mg/m ³	LD ₅₀ (Route/Species)	LC ₅₀ mg/m ³ (Route/Species)
Cellulose and other carbohydrates	65996-61-4	5-10	10*	Not Available	Not Available
Silicates and other binders	1344-09-8	1-5	10*	1153 mg/kg (oral/rat)	Not Available
Titanium dioxides	13463-67-7	1-5	10	Not Available	Not Available
Iron	7439-89-6	1-5	10*	Not Available	Not Available
Limestone and/or calcium carbonate	1317-65-3	1-5	10*	Not Available	Not Available
Manganese and/or manganese alloys and compounds (as Mn)	7439-96-5	1-5	0.02	9 g/kg (oral/rat)	2.3 LCLo (inhalation/human)
Iron oxides	65996-74-9	0.1-1	5	Not Available	Not Available
Quartz	14808-60-7	0.1-1	#0.025**	200 mg/kg LDLo (intratracheal/rat)	300 LCLo (inhalation/human)
Silicon and/or silicon alloys and compounds (as Si)	7440-21-3	0.1-1	10*	Not Available	Not Available
Carbon steel core wire	7439-89-6	60-100	10*	Not Available	Not Available

Notes:

(*) Not listed. The ACGIH guideline for total particulate is 10 milligrams per cubic meter. TLV value for iron oxide is 5 milligrams per cubic meter.

(**) As respirable dust.

(LDLo, LCLo) Lowest published toxic concentration.

(#) Crystalline silica (quartz) is on the IARC (International Agency for Research on Cancer) and NTP (National Toxicology Program) lists as posing a carcinogenic risk to humans.

Section IV - Physical Data

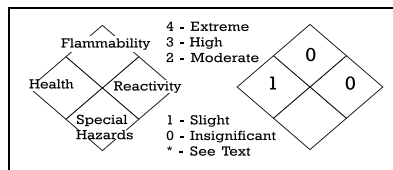
Physical data such as odor, vapor pressure, density, evaporation rate and freezing or boiling points are not listed as they are not applicable to this product and its use.

Section V - Hazard Data

Non Flammable; Welding arc and sparks can ignite combustibles and flammable products. See CSA W117.2 Section 9.7 as referenced in Section VIII. Product is inert, no special handling or spill procedures required.

Product: Fleetweld 5P+

Date: 2/15/2014



Section VI - Health Hazard Data and Toxicological Properties

Acute Lethality Values: LC₅₀ means the concentration of a substance in air that when administered by means of inhalation over a specified length of time in an animal assay, is expected to cause the death of 50% of a defined animal population.

LD₅₀ means the single dose of a substance that, when administered by a defined route in an animal assay, is expected to cause the death of 50% of a defined animal population.

Threshold Limit Value: The ACGIH recommended general limit for Welding Fume NOS - (Not Otherwise Specified) is 5 mg/m³. The TLV-TWA is the time-weighted average concentration for a normal 8-hour workday and a 40 hour workweek, to which nearly all workers may be repeatedly exposed, day after day, without adverse effect. See Section VII for specific fume constituents which may modify this TLV. Threshold Limit Values are figures published by the American Conference of Government Industrial Hygienists.

Effects of Overexposure: Electric arc welding may create one or more of the following health hazards:

Fumes and Gases can be dangerous to your health. Common entry is by inhalation. Other possible routes are skin contact and ingestion.

Short-term (acute) overexposure to welding fumes may result in discomfort such as metal fume fever, dizziness, nausea, or dryness or irritation of nose, throat, or eyes. May aggravate pre-existing respiratory problems (e.g. asthma, emphysema).

Long-term (chronic) overexposure to welding fumes can lead to siderosis (iron deposits in lung) and may affect pulmonary function. Manganese overexposure can affect the central nervous system, resulting in impaired speech and movement. Bronchitis and some lung fibrosis have been reported. Respiratory exposure to the crystalline silica present in this welding electrode is not anticipated during normal use. Respiratory overexposure to airborne crystalline silica is known to cause silicosis, a form of disabling pulmonary fibrosis which can be progressive and may lead to death. Crystalline silica is on the IARC (International Agency for Research on Cancer) and NTP (National Toxicology Program) lists as posing a cancer risk to humans. Titanium dioxide is listed on the IARC (International Agency for Research on Cancer) as a Group 2B carcinogen (possibly carcinogenic to humans based on animal studies).

Arc Rays can injure eyes and burn skin. *Skin cancer has been reported.*

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Other conditions which also influence the composition and quantity of the fumes and gases to which workers may be exposed include: coatings on the metal being welded (such as paint, plating, or galvanizing), the number of welders and the volume of the worker area, the quality and amount of ventilation, the position of the welder's head with respect to the fume plume, as well as the presence of contaminants in the atmosphere (such as chlorinated hydrocarbon vapors from cleaning and degreasing activities.)

When the electrode is consumed, the fume and gas decomposition products generated are different in percent and form from the ingredients listed in Section III. Decomposition products of normal operation include those originating from the volatilization, reaction, or oxidation of the materials shown in Section III, plus those from the base metal and coating, etc., as noted above.

Reasonably expected fume constituents of this product would include: Primarily iron oxide; secondarily complex oxides of manganese, silicon, sodium and titanium.

Maximum fume exposure guideline for this product (based on manganese content) is 0.4 milligrams per cubic meter.

Gaseous reaction products may include carbon monoxide and carbon dioxide. Ozone and nitrogen oxides may be formed by the radiation from the arc.

Determine the composition and quantity of fumes and gases to which workers are exposed by taking an air sample from inside the welder's helmet if worn or in the worker's breathing zone. Improve ventilation if exposures are not below limits. See ANSI/AWS F1.1, F1.2, F1.3 and F1.5, available from the American Welding Society, 8669 Doral Blvd. Doral, FL 33166.

Section VIII - Preventive Measures and Precautions for Safe Handling and Use

Read and understand the manufacturer's instruction and the precautionary label on the product. Request Lincoln Safety Publication E205. See Canadian Standards Association Standard CSA-W117.2 "Safety in Welding, Cutting, and Allied Processes" published by the Canadian Standards Association, 178 Rexdale Blvd., Rexdale, Ontario M9W1R3 for more details on many of the following:

Ventilation: Use enough ventilation, local exhaust at the arc, or both to keep the fumes and gases from the worker's breathing zone and the general area. Train the welder to keep his head out of the fumes. *Keep exposure as low as possible.*

Respiratory Protection: Use respirable fume respirator or air supplied respirator when welding in confined space or general work area when local exhaust or ventilation does not keep exposure below TLV.

Eye Protection: Wear helmet or use face shield with filter lens shade number 12 or darker. Shield others by providing screens and flash goggles.

Protective Clothing: Wear hand, head, and body protection which help to prevent injury from radiation, sparks and electrical shock. See W117.2. At a minimum this includes welder's gloves and a protective face shield, and may include arm protectors, aprons, hats, shoulder protection, as well as dark substantial clothing. Train the welder not to permit electrically live parts or electrodes to contact skin . . . or clothing or gloves if they are wet. Insulate from work and ground.

Disposal Information: Discard any product, residue, disposable container, or liner as ordinary waste in an environmentally acceptable manner according to Federal, State and Local regulations unless otherwise noted. No applicable ecological information available.

Section IX - Emergency and First Aid Procedures

Call for medical aid. Employ first aid techniques recommended by the Canadian Red Cross. IF BREATHING IS DIFFICULT give oxygen. IF NOT BREATHING employ CPR (Cardiopulmonary Resuscitation) techniques. IN CASE OF ELECTRICAL SHOCK, turn off power and follow recommended treatment. In all cases call a physician.

**DuPont™ FREON® 22 Refrigerant**

Version 2.3

Revision Date 10/04/2011

Ref. 130000024323

This SDS adheres to the standards and regulatory requirements of the United States and may not meet the regulatory requirements in other countries.

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	DuPont™ FREON® 22 Refrigerant
Product Grade/Type	:	ASHRAE Refrigerant number designation: R-22
Tradename/Synonym	:	R-22 FREON® 22 CHLORODIFLUOROMETHANE HCFC-22 DYMEL® 22
MSDS Number	:	130000024323
Product Use	:	Refrigerant
Manufacturer	:	DuPont 1007 Market Street Wilmington, DE 19898
Product Information	:	1-800-441-7515 (outside the U.S. 1-302-774-1000)
Medical Emergency	:	1-800-441-3637 (outside the U.S. 1-302-774-1139)
Transport Emergency	:	CHEMTREC: 1-800-424-9300 (outside the U.S. 1-703-527-3887)

SECTION 2. HAZARDS IDENTIFICATION

Emergency Overview

Rapid evaporation of the liquid may cause frostbite.

Potential Health Effects

Skin

Chlorodifluoromet
hane (HCFC-22) : Contact with liquid or refrigerated gas can cause cold burns and frostbite.

Eyes

Chlorodifluoromet
hane (HCFC-22) : Contact with liquid or refrigerated gas can cause cold burns and frostbite.

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Inhalation

Chlorodifluoromethane (HCFC-22)

: Misuse or intentional inhalation abuse may cause death without warning symptoms, due to cardiac effects.

Other symptoms potentially related to misuse or inhalation abuse are: Anaesthetic effects, Light-headedness, dizziness, confusion, incoordination, drowsiness, or unconsciousness, irregular heartbeat with a strange sensation in the chest, heart thumping, apprehension, feeling of fainting, dizziness or weakness.

Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.

Carcinogenicity

None of the components present in this material at concentrations equal to or greater than 0.1% are listed by IARC, NTP, or OSHA, as a carcinogen.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS-No.	Concentration
Chlorodifluoromethane (HCFC-22)	75-45-6	100 %

SECTION 4. FIRST AID MEASURES

- Skin contact** : Take off all contaminated clothing immediately. Flush area with lukewarm water. Do not use hot water. If frostbite has occurred, call a physician.
- Eye contact** : In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Call a physician.
- Inhalation** : Remove from exposure, lie down. Move to fresh air. Keep patient warm and at rest. Artificial respiration and/or oxygen may be necessary. Call a physician.
- Ingestion** : Is not considered a potential route of exposure.
- General advice** : Never give anything by mouth to an unconscious person. When symptoms persist or in all cases of doubt seek medical advice.

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Notes to physician : Because of possible disturbances of cardiac rhythm, catecholamine drugs, such as epinephrine, that may be used in situations of emergency life support should be used with special caution.

SECTION 5. FIREFIGHTING MEASURES

Flammable Properties

Flash point : does not flash

Thermal decomposition : 632 °C (1,170 °F)

Fire and Explosion Hazard

: Cylinders are equipped with pressure and temperature relief devices, but may still rupture under fire conditions. Decomposition may occur. Contact of welding or soldering torch flame with high concentrations of refrigerant can result in visible changes in the size and colour of the torch flame. This flame effect will only occur in concentrations of product well above the recommended exposure limit. Therefore stop all work and ventilate to disperse refrigerant vapors from the work area before using any open flames. This substance is not flammable in air at temperatures up to 100 deg. C (212 deg. F) at atmospheric pressure. However, mixtures of this substance with high concentrations of air at elevated pressure and/or temperature can become combustible in the presence of an ignition source. This substance can also become combustible in an oxygen enriched environment (oxygen concentrations greater than that in air). Whether a mixture containing this substance and air, or this substance in an oxygen enriched atmosphere become combustible depends on the inter-relationship of 1) the temperature 2) the pressure, and 3) the proportion of oxygen in the mixture. In general, this substance should not be allowed to exist with air above atmospheric pressure or at high temperatures; or in an oxygen enriched environment. For example this substance should NOT be mixed with air under pressure for leak testing or other purposes. Experimental data have also been reported which indicate combustibility of this substance in the presence of certain concentrations of chlorine.

Suitable extinguishing media : As appropriate for combustibles in area. Extinguishant for other burning material in area is sufficient to stop burning.



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Firefighting Instructions : In the event of fire, wear self-contained breathing apparatus. Wear neoprene gloves during cleaning up work after a fire. Self-contained breathing apparatus (SCBA) is required if containers rupture and contents are released under fire conditions. Cool containers / tanks with water spray. Water runoff should be contained and neutralized prior to release.

SECTION 6. ACCIDENTAL RELEASE MEASURES

NOTE: Review FIRE FIGHTING MEASURES and HANDLING (PERSONNEL) sections before proceeding with clean-up. Use appropriate PERSONAL PROTECTIVE EQUIPMENT during clean-up.

Safeguards (Personnel) : Evacuate personnel to safe areas. Ventilate the area. Refer to protective measures listed in sections 7 and 8.

Spill Cleanup : Evaporates.

Accidental Release Measures : Should not be released into the environment. Ventilate area, especially low or enclosed places where heavy vapours might collect. Avoid open flames and high temperatures. Self-contained breathing apparatus (SCBA) is required if a large release occurs.

SECTION 7. HANDLING AND STORAGE

Handling (Personnel) : Avoid breathing vapours or mist. Avoid contact with skin, eyes and clothing. Provide sufficient air exchange and/or exhaust in work rooms. For personal protection see section 8. The product should not be mixed with air for leak testing or used with air for any other purpose above atmospheric pressure. Contact with chlorine or other strong oxidizing agents should also be avoided. Handle in accordance with good industrial hygiene and safety practice.

Handling (Physical Aspects) : No special protective measures against fire required.

Storage : Valve protection caps and valve outlet threaded plugs must remain in place unless container is secured with valve outlet piped to use point. Do not drag, slide or roll cylinders. Use a suitable hand truck for cylinder movement. Use a pressure reducing regulator when connecting cylinder to lower pressure



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(>3000 psig) piping or systems. Never attempt to lift cylinder by its cap. Use a check valve or trap in the discharge line to prevent hazardous back flow into the cylinder. Cylinders should be stored upright and firmly secured to prevent falling or being knocked over.

Separate full containers from empty containers. Keep at temperature not exceeding 52°C. Do not store near combustible materials. Avoid area where salt or other corrosive materials are present.

Storage temperature : < 52 °C (< 126 °F)

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering controls : Ensure adequate ventilation, especially in confined areas. Local exhaust should be used when large amounts are released. Mechanical ventilation should be used in low or enclosed places.

Personal protective equipment
Respiratory protection : Under normal manufacturing conditions, no respiratory protection is required when using this product. For rescue and maintenance work in storage tanks use self-contained breathing apparatus.

Hand protection : Additional protection: Impervious gloves

Eye protection : Safety glasses with side-shields Additionally wear a face shield where the possibility exists for face contact due to splashing, spraying or airborne contact with this material.

Protective measures : Self-contained breathing apparatus (SCBA) is required if a large release occurs.

Exposure Guidelines
Exposure Limit Values

Chlorodifluoromethane			
TLV	(ACGIH)	1,000 ppm	TWA

* AEL is DuPont's Acceptable Exposure Limit. Where governmentally imposed occupational exposure limits which are lower than the AEL are in effect, such limits shall take precedence.

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SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Form	: Liquefied gas
Color	: clear
Odor	: slight, ether-like
pH	: neutral
Boiling point	: -40.8 °C (-41.4 °F)
% Volatile	: 100 %
Vapour Pressure	: 10,439.0 hPa at 25 °C (77 °F)
Density	: 1.194 g/cm ³ at 25 °C (77 °F)
Water solubility	: 2.6 g/l at 25 °C (77 °F)
Vapour density	: 3.0 at 25°C (77°F) and 1013 hPa (Air=1.0)
Evaporation rate	: > 1 (CCL4=1.0)

SECTION 10. STABILITY AND REACTIVITY

Stability	: Stable under recommended storage conditions.
Conditions to avoid	: The product is not flammable in air under ambient conditions of temperature and pressure. When pressurised with air or oxygen, the mixture may become flammable. Certain mixtures of HCFCs or HFCs with chlorine may become flammable or reactive under certain conditions. Avoid open flames and high temperatures.
Incompatibility	: Alkali metals Alkaline earth metals, Powdered metals, Powdered metal salts
Hazardous decomposition products	: Decomposition products are hazardous., This material can be decomposed by high temperatures (open flames, glowing metal surfaces, etc.) forming hydrochloric and hydrofluoric acids, and possibly carbonyl halides., These materials are toxic and irritating., Avoid contact with decomposition products
Hazardous reactions	: Polymerization will not occur. Other burning materials may cause HCFC 22 to burn weakly. Chlorodifluoromethane is not flammable at ambient temperatures and atmospheric pressure. However, chlorodifluoromethane has been shown in tests to be combustible at pressures as low as 60 psig at ambient temperature when mixed with air at concentrations of 65 volume % air. Experimental data have also been reported which indicate combustibility of

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HCFC 22 in the presence of certain concentrations of chlorine.

SECTION 11. TOXICOLOGICAL INFORMATION

Chlorodifluoromethane (HCFC-22)

- | | | |
|------------------------|---|--|
| Dermal | : | not applicable |
| Oral | : | not applicable |
| Inhalation 4 h LC50 | : | 220000 ppm , rat |
| Inhalation | : | dog
Cardiac sensitization |
| Skin irritation | : | No skin irritation, rabbit
Not expected to cause skin irritation based on expert review of the properties of the substance. |
| Eye irritation | : | No eye irritation, rabbit
Not expected to cause eye irritation based on expert review of the properties of the substance. |
| Skin sensitization | : | Did not cause sensitization on laboratory animals., guinea pig
Not expected to cause sensitization based on expert review of the properties of the substance. |
| Repeated dose toxicity | : | Inhalation
mouse

No toxicologically significant effects were found. |
| Carcinogenicity | : | An increased incidence of tumours was observed in some laboratory animals but not in others.
Overall weight of evidence indicates that the substance is not carcinogenic. |
| Mutagenicity | : | Did not cause genetic damage in animals.
Did not cause genetic damage in cultured mammalian cells.
Experiments showed mutagenic effects in cultured bacterial cells. |



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- Reproductive toxicity : Evidence suggests the substance is not a reproductive toxin in animals.
- Teratogenicity : Animal testing showed effects on embryo-fetal development at levels equal to or above those causing maternal toxicity.
- Further information : Cardiac sensitisation threshold limit : 175000 mg/m3

SECTION 12. ECOLOGICAL INFORMATION

Aquatic Toxicity
Chlorodifluoromethane (HCFC-22)

- 96 h LC50 : Zebra fish 777 mg/l
- 96 h EC50 : Algae 250 mg/l
- 48 h EC50 : Daphnia magna (Water flea) 433 mg/l

Environmental Fate
DuPont™ FREON® 22 Refrigerant

- Biodegradability : According to the results of tests of biodegradability this product is not readily biodegradable.

SECTION 13. DISPOSAL CONSIDERATIONS

- Waste Disposal : Can be used after re-conditioning. Recover, reclaim by distillation, or remove to a permitted waste disposal facility. Comply with applicable Federal, State/Provincial and Local Regulations.
- Environmental Hazards : Empty pressure vessels should be returned to the supplier.

SECTION 14. TRANSPORT INFORMATION

DOT UN number : 1018

Material Safety Data Sheet



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Revision Date 10/04/2011

Ref. 130000024323

IATA_C
Proper shipping name : Chlorodifluoromethane
Class : 2.2
Labelling No. : 2.2
UN number : 1018

IMDG
Proper shipping name : Chlorodifluoromethane
Class : 2.2
Labelling No. : 2.2
UN number : 1018
Proper shipping name : Chlorodifluoromethane
Class : 2.2
Labelling No. : 2.2

SECTION 15. REGULATORY INFORMATION

SARA 313 Regulated Chemical(s) : Chlorodifluoromethane

California Prop. 65 : Chemicals known to the State of California to cause cancer, birth defects or any other harm: none known

PA Right to Know Regulated Chemical(s) : Substances on the Pennsylvania Hazardous Substances List present at a concentration of 1% or more (0.01% for Special Hazardous Substances): Chlorodifluoromethane

NJ Right to Know Regulated Chemical(s) : Substances on the New Jersey Workplace Hazardous Substance List present at a concentration of 1% or more (0.1% for substances identified as carcinogens, mutagens or teratogens): Chlorodifluoromethane

SECTION 16. OTHER INFORMATION

HMIS

Health : 1
Flammability : 0



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Reactivity/Physical hazard : 1
PPE : Personal Protection rating to be
supplied by user depending on use
conditions.

FREON is a registered trademark of E. I. duPont de Nemours & Company, Inc.
Before use read DuPont's safety information.
For further information contact the local DuPont office or DuPont's nominated distributors.

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

Significant change from previous version is denoted with a double bar.



3245 Fayette Avenue
Birmingham, Alabama 35208
205-787-2611

To Our Valued Customers:

The following documents are the Material Safety Data Sheets (MSDS's) of our various product lines for your reference. They have been prepared with information from our suppliers to comply with the Federal Hazard Communication Standard, 29 CFR 1910.1200. The MSDS contains important safety, health and regulatory information that is important to you, your employees and customers who are exposed to these materials.

In addition, some of the components may be subject to the reporting requirements of Section 313, Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA), 40 CFR Part 372, as well as to the Comprehensive Environmental Response, Conservation and Liability Act of 1980 (CERCLA), 40 CFR Part 302. If you are unsure as to your reporting requirements, or need more information, call the USEPA SARA Hotline: (800) 424-9346, or the Emergency Planning and Community Right-to-Know Act Hotline: (800) 535-0202.

The MSDS is supplied to provide safety, health and environmental information only and must not be used for material specifications.

Please contact your sales person or call us directly if you require further assistance.

Sincerely,

AMICO

IMPORTANT
Liability Disclaimer

The information contained in the referenced Material Safety Data Sheet (MSDS) is believed to be correct as it was obtained from sources we believe are reliable. However, no representations, guarantees or warranties of any kind are made as to its accuracy, suitability for particular applications, hazards connected with the use of the material, variations in methods, conditions and equipment used to store, handle, or process the material and hazards connected with the use of the material are solely the responsibility of the user and remain at his/her sole discretion.

Compliance with all applicable federal, state, and local laws and regulations remains the responsibility of the user, and the user has the responsibility to provide a safe work place to examine all aspects of its operation and to determine if or where precautions, in addition to those described herein, are required.

MATERIAL SAFETY DATA SHEET



A GIBRALTAR INDUSTRIES COMPANY

3245 Fayette Avenue • Birmingham, AL 35208

Creation Date: 09/01/85

Revision Date: 07/31/13

SECTION I. MATERIAL IDENTIFICATION

Chemical Name: Galvanized (Hot Dipped) Sheet - Carbon Steel;

Products: Galvanized Lath
TiLath

Emergency Phone Number: CHEMTREC® (800) 424-9300

SECTION II. COMPOSITION/INFORMATION ON INGREDIENTS

Ingredient Name	CAS Number	Percentage by wt.	OSHA PEL ¹	ACGIH TLV ^{1a}
Base Metal				
Iron	7439-89-6	>90.0	10 mg/m ³ - Iron oxide fume	5 mg/m ³ - Iron oxide dust and fume
Alloying Elements				
Calcium	7440-70-2	0.10 max.	5 mg/m ³ - Calcium oxide	2 mg/m ³ - Calcium oxide
Carbon	7440-44-0	0.60 max.	15 mg/m ³ - Total dust (PNOR) ² 5 mg/m ³ - Respirable fraction (PNOR)	10 mg/m ³ - Inhalable fraction ^{2a} (PNOS) ³ 3 mg/m ³ - Respirable fraction ^{3a} (PNOS)
Copper	7440-50-8	0.50 max.	0.1 mg/m ³ - Fume (as Cu) 1 mg/m ³ - Dusts & mists (as Cu)	0.2 mg/m ³ - Fume 1 mg/m ³ - Dusts & mists (as Cu)
Manganese	7439-96-5	1.50 max.	5 mg/m ³ (C) - Fume & Mn compounds	0.2 mg/m ³
Phosphorus	8049-19-2	0.15 max.	15 mg/m ³ - Total dust (PNOR) 5 mg/m ³ - Respirable fraction (PNOR)	10 mg/m ³ - Inhalable fraction (PNOS) 3 mg/m ³ - Respirable fraction (PNOS)
Silicon	7440-21-3	0.60 max.	15 mg/m ³ - Total dust 5 mg/m ³ - Respirable fraction	10 mg/m ³
Sulfur	7704-34-9	0.04 max.	15 mg/m ³ - Total dust (PNOR) 5 mg/m ³ - Respirable fraction (PNOR)	10 mg/m ³ - Inhalable fraction (PNOS) 3 mg/m ³ - Respirable fraction (PNOS)
Metallic Coating *				
Aluminum	7429-90-5	0.055 max.	15 mg/m ³ - Total dust 5 mg/m ³ - Respirable fraction	10 mg/m ³ - Metal dust 5 mg/m ³ - Welding fume
Antimony	7440-36-0	0.011 max.	0.5 mg/m ³	0.5 mg/m ³
Iron	7439-89-6	0.8 max.	10 mg/m ³ - Iron oxide fume	5 mg/m ³ - Iron oxide dust and fume
Lead	7439-92-1	0.004 max.	0.05 mg/m ³ ³ⁿ	0.05 mg/m ³
Zinc	7440-66-6	0.15 - 9.1	5 mg/m ³ - Fume 15 mg/m ³ - Total dust 5 mg/m ³ - Respirable fraction	5 mg/m ³ - Fume 10 mg/m ³ - Fume (STEL) 10 mg/m ³ - Dust

Notes:

- *Percent weight of metallic coating is a percent of the total product.
- Galvanized sheet surfaces may be chemically treated, generally at the customer's specification, with trace amounts of chromate solution (approximately 1 to 2 mg/ft² per side or <0.002% of total product weight) to prevent humid storage stain, and/or phosphate solutions (<300 mg/ft² or <0.3%) to enhance paint adherence and formability. Surface may also be treated with small amounts (<0.05%) of corrosion-inhibiting oil.
- All commercial steel products may contain small amounts of various elements in addition to those specified. These small quantities (less than 0.1%) may exist as intentional additions, or as "trace" or "residual" elements that generally originate in the raw materials used. These elements may include: aluminum, antimony, arsenic, boron, cadmium, calcium, chromium, cobalt, columbium, copper, lead, molybdenum, nickel, silicon, tin, titanium, vanadium, and zirconium

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¹ OSHA Permissible Exposure Limits (PELs) are 8-hour TWA (time-weighted average) concentrations unless otherwise noted. A ("C") design-

Exposure Limit (STEL) is defined as a 15-minute exposure, which should not be exceeded at any time during a workday.

^{1a} Threshold Limit Values (TLV) established by the American Conference of Governmental Industrial Hygienists (ACGIH) are 8-hour TWA concentrations unless otherwise noted.

² PNOR (Particulates Not Otherwise Regulated). All inert or nuisance dusts, whether mineral, inorganic, or organic, not listed specifically by

substance name are covered by the PNOR limit which is the same as the inert or nuisance dust limit of 15 mg/m³ for total dust and 5 mg/m³ for the respirable fraction.

- ^{2a} Inhalable fraction. The concentration of inhalable particulate for the application of this TLV is to be determined from the fraction passing a size-selector with the characteristics defined in the ACGIH TLVs and BEIs Appendix D, paragraph A.
- ³ PNOS (Particulates Not Otherwise Specified). Particulates identified under the PNOS heading are "nuisance dusts" containing no asbestos and <1% crystalline silica. A TWA-TLV of 10 mg/m³ for inhalable particulate and 3 mg/m³ for respirable particulate has been recommended.
- ^{3a} Respirable fraction. The concentration of respirable dust for the application of this limit is to be determined from the fraction passing a size-selector with the characteristics defined in the ACGIH TLVs and BEIs Appendix D, paragraph C.
- ³ⁿ The 8-hour PEL is 50 ug/m³. If an employee is exposed to lead for more than 8-hours in any work day, the PEL, as a TWA for that day, shall be reduced according to the following formula: Maximum permissible limit (in ug/m³) = 400 divided by hours worked in that day. The Action Level is 30 ug/m³ averaged over an 8-hour period.

SECTION III. HAZARDS IDENTIFICATION

ΔΔΔΔΔ Emergency Overview ΔΔΔΔΔ

This formed solid metal product poses little or no immediate health or fire hazard. When product is subjected to welding, burning, melting, sawing, brazing, grinding, or other similar processes, potentially hazardous airborne particulate and fumes may be generated. Avoid inhalation of metal dusts and fumes. Operations having the potential to generate airborne particulates should be performed in well ventilated areas and, if appropriate, respiratory protection and other personal protective equipment should be used. Iron or steel foreign bodies imbedded in the cornea of the eye may produce rust stains unless removed fairly promptly.

Potential Health Effects

Primary Entry Routes: Inhalation and skin, if coated. Steel products in the natural state do not present an inhalation, ingestion or contact hazard. However, operations such as burning, welding, sawing, brazing, machining and grinding may result in the following effects if exposures exceed recommended limits as listed in Section 2.

Target Organs: Respiratory system.

Acute Effects:

- **Inhalation:** Excessive exposure to high concentrations of dust may cause irritation to the eyes, skin and mucous membranes of the upper respiratory tract. Excessive inhalation of fumes of freshly formed metal oxide particles sized below 1.5 microns and usually between 0.02 - 0.05 microns from many metals can produce an acute reaction known as "metal fume fever". Symptoms consist of chills and fever (very similar to and easily confused with flu symptoms), metallic taste in the mouth, dryness and irritation of the throat followed by weakness and muscle pain. The symptoms come on in a few hours after excessive exposures and usually last from 12 to 48 hours. Long-term effects from metal fume fever have not been noted. Freshly formed oxide fumes of manganese, copper and zinc have been associated with causing metal fume fever. Although not expected to cause effects based upon the quantity present in the material, inhalation or ingestion of lead particles may result in lead-induced systemic toxicity. Symptoms of lead poisoning include abdominal cramps, anemia, muscle weakness and headache.

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- **Eye:** Excessive exposure to high concentrations of dust may cause irritation to the eyes. Particles of iron or iron compounds, which become imbedded in the eye, may cause rust stains unless removed fairly promptly. Touching or burning operations on steel products with surface treatments, oil coatings, or acrylic films may produce emissions that can be irritating to the eyes.
- **Skin:** Skin contact with dusts may cause irritation or sensitization, possibly leading to dermatitis. Repeated or prolonged contact with chemical surface treatments or oil residue may cause skin irritation, dermatitis, ulceration or allergic reactions in sensitized individuals.
- **Ingestion:** Ingestion of harmful amounts of this product as distributed is unlikely due to its solid insoluble form. Ingestion of dust may cause nausea and/or vomiting.

Chronic Effects: Chronic inhalation of metallic fumes and dusts are associated with the following conditions:

- **IRON OXIDE:** Chronic inhalation of excessive concentrations of iron oxide fumes or dusts may result in the develop-

ment of a benign pneumoconiosis, called siderosis, which is observable as an X-ray change. No physical impairment of lung function has been associated with siderosis.

- **CALCIUM:** Depending on the concentration and duration of exposure, repeated or prolonged inhalation may cause inflammation of the respiratory passages, ulcers of the mucous membranes, and possible perforation of the nasal septum. Repeated or prolonged skin contact may cause dermatitis.
- **CARBON:** Chronic inhalation of high concentrations to carbon may cause pulmonary disorders.
- **COPPER:** Skin contact with dusts may cause irritation or sensitization, possibly leading to dermatitis. Repeated or prolonged contact with surface treatments or oil residue may cause skin irritation, dermatitis, ulceration or allergic reactions in sensitized individuals.
- **MANGANESE:** Chronic exposure to high concentrations of manganese fumes and dusts may adversely affect the central nervous system with symptoms including languor, sleepiness, weakness, emotional disturbances, spastic gait, mask-like facial expression and paralysis. Animal studies indicate that manganese exposure may increase susceptibility to bacterial and viral infections.
- **PHOSPHORUS:** Inhalation of dusts and fumes of ferrophosphorus and phosphorus oxides may cause respiratory irritation.
- **SILICON:** Silicon dusts are a low health risk by inhalation and should be treated as a nuisance dust.
- **SULFUR:** Sulfur compounds, present in the fumes, may irritate the skin, eyes, lungs and gastrointestinal tract.
- **ALUMINUM:** Aluminum dusts/fines are a low health risk by inhalation and should be treated as a nuisance dust.
- **ANTIMONY:** Exposure to high concentrations of antimony dust or fumes can cause inflammation of the skin and mucous membranes, headache, dizziness, sleeplessness, bitter taste, nausea, vomiting, diarrhea, abdominal cramps, muscular pains, enlarged liver, pharyngitis, bronchitis, pneumonia.
- **LEAD:** Lead is classified among the highly toxic heavy metals. It is a cumulative hazard (accumulates in the bone and body tissue) and is a systemic poison that may affect a variety of organ systems, including the central nervous system, kidneys, reproductive system, blood formation, and gastrointestinal tract. Symptoms of chronic over-exposure include loss of appetite, nausea, metallic taste in the mouth, constipation, anxiety, anemia, fatigue, headache, muscle and joint pain, and colic accompanied by severe abdominal pain. Paralysis of the extensor muscles of the arms or legs, with wrist and/or foot drop, may result if the peripheral nervous system is affected. Long-term over-exposure may produce kidney damage. Reproductive damage is characterized by decreased sex drive, impotence, and sterility in men; and decreased fertility, abnormal menstrual cycles, and miscarriages in women. Unborn children may suffer

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neurological damage or developmental problems due to excessive lead exposure in pregnant women. Prolonged or repeated skin contact to lead dust may result in dermatitis. Systemic toxicity may develop if lead is transferred to the mouth by cigarettes, chewing tobacco, food or make-up. Prolonged eye contact may cause conjunctivitis.

- **ZINC:** Latent liver dysfunction and gastrointestinal disturbances with pressure in the stomach region, nausea, and weakness have been reported from repeated inhalation of zinc oxide. Repeated or prolonged skin contact to zinc oxide, coupled with poor personal hygiene, may result in "oxide pox" due to clogging of sebaceous glands. "Oxide pox", especially localized to moist areas, is characterized by small red, hard projecting papules with a central white plug, which develops into a pustule with intense itching. The lesions usually clear within 7-10 days. Repeated or prolonged eye contact with zinc oxide fume may produce conjunctivitis.

Long-term inhalation exposure to high concentrations (over-exposure) to pneumoconiotic agents may act synergistically with inhalation of oxides, fumes or dusts of this product to cause toxic effects.

Chemical Surface Treatments/Coatings: The possible presence of chemical surface treatments and oil coatings should be considered when evaluating potential employee health hazards and exposures during handling and welding or other fume activities. Removal of surface coatings should be considered prior to such activities. Repeated or prolonged contact with chemical surface treatments or oil residue may cause skin irritation, dermatitis, ulceration or allergic reactions in sensitized individuals. Torching or burning operations on steel products with surface treatments, oil coatings or acrylic films may produce emissions that can be irritating to the eyes and respiratory tract. Inhalation of hexavalent chromium compounds may cause ulceration of the mucous membranes of the nasal septum and has been related to an increased incidence of lung cancer.

Carcinogenicity: The International Agency for Research on Cancer (IARC), the National Toxicology Program (NTP), and

OSHA do not list steel products as carcinogens. IARC identifies lead and welding fumes as Group 2B carcinogens (possibly carcinogenic to humans). EPA lists lead ad Group B2 (probable human carcinogen) based on a combination of sufficient evidence in animals and inadequate evidence in humans. When specified, a hexavalent chromium passivation treatment is applied to the product surface. IARC lists hexavalent chromium compounds as Group 1 (sufficient evidence for carcinogenicity in humans). NTP lists certain hexavalent chromium compounds as Group 1 (known to be carcinogenic). The American Conference of Governmental Industrial Hygienists (ACGIH) lists hexavalent chromium compounds as A1 (confirmed human carcinogen).

Medical Conditions Aggravated by Long-Term Exposure: Individuals with chronic respiratory disorders (i.e., asthma, chronic bronchitis, emphysema, etc.) may be adversely affected by any fume or airborne particulate matter exposure.

SARA Potential Hazard Categories: Immediate Acute Health Hazard; Delayed Chronic Health Hazard.

SECTION IV. FIRST AID MEASURES

Inhalation: For over-exposure to airborne fumes and particulate, remove exposed person to fresh air. If breathing is difficult or has stopped, administer artificial respiration or oxygen as indicated. Seek medical attention promptly. Metal fume fever may be treated by bed rest, and administering a pain and fever reducing medication.

Eye Contact: Flush with large amounts of clean water to remove particles. Seek medical attention if irritation persists.

Skin Contact: Remove contaminated clothing. Wash affected areas with soap or mild detergent and water. If thermal burn has occurred, flush area with cold water and seek medical attention. If a persistent rash or irritation occurs, seek medical attention.

Ingestion: Not a probable route of industrial exposure. However, if ingested, seek medical attention immediately.

SECTION V. FIRE-FIGHTING MEASURES

Flash Point: Not applicable

LEL: Not applicable

Flash Point Method: Not applicable

UEL: Not applicable

Burning Rate: Not applicable

Auto-ignition Temperature: Not applicable

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Flammability Classification: Non-flammable, non-combustible

Extinguishing Media: Not applicable for solid product. Use extinguishers appropriate for surrounding materials.

Unusual Fire or Explosion Hazards: Not applicable for solid product. Do not use water on molten metal.

Hazardous Combustion Products: At temperatures above the melting point, fumes containing metal oxides and other alloying elements may be liberated.

Fire-Fighting Instructions: Do not release runoff from fire control methods to sewers or waterways.

Fire-Fighting Equipment: Wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in pressure-demand or positive-pressure mode and full protective clothing.

SECTION VI. ACCIDENTAL RELEASE MEASURES

Spill/Leak Procedures: Not applicable to steel in solid state. For spills involving finely divided particles, clean-up personnel should be protected against contact with eyes and skin. If material is in a dry state, avoid inhalation of dust. Fine, dry material should be removed by vacuuming or wet sweeping methods to prevent spreading of dust. Avoid using compressed air. Do not release into sewers or waterways. Collect material in appropriate, labeled containers for recovery or disposal in accordance with federal, state, and local regulations.

Regulatory Requirements: Follow applicable OSHA regulations (29 CFR 1910.120) and all other pertinent state and federal requirements.

Disposal: Contact your supplier or a licensed contractor for detailed recommendations. Follow applicable federal, state, and local regulations.

SECTION VII. HANDLING AND STORAGE

Handling Precautions: Operations with the potential for generating high concentrations of airborne particulates should be evaluated and controlled as necessary. Practice good housekeeping. Avoid breathing metal fume and/or dust.

Storage Requirements: Store away from acids and incompatible materials.

SECTION VIII. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls: Use controls as appropriate to minimize exposure to metal fumes and dusts during handling operations.

Ventilation: Provide general or local exhaust ventilation systems to minimize airborne concentrations. Local exhaust ventilation is preferred because it prevents contamination dispersion into the work area by controlling it at its source.

Administrative Controls: Do not use compressed air to clean-up spills.

Respiratory Protection: Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, wear a NIOSH-approved respirator. Select respirator based on its suitability to provide adequate worker protection for given working conditions, level of airborne contamination, and presence of sufficient oxygen.

Protective Clothing/Equipment: For operations which result in elevating the temperature of the product to or above its melting point or result in the generation of airborne particulates, use protective clothing, gloves and safety glasses or goggles as required for welding, burning, sawing, brazing, grinding or machining operations. Protective gloves should be worn as required for welding, burning or handling operations. Where the surface treatments are applied to the product, wear gloves when handling. Do not continue to use gloves or work clothing that has become saturated or soaked through with oil coating. Wash skin that has been exposed to oil with soap and water or waterless hand cleaner.

SECTION IX. PHYSICAL AND CHEMICAL PROPERTIES

Physical State: Solid

Water Solubility: Insoluble

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Odor Threshold: Not applicable

Boling Point: Not applicable

Appearance and Odor: Metallic Gray, Odorless

Other Solubilities: Not applicable

Vapor Pressure: Not applicable

Viscosity: Not applicable

Vapor Density (Air=1): Not applicable

Refractive Index: Not applicable

Formula Weight: Not applicable

Surface Tension: Not applicable

Density: 7.85 g/cc

% Volatile: Not applicable

Specific Gravity (H₂O=1, at 4 °C): 7.85

Evaporation Rate: Not applicable

pH: Not applicable

Freezing/Melting Point: Base Metal - 2750 °F
Metallic Coating - 800-900 °F

SECTION X. STABILITY AND REACTIVITY

Stability: Steel products are stable under normal storage and handling conditions.

Polymerization: Hazardous polymerization cannot occur.

Chemical Incompatibilities: Will react with strong acids to form hydrogen. Iron oxide dusts in contact with calcium hypochlorite evolve oxygen and may cause an explosion.

Conditions to Avoid: Storage with strong acids or calcium hypochlorite.

Hazardous Decomposition Products: Thermal oxidative decomposition of galvanized steel products can produce fumes containing oxides or zinc, iron and manganese as well as other elements.

SECTION XI. TOXICOLOGICAL INFORMATION

Toxicity Data:*

The possible presence of chemical surface treatment and coatings should be considered when evaluating potential employee health hazards and exposures during handling and welding or other fume generating activities.

Eye Effects: Eye contact with the individual components may cause particulate irritation. Implantation of iron particles in guinea pig corneas has resulted in rust rings with corneal softening about rust ring. Repeated or prolonged eye contact with zinc oxide fume may produce conjunctivitis.

Skin Effects: Skin contact with the individual dust components may cause physical abrasion, irritation and dermatitis.

Acute Inhalation Effects: Inhalation of the individual alloy components has been shown to cause various respiratory effects.

Acute Oral Effects: No data available.

Other: No LC50 or LD50 has been established for the mixture as a whole. Iron LD50: 30 g/kg oral (rat). Calcium LD50: No data. Carbon LD50: No data. Copper TDLo: 120 ug/kg oral (human). Manganese LD50: 9 g/kg oral (rat). Phosphorous LD50: No data. Silicon LD50: 3160 mg/kg oral (rat). Sulfur LD50: >8437 mg/kg oral (rat). Aluminum LD50: No data. Antimony LD50: No data. Lead TDLo: 450 mg/kg/6 yrs. Oral (human). Zinc TCLo: 124 mg/m³/50 min. inhalation (human).

Chronic Effects: See Section 3.

Carcinogenicity: Lead; Chromium (in surface passivation treatment, if specified).

Mutagenicity: No data available.

Teratogenicity: No data available.

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* See NIOSH, *RTECS*: (NO4565500) for additional toxicity data on iron; (EV8040000) for calcium, (FF5250000) for carbon; (GL5325000) for copper; (OO9275000) for manganese; (VW0400000) for silicon, (WS4250000) for sulfur; (BD0330000) for aluminum; (CC4025000) for antimony; (OF7525000) for lead; (ZG8600000) for zinc.

SECTION XII. ECOLOGICAL INFORMATION

Ecotoxicity: No data available for galvanized steel as a whole. However, individual components have been found to be toxic to the environment. Metal dusts may migrate into soil and groundwater and be ingested by wildlife. Lead can be bioaccumulated in plants and water organisms, especially shellfish.

Environmental Fate: No data available.

Environmental Degradation: No data available.

Soil Absorption/Mobility: No data available for galvanized steel as a whole. However, individual components have been found to be absorbed by plants from soil.

SECTION XIII. DISPOSAL CONSIDERATIONS

Disposal: Steel scrap should be recycled whenever possible. Product dusts and fumes from processing operations should also be recycled, or classified by a competent environmental professional and disposed of in accordance with applicable Federal, state or local regulations.

Container Cleaning and Disposal: Follow applicable Federal, state or local regulations. Observe safe handling precautions.

SECTION XIV. TRANSPORT INFORMATION

DOT Transportation Data (49 CFR 172.101):

Galvanized steel is not listed as a hazardous substance under 49 CFR 172.101.

Shipping Name: NA

Shipping Symbols: NA

Hazardous Class: NA

ID No.: NA

Packing Group: NA

Label: NA

Special Provisions (172.102): None

Packaging Authorizations

a) Exceptions: None

b) Non-bulk Packaging: NA

c) Bulk Packaging: NA

Quantity Limitations

a) Passenger, Aircraft, or Railcar: NA

b) Cargo Aircraft Only: NA

Vessel Stowage Requirements

a) Vessel Stowage: NA

b) Other: NA

SECTION XV. REGULATORY INFORMATION

Regulatory Information: *The following listing of regulations relating to a Alabama Metal Industries Corporation product may not be complete and should not be solely relied upon for all regulatory compliance responsibilities.*

This product and/or its constituents are subject to the following regulations:

OSHA Regulations: Air Contaminant (29 CFR 1910.1000, Table Z-1, Z-1-A): The product as a whole is not listed. However, individual components of the product are listed.

OSHA Specifically Regulated Substance: Lead (29 CFR 1910.1025).

EPA Regulations: RCRA (40 CFR 261): Steel scrap is not regulated as a solid waste or a hazardous waste under this act. If product dusts and/or fumes from processing operations are not recycled, they are considered to be a solid waste and may be classified as a hazardous waste depending on the toxicity characteristics of the dust as defined within 40 CFR 261.24.

CERCLA Hazardous Substance (40 CFR 302.4): The product as a whole is not listed. However, individual components of the product are listed: Antimony (Reportable Quantity (RQ)-5000#), Copper (RQ-5000#), and Lead (RQ-10#). Manganese compounds are also listed although no reportable quantity is assigned to this generic or broad class.

SARA 311/312 Codes (40 CFR 370): Immediate (acute) health hazard and delayed (chronic) health hazard.

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SARA 313 (40 CFR 372.65): Manganese and Zinc are subject to SARA 313 reporting requirements. Please note that if you prepackage or redistribute this product to industrial customers, SARA 313 requires that a notice be sent to those customers.

State Regulations: The product as a whole is not listed in any state regulations. However, individual components of the product are listed in various state regulations.

Pennsylvania Right to Know: Contains regulated material in the following categories:

- Hazardous Substances: Calcium, Silicon and Sulfur.
- Environmental Hazards: Aluminum, Antimony, Copper, Lead, Manganese and Zinc.

New Jersey Right to Know: Contains regulated material in the following categories:

- Hazardous Substances: Aluminum (dust and fume), Antimony, Copper, Manganese and Sulfur.
- Special Health Hazard Substances: Lead.

California Prop. 65: This product may contain an extremely small amount of lead in the metallic coating. Per customer specifications, an extremely small amount of hexavalent chromium passivation treatment may be applied to the surface of the galvanized steel product. Lead and hexavalent chromium are materials known to the State of California to cause cancer or reproductive toxicity. In addition, the product may also possibly contain trace quantities (generally much less than 0.1%) of other metallic elements known to the State of California to cause cancer or reproductive toxicity. These include arsenic (inorganic), cadmium and nickel.

Other Regulations: The product as a whole is not listed in any state regulations. However, individual components of the product are listed in various state regulations.

WHMIS Classification (Canadian): D-2

SECTION XVI. OTHER INFORMATION

Hazard Rating Systems:

NFPA Code: 1-0-0

HMIS Code: 1*-0-0 PPE: See Section 8 * Denotes possible chronic hazard if airborne dusts or fumes are generated.

Disclaimer: All information, recommendations, and suggestions appearing herein concerning this product are taken from sources or based upon data believed to be reliable. Although reasonable care has been taken in the preparation of this information, Alabama Metal Industries Corporation (AMICO) extends no warranties or guarantees, express or implied, makes no representations, and assumes no responsibility as to the accuracy, reliability or completeness of the information presented. Since the actual use of the product described herein is beyond our control, AMICO assumes no liability arising out of the use of the product by others. It is the user's responsibility to determine the suitability of the information presented herein, to assess the safety and toxicity of the product under their own conditions of use, and to comply with all applicable laws and regulations. Appropriate warnings and safe handling procedures should be provided to handlers and users.

HAZARDOUS COMMUNICATION LABEL

CARBON STEEL-METALLIC COATING

WARNING! CANCER HAZARD (CONTAINS LEAD AND/OR NICKEL).

EXPOSURE TO HIGH CONCENTRATIONS OF DUST OR FUME DURING WELDING, BURNING, MELTING, CUTTING, BRAZING, GRINDING AND POSSIBLY MACHINING, ETC., MAY PRODUCE IMMEDIATE OR DELAYED DAMAGE TO LUNGS OR OTHER ORGANS. EXPOSURE MAY ALSO CAUSE REPRODUCTIVE DISORDERS THROUGH INHALATION OR INGESTION OF LEAD.

EXCESSIVE INHALATION OF ZINC OXIDE FUMES FROM GALVANIZED PRODUCT (3C012) CAN PRODUCE AN ACUTE REACTION KNOWN AS "METAL FUME FEVER", WITH FLU-LIKE SYMPTOMS LASTING FROM 12 TO 48 HOURS.

THIS PRODUCT MAY BE COATED WITH MATERIALS THAT COULD RESULT IN SKIN IRRITATION WITH PROLONGED CONTACT.

PRECAUTIONS: AVOID BREATHING OR INGESTING DUST AND FUME. ADEQUATE VENTILATION IS REQUIRED WHILE WELDING, BURNING, MELTING, CUTTING, BRAZING, GRINDING AND MACHINING.

FIRST AID: FOR OVEREXPOSURE TO AIRBORNE DUST AND FUME, REMOVE EXPOSED PERSON TO FRESH AIR. IF BREATHING IS DIFFICULT OR HAS STOPPED, ADMINISTER ARTIFICIAL RESPIRATION OR OXYGEN AS INDICATED. SEEK MEDICAL ATTENTION PROMPTLY.

IF PRODUCT IS COATED AND EXCESSIVE SKIN CONTACT OCCURS, WASH WITH SOAP AND WATER. IF IRRITATION DEVELOPS, SEEK MEDICAL ATTENTION.

ADDITIONAL INFORMATION: REFER TO MATERIAL SAFETY DATA SHEETS FOR FURTHER INFORMATION ON SPECIFIC PRODUCTS.

Alabama Metal Industries Corporation, P.O. Box 3928 (MSDS), Birmingham, AL 35208



Material Safety Data Sheet

Issue Date: 20-AUG-2011
Supersedes: 22-MAR-2011

FERROQUEST FQ7101

1 Identification

Identification of substance or preparation
FERROQUEST FQ7101

Product Application Area
Chemical cleaning compound.

Company/Undertaking Identification
GE Water & Process Technologies Canada
3239 Dundas Street West
Oakville, Ontario, L6M 4B2
T 905-465-3030

Emergency Telephone
(800) 877-1940

Prepared by Product Stewardship Group: T 215-355-3300 Prepared on: 20-AUG-2011

2 Hazard(s) identification

EMERGENCY OVERVIEW

May cause slight irritation to the skin. May cause moderate irritation to the eyes. Mists/aerosols may cause irritation to upper respiratory tract.

Odor: Mild; Appearance: Colorless To Amber, Liquid

Fire fighters should wear positive pressure self-contained breathing apparatus(full face-piece type). Proper fire-extinguishing media: Foam, carbon dioxide, dry chemical.

POTENTIAL HEALTH EFFECTS

ACUTE SKIN EFFECTS:

Primary route of exposure; May cause slight irritation to the skin.

ACUTE EYE EFFECTS:

May cause moderate irritation to the eyes.

ACUTE RESPIRATORY EFFECTS:

Mists/aerosols may cause irritation to upper respiratory tract.

INGESTION EFFECTS:

May cause gastrointestinal irritation.

TARGET ORGANS:

No evidence of potential chronic effects.

MEDICAL CONDITIONS AGGRAVATED:

Not known.

SYMPTOMS OF EXPOSURE:

May cause redness or itching of skin.

3 Composition / information on ingredients

Information for specific product ingredients as required by the WHMIS Regulations is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation.

HAZARDOUS INGREDIENTS:

Cas#	Chemical Name	Range (w/w%)
95-14-7	1-H-BENZOTRIAZOLE (BZT) Toxic (by inhalation); irritant (eyes); potential nervous system toxin; in vitro mutagen ORAL LD50-RAT: 560 MG/KG DERMAL LD50-RABBIT: 2,000 MG/KG INHL. LC50-RAT: 1.9 MG/L/3HR	0.1-1.0
7414-83-7	PHOSPHONIC ACID, (1-HYDROXYETHYLIDENE)BIS-, DISODIUM SALT Eye irritant; slight skin irritant ORAL LD50-RAT: 1340 MG/KG DERMAL LD50-RABBIT: >2000 MG/KG INHL. LC50: NO DATA.	7-13

4 First-aid measures

SKIN CONTACT:

Wash thoroughly with soap and water. Remove contaminated clothing. Get medical attention if irritation develops or persists.

EYE CONTACT:

Remove contact lenses. Hold eyelids apart. Immediately flush eyes with plenty of low-pressure water for at least 15 minutes. Get immediate medical attention.

INHALATION:

If nasal, throat or lung irritation develops - remove to fresh air and get medical attention.

INGESTION:

Do not feed anything by mouth to an unconscious or convulsive victim. Do not induce vomiting. Immediately contact physician. Dilute contents of stomach using 2-8 fluid ounces (60-240 mL) of milk or water.

NOTES TO PHYSICIANS:

No special instructions

5 Fire-fighting measures

FIRE FIGHTING INSTRUCTIONS:

Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).

EXTINGUISHING MEDIA:

Foam, carbon dioxide, dry chemical.

HAZARDOUS DECOMPOSITION PRODUCTS:

oxides of carbon, nitrogen and phosphorus; hydrogen chloride

FLASH POINT:

> 200F > 93C P-M(CC)

6 Accidental release measures

PROTECTION AND SPILL CONTAINMENT:

Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container. Flush area with water. Wet area may be slippery. Spread sand/grit.

DISPOSAL INSTRUCTIONS:

The waste characteristics of the absorbed material, or any contaminated soil, should be determined in accordance with provincial regulations. Water contaminated with this product may be sent to a sanitary sewer treatment facility, in accordance with any local agreement or discharged under provincial regulations. Incinerate or land dispose in an approved landfill.

7 Handling and storage

HANDLING:

Normal chemical handling.

STORAGE:

Shelf life = 360 days. Store below 100F (38C). Keep containers closed when not in use. Protect from freezing. If frozen, thaw completely and mix thoroughly prior to use.

8 Exposure controls / personal protection

EXPOSURE LIMITS

Consult local authorities for acceptable provincial values.

CHEMICAL NAME

1-H-BENZOTRIAZOLE (BZT)

PEL (OSHA): LIMITS HAVE NOT BEEN ESTABLISHED BY US OSHA.

TLV (ACGIH): LIMITS HAVE NOT BEEN ESTABLISHED BY ACGIH.

PHOSPHONIC ACID, (1-HYDROXYETHYLIDENE)BIS-, DISODIUM SALT

PEL (OSHA): LIMITS HAVE NOT BEEN ESTABLISHED BY US OSHA.

TLV (ACGIH): LIMITS HAVE NOT BEEN ESTABLISHED BY ACGIH.

ENGINEERING CONTROLS:

adequate ventilation

RESPIRATORY PROTECTION:

If air-purifying respirator use is appropriate, use any of the following particulate respirators: N95, N99, N100, R95, R99, R100, P95, P99 or P100.

SKIN PROTECTION:

rubber, viton or neoprene gloves -- Wash off after each use.
Replace as necessary.

EYE PROTECTION:

splash proof chemical goggles

9 Physical and chemical properties

Spec. Grav. (70F, 21C)	1.105	Vapor Pressure (mmHG)	~ 18.0
Freeze Point (F)	18	Vapor Density (air=1)	< 1.00
Freeze Point (C)	-8		
Viscosity(cps 70F, 21C)	13	% Solubility (water)	100.0

Odor	Mild
Appearance	Colorless To Amber
Physical State	Liquid
Flash Point	P-M(CC) > 200F > 93C
pH As Is (approx.)	6.0
Evaporation Rate (Ether=1)	< 1.00
Percent VOC:	0.0

NA = not applicable ND = not determined

10 Stability and reactivity

CHEMICAL STABILITY:

Stable under normal storage conditions.

POSSIBILITY OF HAZARDOUS REACTIONS:

Contact with water reactive compounds may cause fire or explosion.

INCOMPATIBILITIES:

May react with strong oxidizers.

DECOMPOSITION PRODUCTS:

oxides of carbon, nitrogen and phosphorus; hydrogen chloride

11 Toxicological information

Oral LD50 RAT: 2920 mg/kg
NOTE - Calculated value according to GHS additivity formula
Dermal LD50 RABBIT: >5000 mg/kg
NOTE - Calculated value according to GHS additivity formula

12 Ecological information

AQUATIC TOXICOLOGY

Daphnia magna 48 Hour Static Acute Bioassay
0% Mortality= 2000; LC50 Greater Than= 2000 mg/L
Fathead Minnow 96 Hour Static Bioassay with 48-Hour Renewal
0% Mortality= 2000; LC50 Greater Than= 2000 mg/L

BIODEGRADATION

No Data Available.

13 Disposal considerations

Incinerate or bury in approved landfill. Please be advised that there may be additional local or provincial requirements relating to the disposal of waste. Consult provincial and local regulations regarding the proper disposal of this material.

14 Transport information

Transportation of Dangerous Goods:

Not Regulated

DOT EMERGENCY RESPONSE GUIDE #: Not applicable

15 Regulatory information

This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

CEPA:

All components of this product comply with substance notification requirements under CEPA.

WHMIS CLASSIFICATION:

D2B

16 Other information

HMIS vII		CODE TRANSLATION
Health	1	Slight Hazard
Fire	0	Minimal Hazard
Reactivity	0	Minimal Hazard
Special	NONE	No special Hazard
(1) Protective Equipment	B	Goggles, Gloves

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

CHANGE LOG

	EFFECTIVE DATE	REVISIONS TO SECTION:	SUPERCEDES
	-----	-----	-----
MSDS status:	12-MAY-1997		** NEW **
	17-JUN-1997	;EDIT:9	12-MAY-1997
	06-AUG-1997	3	17-JUN-1997
	06-JUL-2000	12	06-AUG-1997
	20-JUL-2001	4,16	06-JUL-2000
	23-JUN-2004	16	20-JUL-2001
	05-JUL-2006	2,7,8,15	23-JUN-2004
	12-JUN-2008	3,4,5,8,10	05-JUL-2006
	23-OCT-2008	3,8	12-JUN-2008
	17-JUN-2009	10	23-OCT-2008
	08-MAR-2011	10,12	17-JUN-2009
	22-MAR-2011	3,7,8	08-MAR-2011
	20-AUG-2011	11	22-MAR-2011



Material Safety Data Sheet

Issue Date: 28-OCT-2011
Supersedes: 18-JUN-2009

FERROQUEST FQ7102

1 Identification

Identification of substance or preparation
FERROQUEST FQ7102

Product Application Area
Chemical cleaning compound.

Company/Undertaking Identification
GE Water & Process Technologies Canada
3239 Dundas Street West
Oakville, Ontario, L6M 4B2
T 905-465-3030

Emergency Telephone
(800) 877-1940

Prepared by Product Stewardship Group: T 215-355-3300 Prepared on: 28-OCT-2011

2 Hazard(s) identification

EMERGENCY OVERVIEW

Severe irritant to the skin. Potential skin sensitizer. Corrosive to the eyes. Mists/aerosols cause irritation to the upper respiratory tract.

Odor: Strong; Appearance: Colorless To Light Yellow, Liquid

Fire fighters should wear positive pressure self-contained breathing apparatus(full face-piece type). Proper fire-extinguishing media: dry chemical, carbon dioxide, foam or water

POTENTIAL HEALTH EFFECTS

ACUTE SKIN EFFECTS:
Primary route of exposure; Severe irritant to the skin. Potential skin sensitizer.

ACUTE EYE EFFECTS:
Corrosive to the eyes.

ACUTE RESPIRATORY EFFECTS:
Mists/aerosols cause irritation to the upper respiratory tract.

INGESTION EFFECTS:

May cause severe gastrointestinal irritation.

TARGET ORGANS:

Prolonged or repeated exposures may cause skin sensitization and/or toxicity to the kidney and reproductive system.

MEDICAL CONDITIONS AGGRAVATED:

Not known.

SYMPTOMS OF EXPOSURE:

Causes irritation of the skin, eyes, and/or respiratory system.

3 Composition / information on ingredients

Information for specific product ingredients as required by the WHMIS Regulations is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation.

HAZARDOUS INGREDIENTS:

Cas#	Chemical Name	Range (w/w%)
79-14-1	GLYCOLIC ACID (HYDROXYACETIC ACID) Irritant (eyes and skin); may cause toxicity to the kidneys and/or reproductive system; fetotoxic and developmental toxin in laboratory animals ORAL LD50-RAT: 1,950 MG/KG DERMAL LD50: NO DATA. INHL. LC50-RAT: 3.6 MG/L/4HR	1-5
2809-21-4	PHOSPHONIC ACID, (1-HYDROXYETHYLIDINE)BIS- (HEDP) Corrosive (eyes) ORAL LD50-RAT: 2,000 MG/KG DERMAL LD50-RABBIT: >8,000 MG/KG INHL. LC50: NO DATA.	10-20
64-18-6	FORMIC ACID Combustible; corrosive; potential sensitizer (skin) ORAL LD50-RAT: 1,100 MG/KG DERMAL LD50: NO DATA. INHL. LC50-RAT: 15 G/M3/15MIN	7-13

4 First-aid measures

SKIN CONTACT:

Wash thoroughly with soap and water. Remove contaminated clothing. Thoroughly wash clothing before reuse. Get medical attention if irritation develops or persists.

EYE CONTACT:

URGENT! Immediately flush eyes with plenty of low-pressure water for at least 20 minutes while removing contact lenses. Hold eyelids apart. Get immediate medical attention.

INHALATION:

Remove to fresh air. If breathing is difficult, give oxygen. If breathing has stopped, give artificial respiration. Get immediate medical attention.

INGESTION:

Do not feed anything by mouth to an unconscious or convulsive victim. Do not induce vomiting. Immediately contact physician. Dilute contents of stomach using 2-8 fluid ounces (60-240 mL) of milk or water.

NOTES TO PHYSICIANS:

No special instructions

5 Fire-fighting measures

FIRE FIGHTING INSTRUCTIONS:

Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).

EXTINGUISHING MEDIA:

dry chemical, carbon dioxide, foam or water

HAZARDOUS DECOMPOSITION PRODUCTS:

oxides of carbon and phosphorus

FLASH POINT:

> 200F > 93C P-M(CC)

6 Accidental release measures

PROTECTION AND SPILL CONTAINMENT:

Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container. Flush area with water. Wet area may be slippery. Spread sand/grit.

DISPOSAL INSTRUCTIONS:

The waste characteristics of the absorbed material, or any contaminated soil, should be determined in accordance with provincial regulations. Water contaminated with this product may be sent to a sanitary sewer treatment facility, in accordance with any local agreement or discharged under provincial regulations. Incinerate or land dispose in an approved landfill.

7 Handling and storage

HANDLING:

Acidic. Corrosive(Eyes). Do not mix with alkaline material.

STORAGE:

Keep containers closed when not in use. Reasonable and safe chemical storage. Protect from freezing.

8 Exposure controls / personal protection

EXPOSURE LIMITS

Consult local authorities for acceptable provincial values.

CHEMICAL NAME**GLYCOLIC ACID (HYDROXYACETIC ACID)**

PEL (OSHA): LIMITS HAVE NOT BEEN ESTABLISHED BY US OSHA.

TLV (ACGIH): LIMITS HAVE NOT BEEN ESTABLISHED BY ACGIH.

MISC: Note- manufacturer's recommended exposure limit: 10 mg/m3.

PHOSPHONIC ACID, (1-HYDROXYETHYLIDINE)BIS- (HEDP)

PEL (OSHA): LIMITS HAVE NOT BEEN ESTABLISHED BY US OSHA.
TLV (ACGIH): LIMITS HAVE NOT BEEN ESTABLISHED BY ACGIH.

FORMIC ACID

PEL (OSHA): 5 PPM
TLV (ACGIH): 5 PPM

ENGINEERING CONTROLS:

Adequate ventilation to maintain air contaminants below exposure limits.

RESPIRATORY PROTECTION:

If air-purifying respirator use is appropriate, use organic vapor cartridges and any of the following particulate respirators: N95, N99, N100, R95, R99, R100, P95, P99 or P100.

SKIN PROTECTION:

viton or neoprene gloves -- Wash off after each use. Replace as necessary.

EYE PROTECTION:

splash proof chemical goggles

9 Physical and chemical properties

Spec. Grav. (70F, 21C)	1.112	Vapor Pressure (mmHG)	~ 18.0
Freeze Point (F)	14	Vapor Density (air=1)	< 1.00
Freeze Point (C)	-10		
Viscosity (cps 70F, 21C)	10	% Solubility (water)	100.0

Odor	Strong
Appearance	Colorless To Light Yellow
Physical State	Liquid
Flash Point	P-M(CC) > 200F > 93C
pH As Is (approx.)	1.0
Evaporation Rate (Ether=1)	< 1.00
Percent VOC:	0.0

NA = not applicable ND = not determined

10 Stability and reactivity

CHEMICAL STABILITY:

Stable under normal storage conditions.

POSSIBILITY OF HAZARDOUS REACTIONS:

Contact with strong bases may cause a violent reaction releasing heat.

INCOMPATIBILITIES:

May react with strong oxidizers.

DECOMPOSITION PRODUCTS:

oxides of carbon and phosphorus

11 Toxicological information

Oral LD50 RAT:	>5000 mg/kg
NOTE - Calculated value according to GHS additivity formula	
Dermal LD50 RABBIT:	>5000 mg/kg
NOTE - Calculated value according to GHS additivity formula	

12 Ecological information

AQUATIC TOXICOLOGY

Daphnia magna 48 Hour Static Screen (pH adjusted)
60% Mortality= 5000; 0% Mortality= 3250 mg/L
Fathead Minnow 96 Hour Static Renewal Bioassay (pH adjusted)
LC50= 1435; No Effect Level= 580 mg/L
Mysid Shrimp 48 Hour Static Renewal Bioassay (pH adjusted)
LC50= 8880; No Effect Level= 2000 mg/L

BIODEGRADATION

BOD-28 (mg/g): 31
BOD-5 (mg/g): 14
COD (mg/g): 102
TOC (mg/g): 42

13 Disposal considerations

Incinerate or bury in approved landfill. Please be advised that there may be additional local or provincial requirements relating to the disposal of waste. Consult provincial and local regulations regarding the proper disposal of this material.

14 Transport information

Transportation of Dangerous Goods:

CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S.(ORGANIC PHOSPHONIC ACID),
8, UN3265, PG III
DOT EMERGENCY RESPONSE GUIDE #: 153

15 Regulatory information

This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

CEPA:

All components of this product comply with substance notification requirements under CEPA.

WHMIS CLASSIFICATION:

D2A D2B E

16 Other information

HMIS VII

CODE TRANSLATION

Health	3	Serious Hazard
Fire	0	Minimal Hazard
Reactivity	0	Minimal Hazard
Special	CORR	DOT corrosive
(1) Protective Equipment	B	Goggles,Gloves

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

CHANGE LOG

	EFFECTIVE DATE -----	REVISIONS TO SECTION: -----	SUPERCEDES -----
MSDS status:	07-MAY-1997		** NEW **
	04-JUN-1997	12	07-MAY-1997
	17-SEP-1997	12	04-JUN-1997
	21-MAY-1998	2,3	17-SEP-1997
	23-APR-2001	2,3	21-MAY-1998
	05-JUL-2001	2	23-APR-2001
	26-SEP-2002	4,15,16	05-JUL-2001
	17-MAR-2005	14	26-SEP-2002
	27-MAR-2008	4,5,8,10	17-MAR-2005
	18-JUN-2009	10	27-MAR-2008
	28-OCT-2011	11	18-JUN-2009



Material Safety Data Sheet

Issue Date: 12-SEP-2012
Supersedes: 23-APR-2012

FERROQUEST FQ7103

1 Identification

Identification of substance or preparation
FERROQUEST FQ7103

Product Application Area
Cleaner

Company/Undertaking Identification
GE Water & Process Technologies Canada
3239 Dundas Street West
Oakville, Ontario, L6M 4B2
T 905-465-3030

Emergency Telephone
(800) 877-1940

Prepared by Product Stewardship Group: T 215-355-3300 Prepared on: 12-SEP-2012

2 Hazard(s) identification

EMERGENCY OVERVIEW

May cause slight irritation to the skin. Potential skin sensitizer.
Severe irritant to the eyes. May cause irritation to mucous
membranes. Repeated exposure may result in respiratory
sensitization.

Odor: Slight; Appearance: Colorless To Light Yellow, Liquid

Fire fighters should wear positive pressure self-contained breathing
apparatus(full face-piece type). Proper fire-extinguishing media:
dry chemical, carbon dioxide, foam or water

POTENTIAL HEALTH EFFECTS

ACUTE SKIN EFFECTS:

Primary route of exposure; May cause slight irritation to the skin.
Potential skin sensitizer.

ACUTE EYE EFFECTS:

Severe irritant to the eyes.

ACUTE RESPIRATORY EFFECTS:

Primary route of exposure;May cause irritation to mucous membranes.

Repeated exposure may result in respiratory sensitization.

INGESTION EFFECTS:

May cause slight gastrointestinal irritation.

TARGET ORGANS:

Prolonged or repeated exposures may cause primary irritant dermatitis, skin sensitization, and/or allergic respiratory reactions.

MEDICAL CONDITIONS AGGRAVATED:

Asthma, allergies, skin disorders, and chronic respiratory disease.

SYMPTOMS OF EXPOSURE:

May cause local irritation or a sensitization reaction upon direct contact with skin or respiratory tract.

3 Composition / information on ingredients

Information for specific product ingredients as required by the WHMIS Regulations is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation.

HAZARDOUS INGREDIENTS:

Cas#	Chemical Name	Range (w/w%)
7414-83-7	PHOSPHONIC ACID, (1-HYDROXYETHYLIDENE)BIS-, DISODIUM SALT Slight skin irritant; slight eye irritant ORAL LD50-RAT: 1300 MG/KG DERMAL LD50-RABBIT: >5000 MG/KG INHL. LC50: NO DATA.	7-13
7757-83-7	SODIUM SULFITE IARC=3 (carcinogen status not classifiable) ORAL LD50-RAT: 2610 MG/KG DERMAL LD50: NO DATA. INHL. LC50-RAT: >5.5 mg/L/4hr	1-5

4 First-aid measures

SKIN CONTACT:

Wash thoroughly with soap and water. Remove contaminated clothing. Get medical attention if irritation develops or persists.

EYE CONTACT:

Remove contact lenses. Hold eyelids apart. Immediately flush eyes with plenty of low-pressure water for at least 15 minutes. Get immediate medical attention.

INHALATION:

Remove to fresh air. If breathing is difficult, give oxygen. If breathing has stopped, give artificial respiration. Get immediate medical attention.

INGESTION:

Do not feed anything by mouth to an unconscious or convulsive victim. Do not induce vomiting. Immediately contact physician.

Dilute contents of stomach using 2-8 fluid ounces (60-240 mL) of milk or water.

NOTES TO PHYSICIANS:

No special instructions

5 Fire-fighting measures

FIRE FIGHTING INSTRUCTIONS:

Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).

EXTINGUISHING MEDIA:

dry chemical, carbon dioxide, foam or water

HAZARDOUS DECOMPOSITION PRODUCTS:

oxides of carbon, nitrogen, phosphorus and sulfur

FLASH POINT:

> 200F > 93C P-M(CC)

6 Accidental release measures

PROTECTION AND SPILL CONTAINMENT:

Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container. Flush area with water. Wet area may be slippery. Spread sand/grit.

DISPOSAL INSTRUCTIONS:

The waste characteristics of the absorbed material, or any contaminated soil, should be determined in accordance with provincial regulations. Water contaminated with this product may be sent to a sanitary sewer treatment facility, in accordance with any local agreement or discharged under provincial regulations. Incinerate or land dispose in an approved landfill.

7 Handling and storage

HANDLING:

Normal chemical handling.

STORAGE:

Keep containers closed when not in use. Protect from freezing. If frozen, thaw and mix completely prior to use. Shelf life 270 days.

8 Exposure controls / personal protection

EXPOSURE LIMITS

Consult local authorities for acceptable provincial values.

CHEMICAL NAME

PHOSPHONIC ACID, (1-HYDROXYETHYLIDENE)BIS-, DISODIUM SALT

PEL (OSHA): LIMITS HAVE NOT BEEN ESTABLISHED BY US OSHA.

TLV (ACGIH): LIMITS HAVE NOT BEEN ESTABLISHED BY ACGIH.

SODIUM SULFITE

PEL (OSHA): LIMITS HAVE NOT BEEN ESTABLISHED BY US OSHA.

TLV (ACGIH): LIMITS HAVE NOT BEEN ESTABLISHED BY ACGIH.

ENGINEERING CONTROLS:

adequate ventilation

RESPIRATORY PROTECTION:

If air-purifying respirator use is appropriate, use any of the following particulate respirators: N95, N99, N100, R95, R99, R100, P95, P99 or P100.

SKIN PROTECTION:

rubber, butyl or viton gloves -- Wash off after each use. Replace as necessary.

EYE PROTECTION:

splash proof chemical goggles

9 Physical and chemical properties

Spec. Grav. (70F, 21C)	1.122	Vapor Pressure (mmHG)	~ 18.0
Freeze Point (F)	26	Vapor Density (air=1)	< 1.00
Freeze Point (C)	-3		
Viscosity (cps 70F, 21C)	20	% Solubility (water)	100.0
Odor		Slight	
Appearance		Colorless To Light Yellow	
Physical State		Liquid	
Flash Point	P-M(CC)	> 200F > 93C	
pH As Is (approx.)		5.9	
Evaporation Rate (Ether=1)		< 1.00	
Percent VOC:		0.0	

NA = not applicable ND = not determined

10 Stability and reactivity

CHEMICAL STABILITY:

Stable under normal storage conditions.

POSSIBILITY OF HAZARDOUS REACTIONS:

No known hazardous reactions.

INCOMPATIBILITIES:

May react with strong oxidizers.

DECOMPOSITION PRODUCTS:

oxides of carbon, nitrogen, phosphorus and sulfur

11 Toxicological information

Oral LD50 RAT:	>5000 mg/kg
NOTE - Calculated value according to GHS additivity formula	
Dermal LD50 RABBIT:	>5000 mg/kg
NOTE - Calculated value according to GHS additivity formula	

12 Ecological information

AQUATIC TOXICOLOGY

Daphnia magna 48 Hour Static Renewal Bioassay
 30% Mortality= 1300; 0% Mortality= 845 mg/L
 Fathead Minnow 96 Hour Static Renewal Bioassay
 0% Mortality= 2000 mg/L

BIODEGRADATION

No Data Available.

13 Disposal considerations

Incinerate or bury in approved landfill. Please be advised that there may be additional local or provincial requirements relating to the disposal of waste. Consult provincial and local regulations regarding the proper disposal of this material.

14 Transport information

Transportation of Dangerous Goods:

Not Regulated

DOT EMERGENCY RESPONSE GUIDE #: Not applicable

15 Regulatory information

This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

CEPA:

All components of this product comply with substance notification requirements under CEPA.

WHMIS CLASSIFICATION:

D2A D2B

16 Other information

HMIS vII		CODE TRANSLATION
Health	1	Slight Hazard
Fire	1	Slight Hazard
Reactivity	0	Minimal Hazard
Special	NONE	No special Hazard
(1) Protective Equipment	B	Goggles, Gloves

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

CHANGE LOG

	EFFECTIVE DATE	REVISIONS TO SECTION:	SUPERCEDES
	-----	-----	-----
MSDS status:	12-MAY-1997		** NEW **
	04-JUN-1997	12	12-MAY-1997

06-MAY-1998	;EDIT:9	04-JUN-1997
20-NOV-1998	1	06-MAY-1998
23-SEP-1999	2,3,4,15	20-NOV-1998
20-SEP-2002	2,3,4,8	23-SEP-1999
23-AUG-2005	16	20-SEP-2002
16-MAY-2006	16	23-AUG-2005
20-MAY-2009	3,4,5,7,8,10	16-MAY-2006
23-APR-2012	16	20-MAY-2009
12-SEP-2012	16	23-APR-2012



Material Safety Data Sheet

Issue Date: 30-NOV-2012
Supersedes: 13-NOV-2012

FERROQUEST LP7200

1 Identification

Identification of substance or preparation
FERROQUEST LP7200

Product Application Area
Chemical cleaning compound.

Company/Undertaking Identification
GE Water & Process Technologies Canada
3239 Dundas Street West
Oakville, Ontario, L6M 4B2
T 905-465-3030

Emergency Telephone
(800) 877-1940

Prepared by Product Stewardship Group: T 215-355-3300 Prepared on: 30-NOV-2012

2 Hazard(s) identification

EMERGENCY OVERVIEW

May cause moderate irritation to the skin. Severe irritant to the eyes. Vapors, gases, mists and/or aerosols cause irritation to the upper respiratory tract.

Odor: Pungent; Appearance: Colorless To Green, Liquid

Fire fighters should wear positive pressure self-contained breathing apparatus(full face-piece type). Proper fire-extinguishing media: dry chemical, carbon dioxide, foam or water

POTENTIAL HEALTH EFFECTS

ACUTE SKIN EFFECTS:

Primary route of exposure; May cause moderate irritation to the skin.

ACUTE EYE EFFECTS:

Severe irritant to the eyes.

ACUTE RESPIRATORY EFFECTS:

Primary route of exposure;Vapors, gases, mists and/or aerosols cause irritation to the upper respiratory tract.

INGESTION EFFECTS:

May cause slight gastrointestinal irritation with possible nausea, vomiting, diarrhea, incoordination, mental confusion, dizziness and lethargy.

TARGET ORGANS:

Prolonged or repeated exposures may cause primary irritant dermatitis and/or toxicity to the lung.

MEDICAL CONDITIONS AGGRAVATED:

Not known.

SYMPTOMS OF EXPOSURE:

Inhalation may cause irritation of the respiratory tract. Skin contact may cause itching and/or redness.

3 Composition / information on ingredients

Information for specific product ingredients as required by the WHMIS Regulations is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation.

HAZARDOUS INGREDIENTS:

Cas#	Chemical Name	Range (w/w%)
*	(E03G)ORGANIC ACID; Irritant (eyes and skin) ORAL LD50-RAT: 2,750 MG/KG DERMAL LD50-RABBIT: >10,000 MG/KG INHL. LD50: NO DATA.	*
*	(E195)ORGANIC ACID; Irritant (eyes and skin) ORAL LD50-RAT: 2,260 MG/KG DERMAL LD50: NO DATA. INHL. LC50-RAT: >7.7 MG/L/4HR	*
124-04-9	ADIPIC ACID (HEXANEDIOIC ACID) Eye irritant ORAL LD50-RAT: 3600 MG/KG DERMAL LD50-RABBIT: >7940 MG/KG INHL. LC50: NO DATA.	3-7
*	(E03L)ORGANIC ACID; Irritant (eyes and skin) ORAL LD50-RAT: 1,850 MG/KG DERMAL LD50-RABBIT: >5,000 MG/KG INHL. LD50: NO DATA.	*

*HMIRC Trade Secret Registry #:8782

Application Date:29-NOV-2012

4 First-aid measures

SKIN CONTACT:

Wash thoroughly with soap and water. Remove contaminated clothing. Thoroughly wash clothing before reuse. Get medical attention if irritation develops or persists.

EYE CONTACT:

Remove contact lenses. Hold eyelids apart. Immediately flush eyes with plenty of low-pressure water for at least 15 minutes. Get immediate medical attention.

INHALATION:

If nasal, throat or lung irritation develops - remove to fresh air and get medical attention.

INGESTION:

Do not feed anything by mouth to an unconscious or convulsive victim. Do not induce vomiting. Immediately contact physician. If vomiting occurs naturally have victim lean forward to reduce risk of aspiration.

NOTES TO PHYSICIANS:

No special instructions

5 Fire-fighting measures

FIRE FIGHTING INSTRUCTIONS:

Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).

EXTINGUISHING MEDIA:

dry chemical, carbon dioxide, foam or water

HAZARDOUS DECOMPOSITION PRODUCTS:

oxides of carbon

FLASH POINT:

> 200F > 93C P-M(CC)

6 Accidental release measures

PROTECTION AND SPILL CONTAINMENT:

Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container. Flush area with water. Wet area may be slippery. Spread sand/grit.

DISPOSAL INSTRUCTIONS:

The waste characteristics of the absorbed material, or any contaminated soil, should be determined in accordance with provincial regulations. Water contaminated with this product may be sent to a sanitary sewer treatment facility, in accordance with any local agreement or discharged under provincial regulations. Incinerate or land dispose in an approved landfill.

7 Handling and storage

HANDLING:

Contains an oxidizer. Avoid all contact with reducing agents, oils, greases, organics and acids.

STORAGE:

Keep containers closed when not in use. Reasonable and safe chemical storage. Protect from freezing.

8 Exposure controls / personal protection

EXPOSURE LIMITS

Consult local authorities for acceptable provincial values.

CHEMICAL NAME

(E03G)ORGANIC ACID;

PEL (OSHA): LIMITS HAVE NOT BEEN ESTABLISHED BY US OSHA.

TLV (ACGIH): LIMITS HAVE NOT BEEN ESTABLISHED BY ACGIH.

(E195)ORGANIC ACID;

PEL (OSHA): LIMITS HAVE NOT BEEN ESTABLISHED BY US OSHA.

TLV (ACGIH): LIMITS HAVE NOT BEEN ESTABLISHED BY ACGIH.

ADIPIC ACID (HEXANEDIOIC ACID)

PEL (OSHA): NUISANCE DUST

TLV (ACGIH): 5 MG/M3

(E03L)ORGANIC ACID;

PEL (OSHA): LIMITS HAVE NOT BEEN ESTABLISHED BY US OSHA.

TLV (ACGIH): LIMITS HAVE NOT BEEN ESTABLISHED BY ACGIH.

ENGINEERING CONTROLS:

Adequate ventilation to maintain air contaminants below exposure limits.

RESPIRATORY PROTECTION:

If air-purifying respirator use is appropriate, use any of the following particulate respirators: N95, N99, N100, R95, R99, R100, P95, P99 or P100.

SKIN PROTECTION:

rubber, butyl or neoprene gloves -- Wash off after each use.
Replace as necessary.

EYE PROTECTION:

splash proof chemical goggles

9 Physical and chemical properties

Spec. Grav. (70F, 21C)	1.070	Vapor Pressure (mmHG)	~ 36.0
Freeze Point (F)	27	Vapor Density (air=1)	< 1.00
Freeze Point (C)	-3		
Viscosity(cps 70F, 21C)	9	% Solubility (water)	100.0

Odor	Pungent
Appearance	Colorless To Green
Physical State	Liquid
Flash Point	P-M(CC) > 200F > 93C
pH As Is (approx.)	1.4
Evaporation Rate (Ether=1)	< 1.00
Percent VOC:	0.0

NA = not applicable ND = not determined

10 Stability and reactivity

CHEMICAL STABILITY:

Stable under normal storage conditions.

POSSIBILITY OF HAZARDOUS REACTIONS:

Contact with strong bases may cause a violent reaction releasing heat.

INCOMPATIBILITIES:

May react with bases or strong oxidizers.

DECOMPOSITION PRODUCTS:

oxides of carbon

11 Toxicological information

Oral LD50 RAT: 2,685 mg/kg
NOTE - Calculated value
Dermal LD50 RABBIT: >5,000 mg/kg
NOTE - Estimated value

12 Ecological information

AQUATIC TOXICOLOGY

Daphnia magna 48 Hour Static Screen
0% Mortality= 1000 mg/L
Fathead Minnow 96 Hour Static Screen
0% Mortality= 1500 mg/L

BIODEGRADATION

BOD-28 (mg/g): 447
BOD-5 (mg/g): 336
COD (mg/g): 388
TOC (mg/g): 177

13 Disposal considerations

Incinerate or bury in approved landfill. Please be advised that there may be additional local or provincial requirements relating to the disposal of waste. Consult provincial and local regulations regarding the proper disposal of this material.

14 Transport information

Transportation of Dangerous Goods:

CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S.(DIBASIC ACID),
8, UN3265, PG III
DOT EMERGENCY RESPONSE GUIDE #: 154

15 Regulatory information

This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

CEPA:

All components of this product comply with substance notification requirements under CEPA.

WHMIS CLASSIFICATION:

D2B

16 Other information

HMIS VII		CODE TRANSLATION
Health	2	Moderate Hazard
Fire	1	Slight Hazard
Reactivity	0	Minimal Hazard
Special	ACID	pH below 2.1
(1) Protective Equipment	B	Goggles,Gloves

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

CHANGE LOG

	EFFECTIVE DATE	REVISIONS TO SECTION:	SUPERCEDES
	-----	-----	-----
MSDS status:	07-MAY-1997		** NEW **
	27-OCT-1999	3,4	07-MAY-1997
	23-AUG-2001	2	27-OCT-1999
	25-SEP-2003	2	23-AUG-2001
	19-JAN-2005	2	25-SEP-2003
	07-APR-2006	2,3,8,14	19-JAN-2005
	07-JUN-2006	2,8	07-APR-2006
	08-SEP-2006	4	07-JUN-2006
	26-SEP-2006	2	08-SEP-2006
	19-OCT-2006	15	26-SEP-2006
	30-OCT-2006	8,16	19-OCT-2006
	29-MAY-2009	3,8,10	30-OCT-2006
	18-DEC-2009	3,4,11	29-MAY-2009
	13-NOV-2012	16	18-DEC-2009
	30-NOV-2012	3	13-NOV-2012



Material Safety Data Sheet

Issue Date: 30-NOV-2012
Supersedes: 13-NOV-2012

FERROQUEST LP7202

1 Identification

Identification of substance or preparation

FERROQUEST LP7202

Product Application Area

Chemical cleaning compound.

Company/Undertaking Identification

GE Water & Process Technologies Canada
3239 Dundas Street West
Oakville, Ontario, L6M 4B2
T 905-465-3030

Emergency Telephone

(800) 877-1940

Prepared by Product Stewardship Group: T 215-355-3300 Prepared on: 30-NOV-2012

2 Hazard(s) identification

EMERGENCY OVERVIEW

Corrosive to skin. Corrosive to the eyes. Mists/aerosols may cause irritation to upper respiratory tract.

Odor: Pungent; Appearance: Yellow To Amber, Liquid

Fire fighters should wear positive pressure self-contained breathing apparatus(full face-piece type). Proper fire-extinguishing media: dry chemical, carbon dioxide, foam or water

POTENTIAL HEALTH EFFECTS

ACUTE SKIN EFFECTS:

Primary route of exposure; Corrosive to skin.

ACUTE EYE EFFECTS:

Corrosive to the eyes.

ACUTE RESPIRATORY EFFECTS:

Primary route of exposure;Mists/aerosols may cause irritation to upper respiratory tract.

INGESTION EFFECTS:

May cause severe irritation or burning of the gastrointestinal tract.

TARGET ORGANS:

No evidence of potential chronic effects.

MEDICAL CONDITIONS AGGRAVATED:

Not known.

SYMPTOMS OF EXPOSURE:

May cause redness or itching of skin, irritation, and/or tearing of eyes (direct contact).

3 Composition / information on ingredients

Information for specific product ingredients as required by the WHMIS Regulations is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation.

HAZARDOUS INGREDIENTS:

Cas#	Chemical Name	Range (w/w%)
*	(E03G)ORGANIC ACID; Irritant (eyes and skin) ORAL LD50-RAT: 2,750 MG/KG DERMAL LD50-RABBIT: >10,000 MG/KG INHL. LD50: NO DATA.	*
*	(E195)ORGANIC ACID; Irritant (eyes and skin) ORAL LD50-RAT: 2,260 MG/KG DERMAL LD50: NO DATA. INHL. LC50-RAT: >7.7 MG/L/4HR	*
124-04-9	ADIPIIC ACID (HEXANEDIOIC ACID) Eye irritant ORAL LD50-RAT: 3600 MG/KG DERMAL LD50-RABBIT: >7940 MG/KG INHL. LC50: NO DATA.	7-13
*	(E03L)ORGANIC ACID; Irritant (eyes and skin) ORAL LD50-RAT: 1,850 MG/KG DERMAL LD50-RABBIT: >5,000 MG/KG INHL. LD50: NO DATA.	*

*HMIRC Trade Secret Registry #:8783

Application Date:29-NOV-2012

4 First-aid measures

SKIN CONTACT:

URGENT! Wash thoroughly with soap and water for at least 30 minutes. Remove contaminated clothing. Get immediate medical attention. Thoroughly wash clothing before reuse.

EYE CONTACT:

URGENT! Immediately flush eyes with water for 30 minutes while

removing contact lenses. Hold eyelids apart. Get immediate medical attention.

INHALATION:

Remove to fresh air. If breathing is difficult, give oxygen. If breathing has stopped, give artificial respiration. Get immediate medical attention.

INGESTION:

Do not feed anything by mouth to an unconscious or convulsive victim. Do not induce vomiting. Immediately contact physician. If vomiting occurs naturally have victim lean forward to reduce risk of aspiration.

NOTES TO PHYSICIANS:

Material is corrosive. It may not be advisable to induce vomiting. Possible mucosal damage may contraindicate the use of gastric lavage.

5 Fire-fighting measures

FIRE FIGHTING INSTRUCTIONS:

Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).

EXTINGUISHING MEDIA:

dry chemical, carbon dioxide, foam or water

HAZARDOUS DECOMPOSITION PRODUCTS:

oxides of carbon

FLASH POINT:

> 200F > 93C P-M(CC)

6 Accidental release measures

PROTECTION AND SPILL CONTAINMENT:

Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container. Flush area with water. Wet area may be slippery. Spread sand/grit.

DISPOSAL INSTRUCTIONS:

The waste characteristics of the absorbed material, or any contaminated soil, should be determined in accordance with provincial regulations. Water contaminated with this product may be sent to a sanitary sewer treatment facility, in accordance with any local agreement or discharged under provincial regulations. Incinerate or land dispose in an approved landfill.

7 Handling and storage

HANDLING:

This material may be combustible. As with all dry powders it is advisable to ground mechanical equipment in contact with dry material to dissipate the potential buildup of static electricity.

STORAGE:

Keep containers closed when not in use. Store in cool ventilated location. Store away from oxidizers.

8 Exposure controls / personal protection

EXPOSURE LIMITS

Consult local authorities for acceptable provincial values.

CHEMICAL NAME

(E03G)ORGANIC ACID;

PEL (OSHA): LIMITS HAVE NOT BEEN ESTABLISHED BY US OSHA.

TLV (ACGIH): LIMITS HAVE NOT BEEN ESTABLISHED BY ACGIH.

(E195)ORGANIC ACID;

PEL (OSHA): LIMITS HAVE NOT BEEN ESTABLISHED BY US OSHA.

TLV (ACGIH): LIMITS HAVE NOT BEEN ESTABLISHED BY ACGIH.

ADIPIC ACID (HEXANEDIOIC ACID)

PEL (OSHA): NUISANCE DUST

TLV (ACGIH): 5 MG/M3

(E03L)ORGANIC ACID;

PEL (OSHA): LIMITS HAVE NOT BEEN ESTABLISHED BY US OSHA.

TLV (ACGIH): LIMITS HAVE NOT BEEN ESTABLISHED BY ACGIH.

ENGINEERING CONTROLS:

Adequate ventilation to maintain air contaminants below exposure limits.

RESPIRATORY PROTECTION:

If air-purifying respirator use is appropriate, use a respirator with organic vapor cartridges.

SKIN PROTECTION:

gauntlet-type neoprene gloves, chemical resistant apron-- Wash off after each use. Replace as necessary.

EYE PROTECTION:

airtight chemical goggles

9 Physical and chemical properties

Spec. Grav. (70F,21C)	1.143	Vapor Pressure (mmHG)	~ 18.0
Freeze Point (F)	26	Vapor Density (air=1)	< 1.00
Freeze Point (C)	-3		
Viscosity(cps 70F,21C)	ND	% Solubility (water)	100.0

Odor	Pungent
Appearance	Yellow To Amber
Physical State	Liquid
Flash Point	P-M(CC) > 200F > 93C
pH As Is (approx.)	< 1.0
Evaporation Rate (Ether=1)	< 1.00
Percent VOC:	0.0

NA = not applicable ND = not determined

10 Stability and reactivity

CHEMICAL STABILITY:

Stable under normal storage conditions.

POSSIBILITY OF HAZARDOUS REACTIONS:

Contact with strong bases may cause a violent reaction releasing heat.

INCOMPATIBILITIES:

May react with bases or strong oxidizers.

DECOMPOSITION PRODUCTS:

oxides of carbon

11 Toxicological information

Oral LD50 RAT:	2,708 mg/kg
NOTE - Calculated value	
Dermal LD50 RABBIT:	>5,000 mg/kg
NOTE - Estimated value	
Ames Assay BACTERIA:	Negative
Mutagenicity VARIOUS:	Pos/Neg

12 Ecological information

AQUATIC TOXICOLOGY

Daphnia magna 48 Hour Static Acute Bioassay (pH adjusted)
LC50= 3350; No Effect Level= 500 mg/L
Fathead Minnow 96 Hour Static Acute Bioassay (pH adjusted)
LC50= 1440; No Effect Level= 500 mg/L
Rainbow Trout 96 Hour Static Bioassay with 48-Hour Renewal (pH adjusted)
LC50= 1410; No Effect Level= 1000 mg/L

BIODEGRADATION

BOD-28 (mg/g): 179
BOD-5 (mg/g): 122
COD (mg/g): 600
TOC (mg/g): 272

13 Disposal considerations

Incinerate or bury in approved landfill. Please be advised that there may be additional local or provincial requirements relating to the disposal of waste. Consult provincial and local regulations regarding the proper disposal of this material.

14 Transport information

Transportation of Dangerous Goods:

CORROSIVE LIQUID, ACIDIC, ORGANIC, N.O.S.(DIBASIC ACID),
8, UN3265, PG III
DOT EMERGENCY RESPONSE GUIDE #: 154

15 Regulatory information

This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

CEPA:

All components of this product comply with substance notification requirements under CEPA.

WHMIS CLASSIFICATION:

D2B E

16 Other information

HMIS vII

CODE TRANSLATION

Health	3	Serious Hazard
Fire	1	Slight Hazard
Reactivity	0	Minimal Hazard
Special	CORR	DOT corrosive
(1) Protective Equipment	B	Goggles,Gloves

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

CHANGE LOG

	EFFECTIVE DATE	REVISIONS TO SECTION:	SUPERCEDES
	-----	-----	-----
MSDS status:	07-MAY-1997		** NEW **
	21-NOV-1997	3	07-MAY-1997
	13-AUG-1998	12	21-NOV-1997
	21-SEP-1998	12	13-AUG-1998
	01-APR-1999	2	21-SEP-1998
	23-AUG-2001	2	01-APR-1999
	27-JUN-2003	14	23-AUG-2001
	25-SEP-2003	2	27-JUN-2003
	23-OCT-2003	12	25-SEP-2003
	07-APR-2006	2,3,4,8	23-OCT-2003
	19-APR-2006	3,4,8,16	07-APR-2006
	07-JUN-2006	2,8,15	19-APR-2006
	08-SEP-2006	4	07-JUN-2006
	26-SEP-2006	2	08-SEP-2006
	29-MAY-2009	3,10	26-SEP-2006
	18-DEC-2009	3,4,11	29-MAY-2009
	13-NOV-2012	16	18-DEC-2009
	30-NOV-2012	3	13-NOV-2012

MATERIAL SAFETY DATA SHEET

This Material Safety Data Sheet (MSDS) is for U.S. manufactured or distributed welding consumables and related products and may be used to comply with OSHA's Hazard Communication standard, 29 CFR 1910.1200, and Superfund Amendments and Reauthorization Act (SARA) of 1986 Public Law 99-499. The OSHA standard must be consulted for specific requirements. This Safety Data Sheet complies with European Commission Directive 89/106/EEC, 91/155/EEC, ISO 11014-1 and ANSI Z400.1. This document is translated in several languages and available on our website at www.hobartbrothers.com, from your sales representative or by calling customer service at 1 (937) 332-4000.

SECTION 1 – IDENTIFICATION

Manufacturer Name: HOBART BROTHERS COMPANY
 Address: 101 TRADE SQUARE EAST, TROY, OH 45373
 Website: www.hobartbrothers.com
 Telephone No: 1 (937) 332-4000
 Emergency No: 1 (800) 424-9300

Products Type: TUBULAR ARC WELDING ELECTRODES FOR FLUX CORED, METAL CORED AND COMPOSITE SUBMERGED ARC WELDING

GROUP A: Product For: Gas Shielded Carbon and Low Alloy Steel
 Trade Name: E71T-1M; **ECLIPSE** RXR-XLS, ULTIMET 716; **EXCEL-ARC** 71; **FABCO** 82HD, 85, 90, HORNET, RXR, RXR-XLS, TR70, XL-71; **FABCOR** 71, 80XLS, 86R, 96, 702, F6; **FABDUAL** T9M, T91M; **FLUX-COR** 2, 7, 37, 80A1; **GALVACOR**; **HOBART** E71T-GS; **METAL-COR** 6, 6L, 80D2, EN-VISION; **METALLOY** 70, 70R, 70X, 76, 80D2, EM12K-S, EM13K-S, X-CEL; **SPEED-ALLOY** 70, 71, 71A, 71-V, 719, 75, 105D2; **SPEED-COR** 6; **SUPER-COR**; **TM** 11, 22, 37, 55, 72, 73, 81A1, 95D2, 105D2, 711M, 791, 811A1, RX7; **TRIPLE-7**, 8; **VERSATILE**; **VERTI-COR** I, II, III; **VISION** AP70, HiDep 70, MetCOR 70

GROUP B: Product For: Self-Shielded Carbon Steel
 Trade Name: **FABSHIELD** 4, 21B, 23, 55, 7027; **SELF-SHIELD** 4, 11, 11GS; **SPEED-SHIELD** 11, GS; **TM** 44, 121, 123

GROUP C: Product For: Carbon and Low Alloy Steel
 Trade Name: **ELEMENT** 70T LF, 71Ni1C, 71Ni1M, 71T1C, 71T LF, 71T1M, 81K2C, 81K2M, **FABCO** 70XHP, 81K2-C, 811N1, 91K2-C, 107G, 110, 110K3-M, 115, 712M, 750M, 803, 812 Ni1M, MIL-101-TM; **FABCO XTREME** 101, 120, B2, B3, B3V; **FABCOR** 90, 100F3-S, 209, 1100, CVN, EDGE, EDGE MC; **FABSHIELD** 3Ni1, 71K6, 71T8, 81N1, 81N1+, 81N2, K54, XLNT-6, XLR-8, X80, X90, X100, OFFSHORE 71Ni, OFFSHORE 81Ni; **FLUX-COR** 90K2; **FORMULA** XL8Ni1, XL8Ni1-C, XL525, XL550; **MATRIX**; **METAL-COR** MAXIM; **METALLOY** 71, 71SG, 80B2, 80N1, 80N2, 90, 90B3, 100, 100F3-S, 110, 120-S, B2-S, B3-S, F2-S, N1-S, N2-S, VANTAGE, VANTAGE D2, VANTAGE Ni1, W-S; **MX2**; **PREMIER** 70; **PW-201**; **SPEED-ALLOY** 81Ni1-V, 81Ni2-V, 85, 91B3, 111-V, 115, 125, 712, 712M, 790; **TM** 71 HYD, 81B2, 81N1, 81N2, 81W, 91B3, 91K2, 91N2, 95K2, 101K3, 111K3, 115, 125K4, 770, 771, 71HYN, 811B2, 811N1, 811N2, 811N3, 811W, 881K2, 910, 911B3, 911N2, 991K2, 101, 1101K3-C, 1101K3-M; **VERTI-COR** 70, 72, 81Ni2, 91B3, 91K2, 91Ni2, IINi1; **MEGAFIL** 240 M, 710 M, 713 R, 940 M, 1100 M, 550 R, 821/822 R

GROUP D: Product For: Corrosion Resisting Steel
 Trade Name: **FABCOR** 409; **FABLOY** 409, 439; **FABTUF** 960; **METAL-COR** 409, 409Cb, 439; **METALLOY** 18CrCb, 409, 439; **POWERCORE** 91; **SPEED-ALLOY** 5055; **TM** B6, B9

SECTION 2 – IDENTIFICATION OF HAZARDS

IMPORTANT - This section covers the hazardous materials from which this product is manufactured. The fumes and gases produced during welding with normal use of this product are also addressed in Section 8. The term "hazardous" in this section should be interpreted as a term required and defined in OSHA Hazard Communication Standard (29 CFR Part 1910.1200).

HAZARDOUS INGREDIENT	CAS	EINECS ^T	REGULATORY HAZARD CLASSIFICATION/DESIGNATION 67/548/EEC ^Δ	IARC ^E	NTP ^Z	OSHA ^{H1}	65 ^Θ
ALUMINUM	7429-90-5	231-072-3	F - R10, R15, R17	---	---	---	---
ALUMINUM OXIDE	1344-28-1	215-691-6	None	---	---	---	---
ANTIMONY TRIOXIDE	1309-64-4	215-175-0	Carc 3 ^Θ - R40	2B	---	---	X
BARIUM FLOURIDE	7787-32-8	232-108-0	None	---	---	---	---
CALCIUM CARBONATE	1317-65-3	215-279-6	None	---	---	---	---
CERIUM OXIDE	1306-38-3	215-150-4	None	---	---	---	---
CHROMIUM	7440-47-3	231-157-5	O - R9; Carc 1 ^Θ - R45; Muta 2 - R46; Repr 3 - R62; T+ - R26; T - R24/25, R48/23; C - R35, R42/43; N - R50, R53 ^{ΣΣ}	1 ^{ΣΣ} , 3 ^{ΣΣ}	K ^{ΣΣ}	X ^{ΣΣ}	X ^{ΣΣ}
COBALT	7440-48-4	231-158-0	Xn; R42/43, R53	2B	---	X	X
COPPER	7440-50-8	231-159-6	None	---	---	---	---
FLUORSPAR	7789-75-5	232-188-7	None	---	---	---	---
IRON	7439-89-6	231-096-4	None	---	---	---	---
IRON OXIDE	1309-37-1	215-168-2	None	3	---	---	---
LITHIUM CARBONATE	554-13-2	209-062-5	F - R14/15; C - R34 ^T	---	---	---	---
LITHIUM FLUORIDE	7789-24-4	232-152-0	F - R14/15; C - R34 ^T	---	---	---	---
LITHIUM OXIDE	12057-24-8	235-019-5	F - R14/15; C - R34 ^T	---	---	---	---
MAGNESIUM	7439-95-4	231-104-6	F - R11, R15, R17	---	---	---	---
MAGNESIUM OXIDE	1309-48-4	215-171-9	None	---	---	---	---
MANGANESE	7439-96-5	231-105-1	Xn - R20/22 ^Y	---	---	---	---
MANGANESE OXIDE	1344-43-0	215-171-9	None	---	---	---	---
MOLYBDENUM	7439-98-7	231-107-2	Xn - R48/20/22; Xi - R36/37 ^X	---	---	---	---
NICKEL	7440-02-0	231-111-4	Carc 3 ^Θ - R40; T - R43, R48/23	1	K	X	X
SILICA	14808-60-7	238-878-4	Xn - R48/20, R40/20	1 ^Ψ	K	X	X
(Amorphous Silica Fume)	69012-64-2	273-761-5	None	3	K	---	X
SILICON	7440-21-3	231-130-8	None	---	---	---	---
STRONTIUM FLUORIDE	7783-48-4	232-000-3	None	---	---	---	---
TITANIUM	7440-32-6	231-142-3	None	---	---	---	---
TITANIUM DIOXIDE	13463-67-7	236-675-5	None	2B	---	---	X
ZIRCONIUM	7440-67-7	231-176-9	F - R15, R17	---	---	---	---

Γ – European Inventory of Existing Chemical Substances Number Δ – European Union Directive 67/548/EEC – Annex 1 E – International Agency for Research on Cancer (1 – Human Carcinogen, 2A – Probably Carcinogenic to Humans, 2B – Possibly Carcinogenic to Humans, 3 – Unclassifiable as to Carcinogenicity in Humans, 4 Probably Not Carcinogenic to Humans) Z – US National Toxicology Program (K – Known Carcinogen, S – Suspected Carcinogen) H – OSHA Known Carcinogen List Θ – California Proposition 65 (X – On Proposition 65 list) --- Dashes indicate the ingredient is not listed with the IARC, NTP, OSHA or 65 Φ – Carcinogen, Mutagen or Reproductive Category per European Council Directive 67/548/EEC Annex I Σ – Metal and Chromium III Compounds ΣΣ – Chromium VI Compounds ΣΣΣ – Chromium (VI) Trioxide EU 67/548/EEC Classification/Designation Y – Manganese Dioxide EU 67/548/EEC Classification/Designation X – Molybdenum Trioxide EU 67/548/EEC Classification/Designation T – Lithium EU 67/548/EEC Classification/Designation Ψ – Silica Crystalline α-Quartz

The following symbols correspond with the EU 67/548/EEC column above are in European Union Directive 67/548/EEC Annex 1 and EC 1272/2008 Annex VI – Table 3.2:

F – Flammable	Xn – Harmful	Xi – Irritant	O – Oxidizer
C – Corrosive	N – Dangerous for the Environment	T – Toxic	T+ - Extremely Toxic

WARNING! - Avoid breathing welding fumes and gases, they may be dangerous to your health. Always use adequate ventilation. Always use appropriate personal protective equipment.

PRIMARY ROUTES OF ENTRY: Respiratory System, Eyes and/or Skin.
ELECTRIC SHOCK: Arc welding and associated processes can kill. See Section 8.

ARC RAYS: The welding arc can injure eyes and burn skin.
FUMES AND GASES: Can be dangerous to your health.

MATERIAL SAFETY DATA SHEET

Welding fumes and gases cannot be classified simply. The composition and quantity of both are dependent upon the metal being welded, the process, procedures and electrodes used. Most fume ingredients are present as complex oxides and compounds and not as pure metals. When the electrode is consumed, the fume and gas decomposition products generated are different in percent and form from the ingredients listed in Section 3. Decomposition products of normal operation include those originating from the volatilization, reaction or oxidation of the materials shown in this section, plus those from the base metal and coating, etc., as noted above. Monitor for the materials identified in the list within this section.

Fumes from the use of this product may contain complex oxides or compounds of the following elements and molecules: amorphous silica fume, antimony trioxide, barium, calcium oxide, chromium, cobalt, copper, fluorspar or fluorides, lithium, manganese, nickel, silica and strontium. Other reasonably expected constituents of the fume would also include complex oxides of iron, titanium, silicon and molybdenum. Gaseous reaction products may include carbon monoxide and carbon dioxide. Ozone and nitrogen oxides may be formed by the radiation from the arc. Other conditions which also influence the composition and quantity of the fumes and gases to which workers may be exposed include: coatings on the metal being welded (such as paint, plating or galvanizing), the number of welders and the volume of the work area, the quality and amount of ventilation, the position of the welder's head with respect to the fume plume, as well as the presence of contaminants in the atmosphere (such as chlorinated hydrocarbon vapors from cleaning and degreasing activities). One recommended way to determine the composition and quantity of fumes and gases to which workers are exposed is to take an air sample inside the welder's helmet if worn or in the worker's breathing zone. See ANSI/AWS F1.1 and F1.3, available from the "American Welding Society", 8669 Doral Blvd., Suite 130, Doral, FL 33166.

SECTION 3 – HAZARDOUS INGREDIENTS

INGREDIENT	CAS	EINECS	GROUP AND %WEIGHT				INGREDIENT	CAS	EINECS	GROUP AND %WEIGHT			
			A	B	C	D				A	B	C	D
ALUMINUM	7429-90-5	231-072-3	<2	<5	<3 ⁽⁶⁾	---	LITHIUM OXIDE	12057-24-8	235-019-5	---	---	<2	---
ALUMINUM OXIDE	1344-28-1	215-691-6	---	---	<3	---	MAGNESIUM	7439-95-4	231-104-6	---	<3	<2	---
ANTIMONY TRIOXIDE	1309-64-4	215-175-0	---	---	<1 ⁽¹²⁾	---	MAGNESIUM OXIDE	1309-48-4	215-171-9	---	<3	<2	---
BARIIUM FLOURIDE	7787-32-8	232-108-0	---	<12 ⁽¹⁾	<12 ⁽³⁾	---	MANGANESE	7439-96-5	231-105-1	<5	<2	<4	<2
CALCIUM CARBONATE	1317-65-3	215-279-6	<2	<2 ⁽⁷⁾	---	---	MANGANESE OXIDE	1344-43-0	215-171-9	---	---	<2	---
CERIUM OXIDE	1306-38-3	215-150-4	---	---	<2 ⁽¹¹⁾	---	MOLYBDENUM	7439-98-7	231-107-2	<1	---	<2	<2
CHROMIUM	7440-47-3	231-157-5	---	---	<3	5-20	NICKEL	7440-02-0	231-111-4	---	---	<4	<1
COBALT	7440-48-4	231-158-0	---	---	<1 ⁽¹⁰⁾	---	SILICA	14808-60-7	238-878-4	<2	<2	<2	---
COPPER	7440-50-8	231-159-6	<1 ⁽²⁾	---	<2 ⁽²⁾	---	(Amorphous Silica Fume)	69012-64-2	273-761-5	---	---	---	---
FLUORSPAR	7789-75-5	232-188-7	<5 ⁽⁵⁾	<10	<5	---	SILICON	7440-21-3	231-130-8	<4	<2 ⁽⁴⁾	<4	<2
IRON	7439-89-6	231-096-4	75-98	75-95	75-98	75-95	STRONTIUM FLUORIDE	7783-48-4	232-000-3	---	<2 ⁽⁸⁾	---	---
IRON OXIDE	1309-37-1	215-168-2	---	---	<12	---	TITANIUM	7440-32-6	231-142-3	---	<2	<2	<2
LITHIUM CARBONATE	554-13-2	209-062-5	---	---	<2	---	TITANIUM DIOXIDE	13463-67-7	236-675-5	<10	<4 ⁽⁴⁾	<10	<2
LITHIUM FLUORIDE	7789-24-4	232-152-0	---	<2 ⁽⁹⁾	<2 ⁽⁹⁾	---	ZIRCONIUM	7440-67-7	231-176-9	---	---	<1	---

--- Dashes indicate the ingredient is not present within the group of products (1) Present only in FABSHIELD 21B, 23; TM 121, 123; SELF-SHIELD 11, 11GS (2) Present only in FABCO 110K3-M; GALVACOR; METALLOY WS; TM-81W, 811W; MEGAFIL 240 M, 710 M, 713 R, 940 M, 1100 M, 550 R, 821/822 R (3) Present only in FABCO XTREME 120, B2, B3; FABSHIELD 3Ni1, 71K6, 71T8, 81N1, 81N1+, 81N2, XLNT-6, X90; FABSHIELD OFFSHORE 71Ni (4) Present only in FABSHIELD 55 (5) Present only in METALLOY EM13K-S; SPEED-ALLOY 105D2; TM 55, 75A1, 95D2, 105D2 (6) Present only in FABCO XTREME 120, B2, B3; FABSHIELD 3Ni1, 71K6, 71T8, 81N1, 81N1+, 81N2, XLNT-6; FABSHIELD OFFSHORE 71Ni (7) Present only in FABSHIELD 7027 (8) Present only in FABSHIELD 21B; TM 121 (9) Present only in FABCO 750M; FABSHIELD 7027 (10) Present only in FABSHIELD 71K6, 81N1, 81N2 (11) Present only in FABSHIELD 71T8, 81N1+, XLNT-6, X90; FABSHIELD OFFSHORE 71Ni; (12) Present only in FABCOR CVN; MATRIX; METAL-COR MAXIM; METALLOY VANTAGE, VANTAGE CVN, VANTAGE D2, VANTAGE Ni1

SECTION 4 – FIRST AID MEASURES

INHALATION: If breathing is difficult provide fresh air and contact physician. **EYE/SKIN INJURIES:** For radiation burns, see physician.
 Section 11 of this MSDS covers the acute effects of overexposure to the various ingredients within the welding consumable. Section 8 of this MSDS lists the exposure limits and covers methods for protecting yourself and your co-workers.

SECTION 5 - FIRE AND EXPLOSION HAZARD DATA

Welding consumables applicable to this sheet as shipped are nonreactive, nonflammable, nonexplosive and essentially nonhazardous until welded. Welding arcs and sparks can ignite combustibles and flammable products. Unused welding consumables may remain hot for a period of time after completion of a welding process. See American National Standard (ANSI) Z49.1 for further general safety information on the use and handling of welding consumables and associated procedures.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Solid objects can be picked up and placed into a container. Wear proper personal protective equipment while handling. Do not discard as general trash.

SECTION 7 - HANDLING AND STORAGE

HANDLING: No specific requirements in the form supplied. Handle with care to avoid cuts. Wear gloves when handling welding consumables. Avoid exposure to dust. Do not ingest. Some individuals can develop an allergic reaction to certain materials. Retain all warning and product labels.
STORAGE: Keep separate from acids and strong bases to prevent possible chemical reactions.

SECTION 8 - EXPOSURE CONTROL AND PERSONAL PROTECTION

Read and understand the instructions and the labels on the packaging. Welding fumes do not have a specific OSHA PEL or ACGIH TLV. The OSHA PEL for Particulate – Not Otherwise Classified (PNOC) is 5 mg/m³ – Respirable Fraction, 15 mg/m³ – Total Dust. The ACGIH TLV for Particles – Not Otherwise Specified (PNOS) is 3 mg/m³ – Respirable Particles, 10 mg/m³ – Inhalable Particles. The individual complex compounds within the fume may have a lower OSHA PEL or ACGIH TLV than the OSHA Particulate – Not Otherwise Classified (PNOC) and ACGIH Particles – Not Otherwise Specified (PNOS). An Industrial Hygienist, the OSHA Permissible Exposure Limits for Air Contaminants (29 CFR 1910.1000), and the ACGIH Threshold Limit Values should be consulted to determine the specific fume constituents present and their respective exposure limits. European Union Occupational Exposure Limits (EU OEL) are listed with the most stringent limit among the EU member nations. All exposure limits are in milligrams per cubic meter (mg/m³).

INGREDIENT	CAS	EINECS	OSHA PEL	ACGIH TLV	EU OEL
ALUMINUM###	7429-90-5	231-072-3	5 R* (Dust)	1 R* {A4}	4 I*; 1.5 R* - Germany
ALUMINUM OXIDE##	1344-28-1	215-691-6	5 R*	1 R* {A4}	1.5 R*(Aerosol) - Germany; 2 - Poland
ANTIMONY TRIOXIDE	1309-64-4	215-175-0	0.5 (as Sb)	0.5 (as Sb) {A2}	0.1 I*; 0.4*** - Hungary
BARIIUM FLOURIDE#	7787-32-8	232-108-0	0.5 (as Ba)	0.5 (as Ba) {A4}	0.1 I* (Aerosol); 0.4*** (Aerosol) - Austria
CALCIUM CARBONATE	1317-65-3	215-279-6	5 R*, 5 (as CaO)	3 R*, 2 (as CaO)	0.5 I* (Aerosol as Ba), 4*** (Aerosol as Ba) - Germany
CERIUM OXIDE	1306-38-3	215-150-4	5 R* (Dust), 15 (Dust)	3 R* (Dust), 10 (Dust)	10 I* (Aerosol) – UK; 3 R* (Aerosol) - Switzerland
CHROMIUM#	7440-47-3	231-157-5	1 (Metal) 0.5 (Cr II & Cr III Cpnds) 0.005 (Cr VI Cpnds)	0.5 (Metal) {A4} 0.5 (Cr III Cpnds) {A4} 0.05 (Cr VI Sol Cpnds) {A1}	4 I*; 1.5 R* (as Dust - NOS) - Germany 0.1 I* (Aerosol) - Switzerland 0.005; 0.01*** - Denmark 0.005 (Total Aerosol); 0.015*** (Total Aerosol) - Sweden
COBALT	7440-48-4	231-158-0	0.1 (Dust and Fume)	0.02 {A3}	0.01 I*; 0.02*** - Denmark
COPPER	7440-50-8	231-159-6	0.1 (Fume), 1 (Dust)	0.2 (Fume), 1 (Dust)	0.1 I* (Aerosol); 0.2 I*** (Aerosol) - Germany
FLUORSPAR	7789-75-5	232-188-7	2.5 (as F)	2.5 (as F) {A4}	0.1; 0.2*** - Denmark
IRON+	7439-89-6	231-096-4	5 R*	5 R* (Fe ₂ O ₃) {A4}	1 I* (Aerosol as F); 4*** (Aerosol as F) - Germany
IRON OXIDE	1309-37-1	215-168-2	10 (Oxide Fume)	5 R* (Fe ₂ O ₃) {A4}	3 R* (Aerosol as Fe ₂ O ₃) – Switzerland 7*** (as Fe ₂ O ₃) - Denmark
LITHIUM CARBONATE	554-13-2	209-062-5	5 R* (Dust), 15 (Dust)	3 R* (Dust), 10 (Dust)	3 R* (Aerosol as Fe ₂ O ₃) – Switzerland 7*** (as Fe ₂ O ₃) - Denmark
LITHIUM FLUORIDE	7789-24-4	232-152-0	2.5 (as F)	2.5 (as F) {A4}	4 I*; 1.5 R* (as Dust - NOS) - Germany 2.5 - UK



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LITHIUM OXIDE	12057-24-8	235-019-5	1 ■ ■	3 R* (Dust), 10 (Dust)	4 I*; 1.5 R* (as Dust - NOS) - Germany
MAGNESIUM+	7439-95-4	231-104-6	5 R*	3 R*	3 R* (Aerosol) - Switzerland
MAGNESIUM OXIDE	1309-48-4	215-171-9	15 (Fume, Total Part)	10 I* {A4}	4 I* (Aerosol); 1.5 R*** (Aerosol) - Germany 3 R* (Aerosol as Mg) - Switzerland
MANGANESE#	7439-96-5	231-105-1	5 CL ** (Fume) 1, 3 STEL *** ■	0.1 I* {A4} 0.02 R*	4 I* (Aerosol as Mg); 1.5 R*** (Aerosol as Mg) - Germany 0.02 R* (Aerosol); 0.16 R*** (Aerosol) - Germany 0.2 I* (Aerosol) - Germany 0.2; 0.4*** - Denmark
MANGANESE OXIDE	1344-43-0	215-171-9	5 CL ** (Fume) 1, 3 STEL *** ■	0.1 I* {A4} 0.02 R*	0.02 R* (Aerosol); 0.16 R*** (Aerosol) - Germany 0.2 I* (Aerosol) - Germany 0.2; 0.4*** - Denmark
MOLYBDENUM	7439-98-7	231-107-2	5 R*	3 R*; 10 I* (Ele and Insol) 0.5 R* (Sol Cpnds) {A3}	3 R* - Spain; 4; 10*** - Poland
NICKEL#	7440-02-0	231-111-4	1 (Metal) 1 (Sol Cpnds) 1 (Insol Cpnds)	1.5 I* (Ele) {A5} 1.0 I* (Sol Cpnds) {A4} 0.2 I* (Insol Cpnds) {A1}	0.05; 0.1*** - Denmark
SILICA++	14808-60-7	238-878-4	0.1 R*	0.025 R* {A2}	0.1 (Fused, Respirable Dust) - Denmark 0.2*** (Fused, Respirable Dust) - Denmark 2 I*; 4 I*** - Denmark
(Amorphous Silica Fume)	69012-64-2	273-761-5	0.8	3 R*	
SILICON+	7440-21-3	231-130-8	5 R*	3 R*	4 R* (Aerosol); 10 I* (Aerosol) - Denmark
STRONTIUM FLUORIDE	7783-48-4	232-000-3	2.5 (as F)	2.5 (as F) {A4}	1 I* (Aerosol as F); 4*** (Aerosol as F) - Germany
TITANIUM+	7440-32-6	231-142-3	5 R*	3 R*	1.5 R* (as TiO ₂) - Germany
TITANIUM DIOXIDE	13463-67-7	236-675-5	15 (Dust)	10 {A4}	1.5 R* - Germany
ZIRCONIUM	7440-67-7	231-176-9	5 (Zr Cpnds)	5, 10 STEL*** (Zr Cpnds) {A4}	1 I* (Aerosol); 0.1 I*** (Aerosol) - Germany

R* - Respirable Fraction R*** - Respirable Fraction - Short Term Exposure Limit I* - Inhalable Fraction I*** - Inhalable Fraction - Short Term Exposure Limit ** - Ceiling Limit *** - Short Term Exposure Limit + - As a nuisance particulate covered under "Particulates Not Otherwise Regulated" by OSHA or "Particulates Not Otherwise Classified" by ACGIH ++ - Crystalline silica is bound within the product as it exists in the package. However, research indicates silica is present in welding fume in the amorphous (noncrystalline) form # - Reportable material under Section 313 of SARA ## - Reportable material under Section 313 of SARA only in fibrous form ### - Reportable material under Section 313 of SARA as dust or fume ■ - NIOSH REL TWA and STEL ■ ■ - AIHA Ceiling Limit of 1 mg/m³ Ele - Element Sol - Soluble Insol - Insoluble Inorg - Inorganic Cpnds - Compounds NOS - Not Otherwise Specified {A1} - Confirmed Human Carcinogen per ACGIH {A2} - Suspected Human Carcinogen per ACGIH {A3} - Confirmed Animal Carcinogen with Unknown Relevance to Humans per ACGIH {A4} - Not Classifiable as a Human Carcinogen per ACGIH {A5} - Not Suspected as a Human Carcinogen per ACGIH (noncrystalline) form

VENTILATION: Use enough ventilation, local exhaust at the arc or both to keep the fumes and gases below the PEL/TLV/OELs in the worker's breathing zone and the general area. Train the welder to keep his head out of the fumes.

RESPIRATORY PROTECTION: Use NIOSH approved or equivalent fume respirator or air supplied respirator when welding in confined space or where local exhaust or ventilation does not keep exposure below the regulatory limits.

EYE PROTECTION: Wear helmet or use face shield with filter lens. As a rule of thumb begin with Shade Number 14. Adjust if needed by selecting the next lighter and/or darker shade number. Provide protective screens and flash goggles, if necessary, to shield others from the weld arc flash.

PROTECTIVE CLOTHING: Wear hand, head and body protection which help to prevent injury from radiation, sparks and electrical shock. See ANSI Z49.1. At a minimum this includes welder's gloves and a protective face shield, and may include arm protectors, aprons, hats, shoulder protection as well as dark nonsynthetic clothing. Train the welder not to touch live electrical parts and to insulate himself from work and ground.

PROCEDURE FOR CLEANUP OF SPILLS OR LEAKS: Not applicable

SPECIAL PRECAUTIONS (IMPORTANT): Maintain exposure below the PEL/TLV/OEL. Use industrial hygiene monitoring to ensure that your use of this material does not create exposures which exceed PEL/TLV/OEL. Always use exhaust ventilation. Refer to the following sources for important additional information: American National Standard (ANSI) Z49.1; Safety in Welding and Cutting published by the American Welding Society, 8669 Doral Blvd., Suite 130, Doral, FL 33166 and OSHA Publication 2206 (29 CFR 1910), U.S. Government Printing Office, Washington, DC 20402.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Welding consumables applicable to this sheet as shipped are nonreactive, nonflammable, nonexplosive and essentially nonhazardous until welded.

PHYSICAL STATE: Cored Wire

COLOR: Gray

ODOR: N/A

FORM: Round Wire

SECTION 10 - STABILITY AND REACTIVITY

GENERAL: Welding consumables applicable to this sheet are solid and nonvolatile as shipped. This product is only intended for use per the welding parameters it was designed for. When this product is used for welding, hazardous fumes may be created. Other factors to consider include the base metal, base metal preparation and base metal coatings. All of these factors can contribute to the fume and gases generated during welding. The amount of fume varies with the welding parameters.

STABILITY: This product is stable under normal conditions.

REACTIVITY: Contact with acids or strong bases may cause generation of gas.

SECTION 11 - TOXICOLOGICAL INFORMATION

SHORT-TERM (ACUTE) OVEREXPOSURE EFFECTS: Welding Fumes - May result in discomfort such as dizziness, nausea or dryness or irritation of nose, throat or eyes.

Aluminum Oxide - Irritation of the respiratory system. **Antimony Compounds** - Irritation of nose, throat, eyes and skin. **Barium** - Aching eyes, rhinitis, frontal headache, wheezing, laryngeal spasms, salivation or anorexia. **Calcium Oxide** - Dust or fumes may cause irritation of the respiratory system, skin and eyes. **Chromium** - Inhalation of fume with chromium (VI) compounds can cause irritation of the respiratory tract, lung damage and asthma-like symptoms. Swallowing chromium (VI) salts can cause severe injury or death. Dust on skin can form ulcers. Eyes may be burned by chromium (VI) compounds. Allergic reactions may occur in some people. **Cobalt** - Pulmonary irritation, cough, dermatitis, weight loss. **Copper** - Metal fume fever characterized by metallic taste, tightness of chest and fever. Symptoms may last 24 to 48 hours following overexposure. **Fluorides** - Fluoride compounds evolved may cause skin and eye burns, pulmonary edema and bronchitis. **Iron, Iron Oxide** - None are known. Treat as nuisance dust or fume. **Lithium Compounds** - Overexposure may cause tremor and nausea. **Magnesium, Magnesium Oxide** - Overexposure to the oxide may cause metal fume fever characterized by metallic taste, tightness of chest and fever. Symptoms may last 24 to 48 hours following overexposure. **Manganese, Manganese Oxide** - Metal fume fever characterized by chills, fever, upset stomach, vomiting, irritation of the throat and aching of body. Recovery is generally complete within 48 hours of the overexposure. **Molybdenum, Cerium Oxide** - Irritation of the eyes, nose and throat. **Nickel, Nickel Compounds** - Metallic taste, nausea, tightness in chest, metal fume fever, allergic reaction. **Silica (Amorphous)** - Dust and fumes may cause irritation of the respiratory system, skin and eyes. **Strontium Compounds** - Strontium salts are generally non-toxic and are normally present in the human body. In large oral doses, they may cause gastrointestinal disorders, vomiting and diarrhea. **Titanium Dioxide** - Irritation of respiratory system. **Zirconium** - May cause irritation of the eyes, nose and throat due to mechanical effects.

LONG-TERM (CHRONIC) OVEREXPOSURE EFFECTS: Welding Fumes - Excess levels may cause bronchial asthma, lung fibrosis, pneumoconiosis or "siderosis." **Aluminum Oxide** - Pulmonary fibrosis and emphysema. **Antimony Compounds** - Metal fume fever, dermatitis, keratitis, conjunctivitis and ulceration and perforation of the nasal septum. Avoid conditions in which fresh hydrogen will react with antimony to form stibine which is extremely toxic. **Barium** - Long term overexposure to soluble barium compounds may cause nervous disorders and may have deleterious effects on the heart, circulatory system and musculature. **Calcium Oxide** - Prolonged overexposure may cause ulceration of the skin and perforation of the nasal septum, dermatitis and pneumonia. **Chromium** - Ulceration and perforation of nasal septum. Respiratory irritation may occur with symptoms resembling asthma. Studies have shown that chromate production workers exposed to hexavalent chromium compounds have an excess of lung cancers. Chromium (VI) compounds are more readily absorbed through the skin than chromium (III) compounds. Good practice requires the reduction of employee exposure to chromium (III) and (VI) compounds. **Cobalt** - Repeated overexposure to cobalt compounds can produce reduced pulmonary function, diffuse nodular fibrosis of lungs and respiratory hypersensitivity. **Copper** - Copper poisoning has been reported in the literature from exposure to high levels of copper. Liver damage can occur due to copper accumulating in the liver characterized by cell destruction and cirrhosis. High levels of copper may cause anemia and jaundice. High levels of copper may cause central nervous system damage characterized by nerve fiber separation and cerebral degeneration. **Fluorides** - Serious bone erosion (Osteoporosis) and mottling of teeth. **Iron, Iron Oxide Fumes** - Can cause siderosis (deposits of iron in lungs) which some researchers believe may affect pulmonary function. Lungs will clear in time when exposure to iron and its compounds ceases. Iron and magnetite (Fe₃O₄) are not regarded as fibrogenic materials. **Lithium Compounds** - May be considered as potentially teratogenic. **Magnesium, Magnesium Oxide** - No adverse long term health effects have been reported in the literature. **Manganese, Manganese Oxide** - Long-term overexposure to

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manganese compounds may affect the central nervous system. Symptoms may be similar to Parkinson's disease and can include slowness, changes in handwriting, gait impairment, muscle spasms and cramps and less commonly, tremor and behavioral changes. Employees who are overexposed to manganese compounds should be seen by a physician for early detection of neurologic problems. Overexposure to manganese and manganese compounds above safe exposure limits can cause irreversible damage to the central nervous system, including the brain, symptoms of which may include slurred speech, lethargy, tremor, muscular weakness, psychological disturbances and spastic gait. **Molybdenum, Cerium Oxide** - Prolonged overexposure may result in loss of appetite, weight loss, loss of muscle coordination, difficulty in breathing and anemia. **Nickel, Nickel Compounds** - Lung fibrosis or pneumoconiosis. Studies of nickel refinery workers indicated a higher incidence of lung and nasal cancers. **Silica (Amorphous)** - Research indicates that silica is present in welding fume in the amorphous form. Long term overexposure may cause pneumoconiosis. Noncrystalline forms of silica (amorphous silica) are considered to have little fibrotic potential. **Strontium Compounds** - Strontium at high doses is known to concentrate in bone. Major signs of chronic toxicity, which involve the skeleton, have been labeled as "strontium rickets". **Titanium Dioxide** - Pulmonary irritation and slight fibrosis. **Zirconium** - May cause pulmonary fibrosis and pneumoconiosis.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Persons with pre-existing impaired lung functions (asthma-like conditions). Persons with a pacemaker should not go near welding and cutting operations until they have consulted their doctor and obtained information from the manufacturer of the device. Respirators are to be worn only after being medically cleared by your company-designated physician.

EMERGENCY AND FIRST AID PROCEDURES: Call for medical aid. Employ first aid techniques recommended by the American Red Cross. If irritation or flash burns develop after exposure, consult a physician.

CARCINOGENICITY: Chromium VI compounds, nickel compounds and silica (crystalline quartz) are classified as IARC Group 1 and NTP Group K carcinogens. Titanium dioxide, antimony trioxide compounds and cobalt compounds are classified as IARC Group 2B carcinogens. Chromium VI compounds, cobalt compounds, nickel compounds, silica (crystalline quartz) and welding fumes must be considered as carcinogens under OSHA (29 CFR 1910.1200).

CALIFORNIA PROPOSITION 65: For Group C and D products: **WARNING:** This product contains or produces a chemical known to the State of California to cause cancer and birth defects (or other reproductive harm). (California Health & Safety Code Section 25249.5 et seq.) For Group A and B products: **WARNING:** This product, when used for welding or cutting, produces fumes or gases which contain chemicals known to the State of California to cause birth defects and, in some cases, cancer. (California Health & Safety Code Section 25249.5 et seq.)

SECTION 12 – ECOLOGICAL INFORMATION

Welding processes can release fumes directly to the environment. Welding wire can degrade if left outside and unprotected. Residues from welding consumables and processes could degrade and accumulate in the soil and groundwater.

SECTION 13 – DISPOSAL CONSIDERATIONS

Use recycling procedures if available. Discard any product, residue, packaging, disposable container or liner in an environmentally acceptable manner, in full compliance with federal, state and local regulations.

SECTION 14 – TRANSPORT INFORMATION

No international regulations or restrictions are applicable. No special precautions are necessary.

SECTION 15 – REGULATORY INFORMATION

Read and understand the manufacturer's instructions, your employer's safety practices and the health and safety instructions on the label and the material safety data sheet. Observe all local and federal rules and regulations. Take all necessary precautions to protect yourself and others.

United States EPA Toxic Substance Control Act: All constituents of these products are on the TSCA inventory list or are excluded from listing.

CERCLA/SARA TITLE III: Reportable Quantities (RQs) and/or Threshold Planning Quantities (TPQs):

Ingredient name	RQ(lb)	TPQ (lb)
Products on this MSDS are a solid solution in the form of a solid article.	--	--

Spills or releases resulting in the loss of any ingredient at or above its RQ require immediate notification to the National Response Center and to your Local Emergency Planning Committee.

Section 311 Hazard Class

As shipped: Immediate	In use: Immediate delayed
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EPCRA/SARA TITLE III 313 TOXIC CHEMICALS: The following metallic components are listed as SARA 313 "Toxic Chemicals" and potentially subject to annual SARA 312 reporting: Antimony Trioxide, Chromium, Cobalt, Copper, Lithium Carbonate, Manganese, and Nickel. See Section 3 for weight percentage.

CANADIAN WHMIS CLASSIFICATION: Class D; Division 2, Subdivision A

CANADIAN CONTROLLED PRODUCTS REGULATION: This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all of the information required by the CPR.

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA): All constituents of these products are on the Domestic Substance List (DSL).

SECTION 16 – OTHER INFORMATION

The following Risk and Safety Phrase Texts and Hazard Statements correspond with the columns labeled - EU 67/548/EEC within Section 2 of this material safety data sheet. Take appropriate precautions and protective measures to eliminate or limit the associated hazard.

EU Directive 67/548/EEC - Risk Phrase Texts

R9 – Explosive when mixed with combustible material	R24/25 – Toxic in contact with skin and if swallowed	R42/43 – May cause sensitization by inhalation and skin contact	R48/20/22 – Harmful: danger of serious damage to health by prolonged exposure through inhalation and if swallowed
R10 – Flammable	R26 – Very toxic by inhalation	R43 – May cause sensitization by skin contact	R48/23 – Toxic: danger of serious damage to health by prolonged exposure through inhalation
R11 – Highly flammable	R34 – Causes burns	R45 – May cause cancer	R50 – Very toxic to aquatic organisms
R14/15 – Reacts violently with water, liberating extremely flammable gases	R35 – Causes severe burns	R46 – May cause heritable genetic damage	R53 – May cause long-term adverse effects in the aquatic environment
R15 – Contact with water liberates extremely flammable gases	R36/37 – Irritating to eyes and respiratory system	R48/20 – Harmful: danger of serious damage to health by prolonged exposure through inhalation	R62 – Possible risk of impaired fertility
R17 – Spontaneously flammable in air	R40 – Limited evidence of a carcinogenic effect		
R20/22 – Harmful by inhalation and if swallowed	R40/20 – Harmful: possible risk of irreversible effects through inhalation		

For additional information please refer to the following sources:

USA: **American National Standard (ANSI) Z49.1** "Safety in Welding and Cutting", **ANSI/American Welding Society (AWS) F1.5** "Methods for Sampling and Analyzing Gases from Welding and Allied Processes", **ANSI/AWS F1.1** "Method for Sampling Airborne Particles Generated by Welding and Allied Processes", **AWSF3.2M/F3.2** "Ventilation Guide for Weld Fume", American Welding Society, 8669 Doral Blvd., Suite 130, Doral, FL 33166. Safety and Health Fact Sheets available from AWS at www.aws.org.

OSHA Publication 2206 (29 C.F.R. 1910), U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954.

Threshold Limit Values and Biological Exposure Indices, American Conference of Governmental Hygienists (ACGIH), 6500 Glenway Ave., Cincinnati, Ohio 45211, USA.

NFPA 51B "Standard for Fire Prevention During Welding, Cutting and Other Hot Work" published by the National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169.

UK: **WMA Publication 236 and 237**, "Hazards from Welding Fume", "The arc welder at work, some general aspects of health and safety".

Canada: **CSA Standard CAN/CSA-W117.2-01** "Safety in Welding, Cutting and Allied Processes".

Hobart Brothers Company strongly recommends the users of this product study this MSDS, the product label information and become aware of all hazards associated with welding. Hobart Brothers Company believes this data to be accurate and to reflect qualified expert opinion regarding current research. However, Hobart Brothers Company cannot make any expressed or implied warranty as to this information.

SAFETY DATA SHEET

Prepared to U.S. OSHA, CMA, ANSI, Canadian WHMIS Standards, European Union CLP EC 1272/2008, REACH and the Global Harmonization Standard

1. SECTION 1 – IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

IDENTIFICATION of the SUBSTANCE or PREPARATION:

PRODUCT NAME: HALON 1211

CHEMICAL NAME: BROMOCHLORODIFLUOROMETHANE

OTHER MEANS OF IDENTIFICATION/SYNONYMS: R 12B1; BCF; Chlorodifluoromonobromomethane; Flugex 12B1; Fluorocarbon 1211; Freon 12B1; Halon 1211; Methane, bromochlorodifluoro-

RELEVANT PRODUCT USE: Fire Extinguishing Material

USES ADVISED AGAINST: Other than Relevant Use

COMPANY/UNDERTAKING IDENTIFICATION:

U.S. MANUFACTURER: H3R Clean Agents

ADDRESS: 483 Magnolia Ave
Larkspur, CA, U.S.A. 94939

PHONE: 1-800/249-4289 (8:00 a.m. to 4:30 p.m. PST)

FAX: 1-415/945-0311

EUROPEAN SUPPLIER/MANUFACTURER'S NAME:

ADDRESS:

BUSINESS PHONE:

WEB SITE: www.h3rcleanagents.com

EMERGENCY PHONE: CHEMTREC: 1-800-424-9300 (U.S./Canada/Puerto Rico) [24-hours]

CHEMTREC: +1-703-527-3887 (Outside North America) [24-hours]

DATE OF PREPARATION: September 21, 2006

DATE OF REVISION: August 30, 2012

ALL WHMIS required information is included in appropriate sections based on the ANSI Z400.1-2010 format. This compound has been classified in accordance with the hazard criteria of the CPR and the SDS contains all the information required by the CPR. The compound is also classified per all applicable EU Directives through EC 1907: 2006, the European Union CLP EC 1272/2008 and the Global Harmonization Standard.

SECTION 2. HAZARD IDENTIFICATION

GLOBAL HARMONIZATION LABELING AND CLASSIFICATION: Classified in accordance with EU CLP 1272: 2008/2011 and the Global Harmonization Standard. This is a self-classification.

Classification: Gases Under Pressure/Liquefied Gas

Signal Word: Warning

Hazard Statement Code: H280

Precautionary Statement Codes: P410 + P403

Hazard Symbol/Pictogram: GHS04



EU 67/548/EEC LABELING AND CLASSIFICATION: Classified in accordance with the European Community Council Directive 67/548/EEC or subsequent Directives. Under this regulation, compressed and liquefied gases that do not meet any hazard classification, have no applicable classification.

Classification: Not Applicable

Risk Phrase Codes: Not Applicable

Safety Phrase Codes: Not Applicable

Hazard Symbol: Not Applicable

See Section 16 for full classification information for this product.

EMERGENCY OVERVIEW: Product Description: Halon 1211 is a colorless, liquefied gas, with a sweet odor, shipped under pressure. **Health Hazards:** The main acute health hazard associated with releases of this gas is asphyxiation by displacement of oxygen. This gas is heavier than air and will sink into low areas, creating an asphyxiation hazard. The main chronic health hazard associated with releases of this gas is possible adverse effects to the central nervous system and possible cardiac sensitization and arrhythmias. Chronic skin exposure may cause dermatitis. **Flammability Hazards:** This gas is not flammable. **Reactivity Hazards:** This gas is not reactive. **Environmental Hazards:** Release of this product to the environment is not expected to cause environmental harm. **Emergency Response Considerations:** Emergency responders must wear the proper personal protective equipment suitable for the situation to which they are responding. **WARNING**—If rescue personnel need to enter an area suspected of having a low level of Oxygen, they should be equipped with Self-Contained Breathing Apparatus (SCBA) and appropriate personal protective equipment.

SECTION 3. COMPOSITION and INFORMATION ON INGREDIENTS

Chemical Name	Chemical Formula	CAS #	EINECS #	% Composition	EU Classification (67/548/EEC) GHS & EU Classification (1272/2008 EC) Risk Phrases/Hazard Statements
Bromochlorodifluoromethane	CB ₂ ClF ₂	353-59-3	206-537-9	> 99%	SELF CLASSIFICATION EU 67/548/EEC <u>Classification:</u> Not Applicable <u>Risk Phrases:</u> Not Applicable <u>Symbols:</u> Not Applicable GHS & EU CLP: 1272/2008: <u>Classification:</u> Compressed Gas/Liquefied Gas <u>Hazard Statement Codes:</u> H280 <u>Hazard Symbols/Pictograms:</u> GHS04

See Section 16 for full product classification information.

SECTION 4. FIRST AID MEASURES

PROTECTION OF FIRST AID RESPONDERS: RESCUERS SHOULD NOT ATTEMPT TO RETRIEVE VICTIMS OF EXPOSURE TO THIS GAS WITHOUT ADEQUATE PERSONAL PROTECTIVE EQUIPMENT. Self-Contained Breathing Apparatus should be worn if the level of oxygen cannot be determined. Rescuers should be taken for medical attention, if necessary. Only trained personnel should administer supplemental oxygen and/or cardio-pulmonary resuscitation, if necessary.

DESCRIPTION OF FIRST AID MEASURES: Remove victim(s) to fresh air, as quickly as possible. Take copy of label and SDS to physician or other health professional with victim(s).

INHALATION EXPOSURE: If inhaled, remove victim to fresh air. If necessary, use artificial respiration to support vital functions. Seek medical attention if adverse effect occurs after removal to fresh air.

SKIN EXPOSURE: If this gas contaminates the skin, immediately begin decontamination with running water. Minimum flushing is for 20 minutes. Remove exposed or contaminated clothing, taking care not to contaminate eyes. Victim must seek immediate medical attention. Remove any clothing that may restrict circulation to any frozen area. Do not rub frozen parts as tissue damage may occur. As soon as practicable, place any affected area in warm water bath which has a temperature that does not exceed 105°F (40°C). NEVER USE HOT WATER. NEVER USE DRY HEAT. If area of frostbite is extensive, and if possible, remove clothing while showering with warm water. If warm water is not available, or is impractical to use, wrap the affected parts gently in blankets. Alternatively, if the fingers or hands are frostbitten, place the affected area of the body in the armpit. Encourage victim to gently exercise the affected part while being warmed. Frozen tissue is painless and appears waxy, with a possible yellow color. Frozen tissue will become swollen, painful and prone to infection when thawed. If the frozen part of the body has been thawed by the time medical attention has been obtained, cover the area with a dry sterile dressing and a large bulky protective covering.

EYE EXPOSURE: If mechanical injury occurs, cover eye with bandage and seek appropriate medical attention. If rapid release has caused frostbite, cover injured eye; an ophthalmologist should be sought as soon as possible.

INGESTION: Ingestion is an unlikely route of exposure for this gas.

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE: None are anticipated.

INDICATION OF IMMEDIATE MEDICAL ATTENTION AND SPECIAL TREATMENT IF NEEDED: Administer oxygen, if necessary, and treat symptoms. This gas is an asphyxiant and can induce cardiac muscle sensitization to circulating epinephrine-like compounds. Do NOT give adrenalin or similar sympathomimetic drugs. Do NOT allow victim to exercise until 24 hours following specific exposures. Freeze burns of mucosal tissue can develop following specific exposures.

SECTION 5. FIRE FIGHTING MEASURES

FLASH POINT: Not Applicable

AUTOIGNITION: Not Applicable

FLAMMABLE RANGE: Not Applicable

EXTINGUISHING MEDIA: This is a non-flammable gas; use fire-extinguishing media appropriate for the surrounding materials.

UNSUITABLE FIRE EXTINGUISHING MEDIA: None known.

SPECIFIC HAZARDS ARISING FROM THE CHEMICAL: This gas does not burn; however, containers, when involved in fire, may rupture or burst in the heat of the fire. Most cylinders have a pressure release device, which will vent contents if the cylinder is exposed to high temperatures. This gas is heavier than air, creating an asphyxiation hazard in low areas.

EXPLOSION SENSITIVITY TO MECHANICAL IMPACT: Not sensitive.

EXPLOSION SENSITIVITY TO STATIC DISCHARGE: Not sensitive.

HAZARDOUS COMBUSTION PRODUCTS: Combustion or decomposition products above 481.7°C (900°F) include hydrogen bromide, hydrogen chloride, hydrogen fluoride, free halogens, and small amounts of carbonyl halides. These by-products have a sharp irritating odor and are dangerous even in low concentrations and in sufficient concentrations can result in personal injury or death.

SPECIAL PROTECTIVE ACTIONS FOR FIRE-FIGHTERS: Move fire-exposed containers if it can be done without risk to firefighters. Use water spray to cool fire-exposed cylinders. Take care not to block pressure relief valves. Stay away from ends of tanks (but realize that shrapnel may travel in any direction). Withdraw immediately in case of rising sound from venting safety device or any discoloration of tanks due to fire.

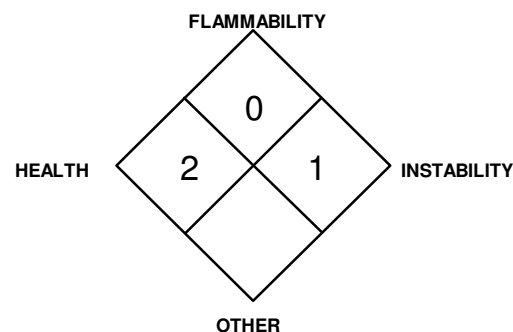
SECTION 6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS AND EMERGENCY PROCEDURES: Evacuate immediate area. Uncontrolled releases should be responded to by trained personnel using pre-planned procedures. Vapors from liquefied gas are initially heavier than air and spread along ground, creating an oxygen-deficient atmosphere in low-lying areas or confined spaces. Detection systems should be available to monitor for level of oxygen. The level of oxygen should be above 19.5% before personnel can be allowed in the area without SCBA.

PERSONAL PROTECTIVE EQUIPMENT: Proper protective equipment should be used.

All Releases: Minimum Personal Protective Equipment should be **Level B: Self-Contained Breathing Apparatus**. Note: chemically protective clothing may provide little or no thermal protection against the hazard of frostbite. The atmosphere must at least 19.5 percent Oxygen before non-emergency personnel can be allowed in the area without Self-Contained Breathing Apparatus and fire protection. If gas is leaking incidentally from the cylinder or its valve, contact your supplier.

NFPA RATING



Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate
3 = Serious 4 = Severe

SECTION 6. ACCIDENTAL RELEASE MEASURES (Continued)

METHODS FOR CLEAN-UP AND CONTAINMENT:

All Releases: In the event of a release of this product, operator should close the gas source if possible to do so safely. Evacuate area in the event of a significant release. Locate and seal the source of the leaking gas. If leak is in user's gas handling equipment or system, close cylinder valve, and safely vent high pressure before attempting repairs. If leak is from the cylinder, cylinder valve or the valve pressure relief device (PRD), contact your supplier. If this does not stop the release (or if it is not possible to reach the valve), allow the gas to release in-place or remove it to a safe area and allow the gas to be released there. Call CHEMTREC (1-800-424-9300) for emergency assistance. Or if in Canada, call CANUTEC (613-996-6666).

ENVIRONMENTAL PRECAUTIONS: All release to the environment should be avoided as this material has an ozone depletion potential and a global warming potential. Run-off water may be contaminated by other materials and should be contained to prevent possible environmental damage.

REFERENCE TO OTHER SECTIONS: See information in Section 8 (Exposure Controls – Personal Protection) and Section 13 (Disposal Considerations) for additional information.

SECTION 7. HANDLING AND STORAGE

PRECAUTIONS FOR SAFE HANDLING: Releases of Halon 1211 can create an oxygen-deficient atmosphere. Be aware of any signs of dizziness or fatigue; exposures to fatal concentrations could occur without any significant warning symptoms, due to oxygen-deficiency. All work operations should be monitored in such a way that emergency personnel can be immediately contacted in the event of a release. Wearing contact lenses is not recommended when handling this gas.

Cylinder valves should be inspected regularly for physical damage or corrosion (apparent by discoloration or rust). Care should be taken to inspect the following valve locations for corrosion: neck (where valve inserts into cylinder); bonnet nut (where handle attaches to valve body). Close valve after each use and when empty.

Do not drag, roll, slide or drop cylinder. Use a suitable hand truck designed for cylinder movement. Never attempt to lift a cylinder by its cap. Secure cylinders at all times while in use. Use a pressure regulator to safely discharge product from cylinder. Use a check valve to prevent reverse flow into cylinder. Once cylinder has been connected to properly purged process, open cylinder valve slowly and carefully. If user experiences any difficulty operating cylinder valve, discontinue use and contact supplier. Never insert an object (e.g., wrench, screwdriver, etc.) into valve cap openings; doing so may damage valve, causing a leak to occur. Use an adjustable strap-wrench to remove over-tight or rusted caps.

Do not heat cylinders by any means to increase the discharge rate of product from the cylinder. Never apply flame or localized heat directly to any part of the cylinder. Cylinders should not be artificially cooled as certain types of steel undergo property changes when cryogenically cooled, thus making the cylinder unstable.

CONDITIONS FOR SAFE STORAGE: Always store and handle compressed gas cylinders in accordance with Compressed Gas Association, Inc. at www.cganet.com pamphlet CGA P-1, *Safe Handling of Compressed Gases in Containers*. Local regulations may require specific equipment for storage and use. Cylinders should be stored upright and be firmly secured to prevent falling or being knocked-over. Cylinders can be stored in the open, but in such cases, should be protected against extremes of weather and from the dampness of the ground to prevent rusting. Cylinders should be stored in dry, well-ventilated areas away from sources of heat, ignition and direct sunlight. Do not allow area where cylinders are stored to exceed 52°C (125°F). Store containers away from heavily trafficked areas and emergency exits. Isolate from other non compatible chemicals (refer to Section 10, Stability and Reactivity). Store away from process and production areas, away from elevators, building and room exits or main aisles leading to exits. Protect cylinders against physical damage. Full and empty cylinders should be segregated. Use a first-in, first-out inventory systems to prevent full containers from being stored for long periods of time. **NOTE:** Use only DOT or ASME code cylinders designed for compressed gas storage. Cylinders must not be recharged except by or with the consent of owner.

STANDARD VALVE CONNECTIONS FOR U.S. AND CANADA: Use the proper CGA connections, DO NOT USE ADAPTERS:

PRODUCT USE: This product is used as a fire-extinguishing agent, refrigerant gas and as a cleaning agent.

PROTECTIVE PRACTICES DURING MAINTENANCE OF CONTAMINATED EQUIPMENT: Follow practices indicated in Section 6 (Accidental Release Measures). Relieve pressure before attempting repairs.

SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMITS/CONTROL PARAMETERS:

VENTILATION AND ENGINEERING CONTROLS: Forced ventilation systems for the general work area should be provided. If appropriate, install automatic monitoring equipment to detect the level of oxygen.

OCCUPATIONAL/WORKPLACE EXPOSURE LIMITS/GUIDELINES:

Chemical Name	CAS #	OSHA PELs ppm	ACGIH TLVs ppm	NIOSH RELs ppm	NIOSH IDLH ppm	DFG MAKs ppm	AIHA WEELs ppm
Halon 1211	353-59-3	NE	NE	NE	NE	NE	NE

NE = Not Established

INTERNATIONAL EXPOSURE LIMITS: Currently, the following international exposure limits are in place for Halon 1211 (specific country limits may become available or change-consult individual countries for most current information).

Russia: STEL = 1000 mg/m³, JUNE 1993

PERSONAL PROTECTIVE EQUIPMENT: The following information on appropriate Personal Protective Equipment is provided to assist employers in complying with OSHA regulations found in 29 CFR Subpart I (beginning at 1910.132), equivalent standards of Canada (including CSA Standard Z94.4-02 and CSA Standard Z94.3-02), or standards of EU member states (including EN 529:2005 for respiratory PPE, CEN/TR 15419:2006 for hand protection, and CR 13464:1999 for face/eye protection). Please reference applicable regulations and standards for relevant details.

SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION (Continued)

PERSONAL PROTECTIVE EQUIPMENT (continued):

RESPIRATORY PROTECTION: Maintain oxygen levels above 19.5% in the workplace. Use supplied air respiratory protection if oxygen level is below 19.5%, or during emergency response to a release of this product. If necessary, use only respiratory protection authorized under appropriate regulations. In the U.S., oxygen levels below 19.5% are considered IDLH by OSHA. In such atmospheres, use of a full-facepiece pressure/demand SCBA or a full facepiece, supplied air respirator with auxiliary self-contained air supply is required under OSHA's Respiratory Protection Standard (1910.134-1998).

EYE PROTECTION: Use approved safety goggles or safety glasses. If necessary, refer to appropriate regulations for further information.

HAND PROTECTION: Wear leather gloves when handling cylinders of this gas. Otherwise, wear glove protection appropriate to the specific operation for which this gas is used. If necessary, refer to appropriate regulations.

BODY PROTECTION: Use body protection appropriate for task. Safety shoes are recommended when handling cylinders. If a hazard of injury to the feet exists due to falling objects, rolling objects, where objects may pierce the soles of the feet or where employee's feet may be exposed to electrical hazards, use foot protection, as described in appropriate country regulations and standards.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Halon 1211	
Form	Liquefied gas under pressure
Color	Colorless
Odor	Sweet
Molecular Weight	165.36
Molecular Formula	CBrClF ₂
Boiling Point @ 1 atm	-4°C (26°F)
Freezing/Melting Point @ 1 atm	-159.5°C (319.1°F)
Specific Gravity [Relative Density] (water = 1)	1.83
Solubility in Water :	Negligible
Vapor Pressure:	37.5 psi @ 70°F; 2,270 hPa @ 20°C
Vapor Density (air = 1)	5.7
Odor Threshold	Not determined

WARNING PROPERTIES FOR THIS GAS: The odor may be a warning of a release. In terms of leak detection, fittings and joints can be painted with a soap solution to detect leaks, which will be indicated by a bubble formation.

SECTION 10. STABILITY AND REACTIVITY

CHEMICAL STABILITY: Stable.

CONDITIONS TO AVOID: Cylinders should not be exposed to temperatures in excess of 125°F (52°C).

MATERIALS WITH WHICH GAS IS INCOMPATIBLE: Metal halides. Contact with acids can evolve highly toxic hydrogen chloride.

HAZARDOUS DECOMPOSITION PRODUCTS: *Combustion:* Combustion or decomposition products above 900°F include hydrogen bromide, hydrogen chloride, hydrogen fluoride, free halogens, and small amounts of carbonyl halides. These by-products have a sharp irritating odor. *Hydrolysis:* None known.

POSSIBILITY OF HAZARDOUS REACTION OR POLYMERIZATION: Will not occur.

SECTION 11. TOXICOLOGICAL INFORMATION

ROUTES OF ENTRY, SYMPTOMS OF ACUTE EXPOSURE: **WARNING-**If rescue personnel need to enter an area in which a release of Halon 1211 has occurred, they should be equipped with Self-Contained Breathing Apparatus (SCBA) and appropriate personal protective equipment. High concentration of this gas will create an oxygen-deficient atmosphere, creating the risk of asphyxiation.

EYE CONTACT: Release of a high-pressure gas may result in airborne objects.

INGESTION: Ingestion of this gas is not a likely route of industrial exposure.

INHALATION: Inhalation of high concentrations of this gas may lead to heart arrhythmias. High concentrations of this gas can cause an oxygen-deficient environment. Individuals breathing such an atmosphere may experience symptoms which include headaches, ringing in ears, dizziness, drowsiness, unconsciousness, nausea, vomiting, and depression of all the senses. The skin of a victim may have a blue color. Under some circumstances of over-exposure, death may occur, due to the displacement of oxygen. The effects associated with various levels of oxygen are described on the following page.

CONCENTRATION of OXYGEN

20.9% Oxygen:
15–19% Oxygen:

12–15% Oxygen:
10–12% Oxygen:

8-10% Oxygen:
6–8% Oxygen:

4–6% Oxygen:

EXPOSURE SYMPTOM

Normal oxygen concentration in air.

Decreased ability to perform tasks. May impair coordination and may induce early symptoms in persons with heart, lung, or circulatory problems.

Breathing increases, especially in exertion. Pulse up. Impaired coordination, perception, and judgment.

Breathing further increases in rate and depth, poor coordination and judgment, lips slightly blue.

Mental failure, fainting, unconsciousness, ashen face, blueness of lips, nausea (upset stomach), and vomiting.

8 minutes, may be fatal in 50–100% of cases; 6 minutes, may be fatal in 25 to 50% of cases; 4–5 minutes, recovery with treatment.

Coma in 40 seconds, followed by convulsion, breathing failure, death.

SECTION 11. TOXICOLOGICAL INFORMATION (Continued)

ROUTES OF ENTRY, SYMPTOMS OF ACUTE EXPOSURE (continued):

INHALATION (continued): WARNING: Exposure to atmospheres containing 8–10% or less oxygen will bring about unconsciousness without warning and so quickly that individuals cannot help or protect themselves. Lack of sufficient oxygen may cause serious injury or death.

SKIN CONTACT: Transitory skin contact should not cause any adverse effects.

OTHER ACUTE HEALTH EFFECTS: Contact with rapidly expanding gases (which are released from under high pressure) may cause frostbite. Symptoms of frostbite include change in skin color to white or grayish-yellow. The pain caused by frostbite can quickly subside, masking the injury. In addition, the sudden release of a pressurized gas (such as may occur in the event of a valve failure), presents a severe hazard of mechanical injury.

ACUTE EXPOSURE TARGET ORGANS: Respiratory system.

ROUTES OF ENTRY, SYMPTOMS OF CHRONIC EXPOSURE:

INHALATION: In animal tests, rats were exposed by inhalation for 21 days, dosed 6 hours per day, 5 days per week, at 3,300 ppm and no adverse effects of toxicological significance (NOAEL) were observed. At 10,000 ppm, there were signs of central nervous system depression. However, there were no signs of toxicity or histopathological changes observed and no potentiation of cardiac sensitization potential. Other animal testing resulted in cardiac sensitization at various concentrations for varying exposure times. Chronic exposure to oxygen-deficient atmospheres (below 18% oxygen in air) may affect the heart and nervous system.

SKIN CONTACT: Prolonged contact may cause dermatitis (dry, red, cracked skin) due to defatting of the skin.

CHRONIC EXPOSURE TARGET ORGANS: Skin, cardiac system, central nervous system.

CARCINOGENIC POTENTIAL: Halon 1211 is not listed as a carcinogen or as a potential carcinogen on EPA, NIOSH, GERMAN MAK, OSHA, NTP, IARC, or CAL/OSHA Carcinogen lists.

TOXICITY DATA: There toxicology data are currently available for Halon 1211.

BROMOCHLORODIFLUOROMETHANE:

TCLo (Inhalation-Man) 4 pph/1 minute: Peripheral Nerve and Sensation: paresthesia; Behavioral: hallucinations, distorted perceptions; Cardiac: EKG changes not diagnostic of specified effects

TCLo (Inhalation-Human) 295,200 mg/m³/1 minute: Peripheral Nerve and Sensation: paresthesia

LC₅₀ (Inhalation-Rat) 20 pph/15 minutes: Behavioral: tremor, convulsions or effect on seizure threshold; Lungs, Thorax, or Respiration: respiratory depression

LC₅₀ (Inhalation-Rat) 2,140,000 mg/m³/5 minutes

LCLo (Inhalation-Dog) 5 pph/30 minutes: Behavioral: tremor, convulsions or effect on seizure threshold; Cardiac: other changes

LCLo (Inhalation-Guinea Pig) 30 pph/2 hours: Behavioral: convulsions or effect on seizure threshold

TCLo (Inhalation-Rat) 396,000 mg/m³/10 minutes: Behavioral: general anesthetic

TCLo (Inhalation-Rat) 210 µg/m³/4 hours/12 weeks-intermittent: Blood: pigmented or nucleated red blood cells, changes in erythrocyte (RBC) count, changes in platelet count

TCLo (Inhalation-Rat) 1 pph/6 hours/3 weeks-intermittent: Behavioral: somnolence (general depressed activity)

TCLo (Inhalation-Rat) 50,000 ppm: female 6-15 day(s) after conception: Reproductive: Maternal Effects: other effects

Mutation in Microorganisms (Bacteria-*Salmonella typhimurium*) 10 pph

ADDITIONAL TOXICOLOGICAL DATA:

Acute: Inhalation-Rat: At 50,000 ppm, no effects were noted. At 75,000 ppm, slightly accelerated respiration was noted. At 100,000 ppm, mild excitement was seen. At 200,000 ppm, within 1 to 2 minutes marked excitation and some convulsions were noted. At 60 to 90 minutes, 2 of the 4 animals died. A concentration of 300,000 ppm immediately gave rise to convulsions and narcosis and all animals died within 50 min. Inhalation-Dog: At 25,000 to 75,000 ppm for 3.5 hours, there was reversible myocardial lesions and fatty degeneration of the liver.

Chronic: A case of occupational rhabdomyolysis in an individual susceptible to malignant hyperthermia was described. A 43 year old male was found to have a serum creatine-kinase activity of 650 international units per liter, normal range 10 to 200 international units/liter, suggesting that he was susceptible to malignant hyperthermia. His susceptibility was confirmed by in vitro testing of a muscle specimen with halothane and caffeine. The subject was subsequently employed in a factory that made fire extinguishers where one of his jobs consisted of discharging Bromochlorodifluoromethane from fire extinguishers before refilling them. Although discharging was done in open air, some gas was commonly inhaled. Eighteen months after beginning this work, he was examined for complaints of malaise and stiffness and weakness in the forearms and hands. The symptoms progressively worsened during the week and improved the weekends. Serum creatine-kinase activity was 1056 IU/l on one Saturday and 544 IU/l the following Monday. Because of the similarity in structure between Bromochlorodifluoromethane and halothane, the effects of the former on contractions of a muscle specimen were examined. Bromochlorodifluoromethane induced contractions identical to those of halothane. The patient was advised to change jobs. After he did so his symptoms immediately improved. It was concluded that the patient's rhabdomyolysis is due to recurring exposures to Bromochlorodifluoromethane. They recommended that persons susceptible to malignant hyperthermia avoid exposure to similar halogenated hydrocarbons. Inhalation-Human: At 4 to 5% for 1 minute using face mask, subjects at 30 seconds became slightly dizzy and light-headed. Over the next few seconds, these symptoms rapidly increased in severity until at 1 minute the subjects felt as though they were about to lose consciousness and exposure was stopped.



HAZARDOUS MATERIAL IDENTIFICATION SYSTEM

HEALTH HAZARD (BLUE) 2*

FLAMMABILITY HAZARD (RED) 0

PHYSICAL HAZARD (YELLOW) 0

PROTECTIVE EQUIPMENT

EYES	RESPIRATORY	HANDS	BODY
	SEE SECTION 8		SEE SECTION 8

For Routine Industrial Use and Handling Applications

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate
3 = Serious 4 = Severe * = Chronic hazard

SECTION 11. TOXICOLOGICAL INFORMATION (Continued)

ADDITIONAL TOXICOLOGICAL DATA (continued):

Chronic (continued): Paresthesia of the fingers and other parts of the body was sometimes noted towards the end of the experiment. Heart rate rose by approximately 30% during the early stages of exposure and remained at that level through the experiment. Depression of the T wave was consistently observed on the ECG tracings. The subjects recovered rapidly on cessation of exposure and felt perfectly normal again within 5 minutes. The heart rate and the ECG reverted to normal within 1 minute. There were no delayed after effects. Inhalation-Dog: At 5,000 to 100,000 ppm resulted in cardiac sensitization above 20,000 ppm and in 10 to 0.5 minutes, depending on concentration.

IRRITANCY OF PRODUCT: Not applicable.

SENSITIZATION OF PRODUCT: Halon 1211 is not a human skin or respiratory sensitizer, but has been shown to be a cardiac sensitizer in animal studies.

REPRODUCTIVE TOXICITY INFORMATION: Halon 1211 is not reported to cause mutagenic, embryotoxic, teratogenic or reproductive toxicity effects in humans. No animal data are available.

BIOLOGICAL EXPOSURE INDICES (BEIs): Currently, Biological Exposure Indices (BEIs) have not been determined for Halon 1211.

SECTION 12. ECOLOGICAL INFORMATION

ALL WORK PRACTICES MUST BE AIMED AT ELIMINATING ENVIRONMENTAL CONTAMINATION.

MOBILITY: Using a structure estimation method based on molecular connectivity indices, the Koc for Halon 1211 can be estimated to be about 49. According to a classification scheme, this estimated Koc value suggests that Halon 1211 is expected to have very high mobility in soil.

PERSISTENCE AND BIODEGRADABILITY: Photodegradation: > 50% after 14 years. If released to air, a vapor pressure of 2.07×10^{-3} mm Hg at 25°C indicates Halon 1211 will exist solely in the gas phase in the ambient atmosphere. Gas phase Bromochlorodifluoromethane will slowly be degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals; the half-life for this reaction in air is estimated to be greater than 44 years. Halon 1211 absorbs very little UV radiation above 290 nm and is not expected to photolyze at a significant rate in the ambient atmosphere. Volatilization from moist soil surfaces is expected to be an important fate process based upon an estimated Henry's Law constant of 9.4×10^{-2} atm-cu m/mole. Halon 1211 will volatilize rapidly from dry soil surfaces since it exists as a gas in the ambient environment. If released into water, Halon 1211 is not expected to adsorb to suspended solids and sediment based upon the estimated Koc. Volatilization from water surfaces is expected to be an important fate process based upon this compound's estimated Henry's Law constant. Estimated volatilization half-lives for a model river and model lake are 1.3 hrs and 5.1 days, respectively. Given its high degree of halogenation, it is not expected to be an important degradation pathway for Halon 1211.

POTENTIAL TO BIOACCUMULATE: An estimated BCF of 5.8 was calculated for Halon 1211, using an estimated log Kow of 1.9 and a regression-derived equation. According to a classification scheme, this BCF suggests the potential for bioconcentration in aquatic organisms is low.

ECOTOXICITY: There is currently no evidence of adverse effects from exposure to Halon 1211 on aquatic life. Immediate adverse effect on plants would be related to oxygen-deficient environments or frost from rapidly expanding gases.

OZONE-DEPLETION POTENTIAL: Halon 1211 is rated as 3 (compared to trichlorofluoromethane nominally 1). Halon 1211 is a Class I ozone depleting chemical (40 CFR Part 82). Halon 1211 may contribute to global warming.

ENVIRONMENTAL EXPOSURE CONTROLS: Controls should be engineered to prevent release to the environment, including procedures to prevent spills, atmospheric release and release to waterways.

RESULTS OF PBT and vPvB ASSESSMENT: No data available. PBT and vPvB assessments are part of the chemical safety report required for some substances in European Union Regulation (EC) 1907/2006, Article 14.

SECTION 13. DISPOSAL CONSIDERATIONS

PRECAUTIONS TO BE FOLLOWED DURING WASTE HANDLING: Wear proper protective equipment when handling waste materials.

UNUSED PRODUCT / EMPTY CONTAINER: Do not dispose of residual product. Return used product in cylinders to: H3R Clean Agent Specialists, Inc.

DISPOSAL INFORMATION: Relative to the environment, this material has an ozone depletion potential and a global warming potential. Refer to the regulations of the U.S. EPA or the State-specific regulations for proper waste disposal, regulations of Canada and its Provinces, or regulations of EU member states.

U.S. EPA WASTE NUMBER: Not applicable.

EUROPEAN (EWC) WASTE CODES: 16 05 04* gases in pressure containers (including halons) containing dangerous substances

SECTION 14. TRANSPORT INFORMATION

U.S. SHIPPING INFORMATION: This gas is classified as dangerous goods, per U.S. DOT regulations, under 49 CFR 172.101.

UN IDENTIFICATION NUMBER:	UN 1044
U.S. DOT PROPER SHIPPING NAME:	Fire extinguisher with compressed or liquefied gas
HAZARD CLASS NUMBER and DESCRIPTION:	2.2 (Non-Flammable Gas)
U.S. DOT SHIPPING LABEL(S) REQUIRED:	Class 2.2 (Non-Flammable Gas)
PACKING GROUP:	Not Applicable
PLACARD (When required):	Class 2.2 (Non-Flammable Gas)

SPECIAL SHIPPING INFORMATION: Cylinders should be transported in a secure position in a well-ventilated truck (never transport in passenger compartment of a vehicle). Ensure cylinder valve is properly closed, valve outlet cap has been reinstalled, and valve protection cap is secured before shipping cylinder.

SECTION 14. TRANSPORT INFORMATION (Continued)

U.S. SHIPPING INFORMATION (continued):

CAUTION: Compressed gas cylinders shall not be refilled except by qualified producers of compressed gases. Shipment of a compressed gas cylinder which has not been filled by the owner or with the owner's written consent is a violation of Federal law (49 CFR 173.301).

ERG (EMERGENCY RESPONSE GUIDEBOOK) #: 126

SPECIAL PROVISIONS: T50 Portable tanks - Applies to various liquefied compressed gases: Consult the regulations for specific requirements Sec. 172.102 Special Provision Portable Tank Code T50.

TRANSPORT CANADA TRANSPORTATION OF DANGEROUS GOODS REGULATIONS: This product is classified as Dangerous Goods, per regulations of Transport Canada. The use of the above U.S. DOT information from the U.S. 49 CFR regulations is allowed for shipments that originate in the U.S. For shipments via ground vehicle or rail that originate in Canada, the following information is applicable.

UN IDENTIFICATION NUMBER: UN 1044
PROPER SHIPPING NAME: Fire extinguisher with compressed or liquefied gas
HAZARD CLASS NUMBER and DESCRIPTION: 2.2 (Non-Flammable Gas)
PACKING GROUP: Not Applicable
HAZARD SHIPPING LABEL(S) REQUIRED: Class 2.2 (Non-Flammable Gas)
SPECIAL PROVISIONS: None
EXPLOSIVE LIMIT & LIMITED QUANTITY INDEX: 0.125
ERAP INDEX: None
PASSENGER CARRYING SHIP INDEX: None
PASSENGER CARRYING ROAD OR RAIL VEHICLE INDEX: 75

INTERNATIONAL AIR TRANSPORT ASSOCIATION SHIPPING INFORMATION (IATA): This gas is classified as dangerous goods, per the International Air Transport Association.

UN IDENTIFICATION NUMBER: UN 1044
PROPER SHIPPING NAME/DESCRIPTION: Fire extinguisher with compressed or liquefied gas
HAZARD CLASS or DIVISION: 2.2 (Non-Flammable Gas)
HAZARD LABEL(S) REQUIRED: Class 2.2 (Non-Flammable Gas)
PACKING GROUP: None
EXCEPTED QUANTITIES: E0
PASSENGER and CARGO AIRCRAFT PACKING INSTRUCTION: 213
PASSENGER and CARGO AIRCRAFT MAXIMUM NET QUANTITY PER PKG: 75 kg
PASSENGER and CARGO AIRCRAFT LIMITED QUANTITY PACKING INSTRUCTION: Forbidden
PASSENGER and CARGO AIRCRAFT LIMITED QUANTITY MAXIMUM NET QUANTITY PER PKG: Forbidden
CARGO AIRCRAFT ONLY PACKING INSTRUCTION: 213
CARGO AIRCRAFT ONLY MAXIMUM NET QUANTITY PER PKG: 150 kg
SPECIAL PROVISIONS: A19
ERG CODE: 2L

INTERNATIONAL MARITIME ORGANIZATION SHIPPING INFORMATION (IMO): This material is classified as dangerous goods, per the International Maritime Organization.

UN No.: 1044
PROPER SHIPPING NAME: Fire extinguisher with compressed or liquefied gas
HAZARD CLASS NUMBER: 2.2
PACKING GROUP: None
SPECIAL PROVISIONS: 225
LIMITED QUANTITIES: 120 mL
EXCEPTED QUANTITIES: E0
PACKING: Instructions: P003; Provisions: None
IBCs: Instructions: None; Provisions: None
TANKS: Instructions: None; Provisions: None
EmS: F-C, S-V
STOWAGE CATEGORY: Category A.

MARINE POLLUTANT: This gas does not meet the criteria of a Marine Pollutant.

EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY ROAD (ADR): This gas is classified by the Economic Commission for Europe to be dangerous goods.

UN NO.: 1044
NAME and DESCRIPTION: Fire extinguisher with compressed or liquefied gas
CLASS: 2
CLASSIFICATION CODE: 6A
PACKING GROUP: None
LABELS: 2.2
SPECIAL PROVISIONS: 225, 594
LIMITED QUANTITIES: 120 mL
EXCEPTED QUANTITIES: E0
PACKING INSTRUCTIONS: P003

SECTION 14. TRANSPORT INFORMATION (Continued)

EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY ROAD (ADR) [continued]:

SPECIAL PACKING INSTRUCTIONS: None
MIXED PACKING PROVISIONS: MP9
PORTABLE TANK and BULK CONTAINER: Instructions: None; Special Provisions: None
HAZARD IDENTIFICATION No.: None

The following shipping information applies when the product is supplied in types of cylinders other than fire extinguishers:

U.S. SHIPPING INFORMATION:

UN IDENTIFICATION NUMBER: UN 1974
U.S. DOT PROPER SHIPPING NAME: Chlorodifluorobromomethane **or** Refrigerant gas R12B1
HAZARD CLASS NUMBER and DESCRIPTION: 2.2 (Non-Flammable Gas)
U.S. DOT SHIPPING LABEL(S) REQUIRED: Class 2.2 (Non-Flammable Gas)
PACKING GROUP: Not Applicable
PLACARD (When required): Class 2.2 (Non-Flammable Gas)
ERG (EMERGENCY RESPONSE GUIDEBOOK) #: 126

SPECIAL SHIPPING INFORMATION: Cylinders should be transported in a secure position in a well-ventilated truck (never transport in passenger compartment of a vehicle). Ensure cylinder valve is properly closed, valve outlet cap has been reinstalled, and valve protection cap is secured before shipping cylinder.

CAUTION: Compressed gas cylinders shall not be refilled except by qualified producers of compressed gases. Shipment of a compressed gas cylinder which has not been filled by the owner or with the owner's written consent is a violation of Federal law (49 CFR 173.301).

SPECIAL PROVISIONS: T50 Portable tanks - Applies to various liquefied compressed gases: Consult the regulations for specific requirements Sec. 172.102 Special Provision Portable Tank Code T50.

TRANSPORT CANADA TRANSPORTATION OF DANGEROUS GOODS REGULATIONS:

UN IDENTIFICATION NUMBER: UN 1974
PROPER SHIPPING NAME: Chlorodifluorobromomethane **or** Refrigerant gas R12B1
HAZARD CLASS NUMBER and DESCRIPTION: 2.2 (Non-Flammable Gas)
PACKING GROUP: Not Applicable
HAZARD SHIPPING LABEL(S) REQUIRED: Class 2.2 (Non-Flammable Gas)
SPECIAL PROVISIONS: None
EXPLOSIVE LIMIT & LIMITED QUANTITY INDEX: 0.125
ERAP INDEX: None
PASSENGER CARRYING SHIP INDEX: None
PASSENGER CARRYING ROAD OR RAIL VEHICLE INDEX: 75

INTERNATIONAL AIR TRANSPORT ASSOCIATION SHIPPING INFORMATION (IATA):

UN IDENTIFICATION NUMBER: UN 1974
PROPER SHIPPING NAME/DESCRIPTION: Chlorodifluorobromomethane **or** Refrigerant gas R12B1
HAZARD CLASS or DIVISION: 2.2 (Non-Flammable Gas)
HAZARD LABEL(S) REQUIRED: Class 2.2 (Non-Flammable Gas)
PACKING GROUP: None
EXCEPTED QUANTITIES: E1
PASSENGER and CARGO AIRCRAFT PACKING INSTRUCTION: 200
PASSENGER and CARGO AIRCRAFT MAXIMUM NET QUANTITY PER PKG: 75 kg
PASSENGER and CARGO AIRCRAFT LIMITED QUANTITY PACKING INSTRUCTION: Forbidden
PASSENGER and CARGO AIRCRAFT LIMITED QUANTITY MAXIMUM NET QUANTITY PER PKG: Forbidden
CARGO AIRCRAFT ONLY PACKING INSTRUCTION: 200
CARGO AIRCRAFT ONLY MAXIMUM NET QUANTITY PER PKG: 150 kg
SPECIAL PROVISIONS: None
ERG CODE: 2L

INTERNATIONAL MARITIME ORGANIZATION SHIPPING INFORMATION (IMO):

UN No.: 1974
PROPER SHIPPING NAME: Chlorodifluorobromomethane **or** Refrigerant gas R12B1
HAZARD CLASS NUMBER: 2.2
PACKING GROUP: None
SPECIAL PROVISIONS: None
LIMITED QUANTITIES: 120 mL
EXCEPTED QUANTITIES: E1
PACKING: Instructions: P200; Provisions: None
IBCs: Instructions: None; Provisions: None
TANKS: Instructions: T50; Provisions: None
EmS: F-C, S-V
STOWAGE CATEGORY: Category A.
MARINE POLLUTANT: This gas does not meet the criteria of a Marine Pollutant.

SECTION 14. TRANSPORT INFORMATION (Continued)
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EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY ROAD (ADR):

UN NO.:	1974
NAME and DESCRIPTION:	Chlorodifluorobromomethane or Refrigerant gas R12B1
CLASS:	2
CLASSIFICATION CODE:	2A
PACKING GROUP:	None
LABELS:	2.2
SPECIAL PROVISIONS:	None
LIMITED QUANTITIES:	120 mL
EXCEPTED QUANTITIES:	E1
PACKING INSTRUCTIONS:	P200
SPECIAL PACKING INSTRUCTIONS:	None
MIXED PACKING PROVISIONS:	MP9
PORTABLE TANK and BULK CONTAINER:	Instructions: (M) T50; Special Provisions: None
HAZARD IDENTIFICATION No.:	20

TRANSPORT IN BULK ACCORDING TO THE IBC CODE: See the information under the individual jurisdiction listings for IBC information.

ENVIRONMENTAL HAZARDS: This gas does not meet the criteria of environmentally hazardous according to the criteria of the UN Model Regulations (as reflected in the IMDG Code, ADR, RID, and ADN); this gas is not specifically listed in Annex III under MARPOL 73/78.

SECTION 15. REGULATORY INFORMATION

U.S. FEDERAL REGULATIONS:
EPA - ENVIRONMENTAL PROTECTION AGENCY:

CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act of 1990 (40 CFR Parts 117 and 302)
Reportable Quantity (RQ): Not Applicable

SARA TITLE III: Superfund Amendment and Reauthorization Act

SECTIONS 302/304: Emergency Planning and Notification (40 CFR Part 355)

Extremely Hazardous Substances: Halon 1211 is not listed.

Threshold Planning Quantity (TPQ): Not Applicable

Reportable Quantity (RQ): Not Applicable

SECTIONS 311/312: Hazardous Chemical Reporting (40 CFR Part 370)

IMMEDIATE HEALTH: No PRESSURE: Yes DELAYED HEALTH: No REACTIVITY: No FIRE: No

SECTION 313: Toxic Chemical Release Reporting (40 CFR 372)

Releases of Halon 1211 require reporting under Section 313.

CLEAN AIR ACT:

SECTION 112 (r): Risk Management Programs for Chemical Accidental Release (40 CFR Part 68)

Threshold Planning Quantity (TPQ): Not Applicable

TSCA: Toxic Substances Control Act

Halon 1211 is listed in the TSCA Inventory

OSHA - OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION:

29 CFR Part 1910.119: Process Safety Management of Highly Hazardous Chemicals.

Threshold Planning Quantity (TPQ): Not Applicable

OTHER U.S. FEDERAL REGULATIONS: Requirements under (40 CFR Part 82) may be applicable as Halon 1211 is designated as an ozone-depleting compound.

U.S. STATE REGULATORY INFORMATION:

CALIFORNIA PROPOSITION 65: Halon 1211 is NOT listed on the California Proposition 65 lists.

CANADIAN FEDERAL REGULATIONS:

CANADIAN DSL INVENTORY STATUS: Halon 1211 is listed on the DSL Inventory.

OTHER CANADIAN REGULATIONS: Halon 1211 is categorized as a Controlled Product, Hazard Class A, as per the Controlled Product Regulations. Halon 1211 is not on the CEPA Priorities Substances Lists.

CANADIAN WHMIS CLASSIFICATION and SYMBOLS: **Class A:** Compressed Gas


ADDITIONAL EUROPEAN REGULATIONS:
SAFETY, HEALTH, AND ENVIRONMENTAL REGULATIONS/LEGISLATION SPECIFIC FOR THE PRODUCT:

Currently, there is no specific legislation pertaining to this product.

CHEMICAL SAFETY ASSESSMENT: No data available. The chemical safety assessment is required for some substances according to European Union Regulation (EC) 1907/2006, Article 14.

SECTION 16. OTHER INFORMATION

GLOBAL HARMONIZATION AND EU CLP REGULATION (EC) 1272/2208 LABELING AND CLASSIFICATION:

Classified in accordance with CLP Regulation (EC) 1272/2008. For information on classification under (67/548/EEC), see below.

Classification: Gas under Pressure/Liquefied Gas

Signal Words: Warning

Hazard Statements: H280: Contains gas under pressure; may explode if heated.

Prevention Statements:

Precautionary: None.

Response: None

Storage: P410 + P403: Protect from sunlight. Store in a well-ventilated place.

Disposal: P501: Dispose of contents/containers in accordance with all local, regional, national and international regulations.

Hazard Symbol: GHS04

EU 67/548/EEC LABELING AND CLASSIFICATION: Under European Union Council Directive 67/548/EEC and subsequent Directives, this is no classification for simple compressed gases.

Classification: None

Risk Phrases: None

Safety Phrases: None

Hazard Symbol: None

Information contained in this Safety Data Sheet is provided to our customers so they may comply with 29 CFR 1910.1200, Hazard Communication Standard, the Canadian WHMIS Standard, and the requirements of the European Union Directives. The intent of this Material Safety Data Sheet is to provide end users of this product with the health and physical hazards associated with possible exposure to this product. All statements, technical data and recommendations are based on readily available texts and data that H₂R Aviation, believes to be reliable and accurate. H₂R Aviation makes no warranties, guarantees or representations of any kind with respect to this product or this data. It is the responsibility of the user to obtain and use the most recent version of this MSDS.

PREPARED BY: CHEMICAL SAFETY ASSOCIATES, Inc. • PO Box 1961, Hilo, HI 96721 • 800/441-3365

REFERENCES AND DATA SOURCES: Contact the supplier for information.

METHODS OF EVALUATING INFORMATION FOR THE PURPOSE OF CLASSIFICATION: Bridging principles were used to classify this product.

REVISION DETAILS: August 2009: Review and up-date of MSDS to current Standards. August 2012: Review and up-date SDS, to include European CLP 1272: 2008 and Global Harmonization Standard Classification.

DEFINITIONS OF TERMS

A large number of abbreviations and acronyms appear on a MSDS. Some of these which are commonly used include the following:

CAS #: This is the Chemical Abstract Service Number that uniquely identifies each constituent.

EXPOSURE LIMITS IN AIR:

CEILING LEVEL: The concentration that shall not be exceeded during any part of the working exposure.

DFG MAK Germ Cell Mutagen Categories: **1:** Germ cell mutagens which have been shown to increase the mutant frequency in the progeny of exposed humans. **2:** Germ cell mutagens which have been shown to increase the mutant frequency in the progeny of exposed mammals. **3A:** Substances which have been shown to induce genetic damage in germ cells of human of animals, or which produce mutagenic effects in somatic cells of mammals *in vivo* and have been shown to reach the germ cells in an active form. **3B:** Substances which are suspected of being germ cell mutagens because of their genotoxic effects in mammalian somatic cell *in vivo*; in exceptional cases, substances for which there are no *in vivo* data, but which are clearly mutagenic *in vitro* and structurally related to known *in vivo* mutagens. **4:** Not applicable (Category 4 carcinogenic substances are those with non-genotoxic mechanisms of action. By definition, germ cell mutagens are genotoxic. Therefore, a Category 4 for germ cell mutagens cannot apply. At some time in the future, it is conceivable that a Category 4 could be established for genotoxic substances with primary targets other than DNA [e.g. purely aneugenic substances] if research results make this seem sensible.) **5:** Germ cell mutagens, the potency of which is considered to be so low that, provided the MAK value is observed, their contribution to genetic risk for humans is expected not to be significant.

DFG MAK Pregnancy Risk Group Classification: **Group A:** A risk of damage to the developing embryo or fetus has been unequivocally demonstrated. Exposure of pregnant women can lead to damage of the developing organism, even when MAK and BAT (Biological Tolerance Value for Working Materials) values are observed. **Group B:** Currently available information indicates a risk of damage to the developing embryo or fetus must be considered to be probable. Damage to the developing organism cannot be excluded when pregnant women are exposed, even when MAK and BAT values are observed. **Group C:** There is no reason to fear a risk of damage to the developing embryo or fetus when MAK and BAT values are observed. **Group D:** Classification in one of the groups A-C is not yet possible because, although the data available may indicate a trend, they are not sufficient for final evaluation.

IDLH-Immediately Dangerous to Life and Health: This level represents a concentration from which one can escape within 30-minutes without suffering escape-preventing or permanent injury.

LOQ: Limit of Quantitation.

MAK: Federal Republic of Germany Maximum Concentration Values in the workplace.

NE: Not Established. When no exposure guidelines are established, an entry of NE is made for reference.

NIC: Notice of Intended Change.

NIOSH CEILING: The exposure that shall not be exceeded during any part of the workday. If instantaneous monitoring is not feasible, the ceiling shall be assumed as a 15-minute TWA exposure (unless otherwise specified) that shall not be exceeded at any time during a workday.

NIOSH RELs: NIOSH's Recommended Exposure Limits.

PEL-Permissible Exposure Limit: OSHA's Permissible Exposure Limits. This exposure value means exactly the same as a TLV, except that it is enforceable by OSHA. The OSHA Permissible Exposure Limits are based in the 1989 PELs and the June, 1993 Air Contaminants Rule (Federal Register: 58: 35338-35351 and 58: 40191). Both the current PELs and the vacated PELs are indicated. The phrase, "Vacated 1989 PEL," is placed next to the PEL that was vacated by Court Order

SKIN: Used when there is a danger of cutaneous absorption.

EXPOSURE LIMITS IN AIR (continued):

STEL-Short Term Exposure Limit: Short Term Exposure Limit, usually a 15-minute time-weighted average (TWA) exposure that should not be exceeded at any time during a workday, even if the 8-hr TWA is within the TLV-TWA, PEL-TWA or REL-TWA.

SKIN: Used when there is a danger of cutaneous absorption.

STEL-Short Term Exposure Limit: Short Term Exposure Limit, usually a 15-minute time-weighted average (TWA) exposure that should not be exceeded at any time during a workday, even if the 8-hr TWA is within the TLV-TWA, PEL-TWA or REL-TWA.

TLV-Threshold Limit Value: An airborne concentration of a substance that represents conditions under which it is generally believed that nearly all workers may be repeatedly exposed without adverse effect. The duration must be considered, including the 8-hour.

TWA-Time Weighted Average: Time Weighted Average exposure concentration for a conventional 8-hr (TLV, PEL) or up to a 10-hr (REL) workday and a 40-hr workweek.

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM

HAZARD RATINGS: This rating system was developed by the National Paint and Coating Association and has been adopted by industry to identify the degree of chemical hazards.

HEALTH HAZARD: 0 (Minimal Hazard): No significant health risk, irritation of skin or eyes not anticipated. *Skin Irritation:* Essentially non-irritating. PII or Draize = "0". *Eye Irritation:* Essentially non-irritating, or minimal effects which clear in < 24 hours [e.g. mechanical irritation]. Draize = "0". *Oral Toxicity LD₅₀ Rat:* < 5000 mg/kg. *Dermal Toxicity LD₅₀ Rat or Rabbit:* < 2000 mg/kg. *Inhalation Toxicity 4-hrs LC₅₀ Rat:* < 20 mg/L; **1 (Slight Hazard):** Minor reversible injury may occur; slightly or mildly irritating. *Skin Irritation:* Slightly or mildly irritating. *Eye Irritation:* Slightly or mildly irritating. *Oral Toxicity LD₅₀ Rat:* > 500-5000 mg/kg. *Dermal Toxicity LD₅₀ Rat or Rabbit:* > 1000-2000 mg/kg. *Inhalation Toxicity LC₅₀ 4-hrs Rat:* > 2-20 mg/L; **2 (Moderate Hazard):** Temporary or transitory injury may occur. *Skin Irritation:* Moderately irritating; primary irritant; sensitizer. PII or Draize > 0, < 5. *Eye Irritation:* Moderately to severely irritating and/or corrosive; reversible corneal opacity; corneal involvement or irritation clearing in 8-21 days. Draize > 0, ≤ 25. *Oral Toxicity LD₅₀ Rat:* > 500-500 mg/kg. *Dermal Toxicity LD₅₀ Rat or Rabbit:* > 200-1000 mg/kg. *Inhalation Toxicity LC₅₀ 4-hrs Rat:* > 0.5-2 mg/L; **3 (Serious Hazard):** Major injury likely unless prompt action is taken and medical treatment is given; high level of toxicity; corrosive. *Skin Irritation:* Severely irritating and/or corrosive; may destroy dermal tissue, cause skin burns, dermal necrosis. PII or Draize > 5-8 with destruction of tissue. *Eye Irritation:* Corrosive, irreversible destruction of ocular tissue; corneal involvement or irritation persisting for more than 21 days. Draize > 80 with effects irreversible in 21 days. *Oral Toxicity LD₅₀ Rat:* > 1-50 mg/kg. *Dermal Toxicity LD₅₀ Rat or Rabbit:* > 20-200 mg/kg. *Inhalation Toxicity LC₅₀ 4-hrs Rat:* > 0.05-0.5 mg/L; **4 (Severe Hazard):** Life-threatening; major or permanent damage may result from single or repeated exposure. *Skin Irritation:* Not appropriate. Do not rate as a "4", based on skin irritation alone. *Eye Irritation:* Not appropriate. Do not rate as a "4", based on eye irritation alone. *Oral Toxicity LD₅₀ Rat:* ≤ 1 mg/kg. *Dermal Toxicity LD₅₀ Rat or Rabbit:* ≤ 20 mg/kg. *Inhalation Toxicity LC₅₀ 4-hrs Rat:* ≤ 0.05 mg/L.

FLAMMABILITY HAZARD: 0 (Minimal Hazard): Materials that will not burn in air when exposure to a temperature of 815.5°C [1500°F] for a period of 5 minutes.; **1 (Slight Hazard):** Materials that must be pre-heated before ignition can occur. Material require considerable pre-heating, under all ambient temperature conditions before ignition and combustion can occur. Including: Materials that will burn in air when exposed to a temperature of 815.5°C (1500°F) for a period of 5 minutes or less; Liquids, solids and semisolids having a flash point at or above 93.3°C [200°F] (e.g. OSHA Class IIIB, or; Most ordinary combustible materials [e.g. wood, paper, etc.];

DEFINITIONS OF TERMS (Continued)

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM
HAZARD RATINGS (continued):

FLAMMABILITY HAZARD (continued): 2 (Moderate Hazard-Materials that must be moderately heated or exposed to relatively high ambient temperatures before ignition can occur. Materials in this degree would not, under normal conditions, form hazardous atmospheres in air, but under high ambient temperatures or moderate heating may release vapor in sufficient quantities to produce hazardous atmospheres in air, including: Liquids having a flash-point at or above 37.8°C [100°F]; Solid materials in the form of coarse dusts that may burn rapidly but that generally do not form explosive atmospheres; Solid materials in a fibrous or shredded form that may burn rapidly and create flash fire hazards (e.g. cotton, sisal, hemp; Solids and semisolids that readily give off flammable vapors.); 3 (Serious Hazard- Liquids and solids that can be ignited under almost all ambient temperature conditions. Materials in this degree produce hazardous atmospheres with air under almost all ambient temperatures, or, unaffected by ambient temperature, are readily ignited under almost all conditions, including: Liquids having a flash point below 22.8°C [73°F] and having a boiling point at or above 38°C [100°F] and below 37.8°C [100°F] [e.g. OSHA Class IB and IC]; Materials that on account of their physical form or environmental conditions can form explosive mixtures with air and are readily dispersed in air [e.g., dusts of combustible solids, mists or droplets of flammable liquids]; Materials that burn extremely rapidly, usually by reason of self-contained oxygen [e.g. dry nitrocellulose and many organic peroxides]); 4 (Severe Hazard-Materials that will rapidly or completely vaporize at atmospheric pressure and normal ambient temperature or that are readily dispersed in air, and which will burn readily, including: Flammable gases; Flammable cryogenic materials; Any liquid or gaseous material that is liquid while under pressure and has a flash point below 22.8°C [73°F] and a boiling point below 37.8°C [100°F] [e.g. OSHA Class IA; Material that ignites spontaneously when exposed to air at a temperature of 54.4°C [130°F] or below [e.g. pyrophoric]).

PHYSICAL HAZARD: 0 (Water Reactivity): Materials that do not react with water. *Organic Peroxides:* Materials that are normally stable, even under fire conditions and will not react with water. *Explosives:* Substances that are Non-Explosive. *Unstable Compressed Gases:* No Rating. *Pyrophorics:* No Rating. *Oxidizers:* No "0" rating allowed. *Unstable Reactives:* Substances that will not polymerize, decompose, condense or self-react.; 1 (*Water Reactivity:* Materials that change or decompose upon exposure to moisture. *Organic Peroxides:* Materials that are normally stable, but can become unstable at high temperatures and pressures. These materials may react with water, but will not release energy. *Explosives:* Division 1.5 & 1.6 substances that are very insensitive explosives or that do not have a mass explosion hazard. *Compressed Gases:* Pressure below OSHA definition. *Pyrophorics:* No Rating. *Oxidizers:* Packaging Group III; *Solids:* any material that in either concentration tested, exhibits a mean burning time less than or equal to the mean burning time of a 3:7 potassium bromate/cellulose mixture and the criteria for Packing Group I and II are not met. *Liquids:* any material that exhibits a mean pressure rise time less than or equal to the pressure rise time of a 1:1 nitric acid (65%)/cellulose mixture and the criteria for Packing Group I and II are not met. *Unstable Reactives:* Substances that may decompose, condense or self-react, but only under conditions of high temperature and/or pressure and have little or no potential to cause significant heat generation or explosive hazard. Substances that readily undergo hazardous polymerization in the absence of inhibitors.); 2 (*Water Reactivity:* Materials that may react violently with water. *Organic Peroxides:* Materials that, in themselves, are normally unstable and will readily undergo violent chemical change, but will not detonate. These materials may also react violently with water. *Explosives:* Division 1.4 – Explosive substances where the explosive effect are largely confined to the package and no projection of fragments of appreciable size or range are expected. An external fire must not cause virtually instantaneous explosion of almost the entire contents of the package. *Compressed Gases:* Pressurized and meet OSHA definition but < 514.7 psi absolute at 21.1°C (70°F) [500 psig]. *Pyrophorics:* No Rating. *Oxidizers:* Packing Group II *Solids:* any material that, either in concentration tested, exhibits a mean burning time of less than or equal to the mean burning time of a 2:3 potassium bromate/cellulose mixture and the criteria for Packing Group I are not met. *Liquids:* any material that exhibits a mean pressure rise time less than or equal to the pressure rise time of a 1:1 aqueous sodium chlorate solution (40%)/cellulose mixture and the criteria for Packing Group I are not met. *Unstable Reactives:* Substances that may polymerize, decompose, condense, or self-react at ambient temperature and/or pressure, but have a low potential for significant heat generation or explosion. Substances that readily form peroxides upon exposure to air or oxygen at room temperature); 3 (*Water Reactivity:* Materials that may form explosive reactions with water. *Organic Peroxides:* Materials that are capable of detonation or explosive reaction, but require a strong initiating source, or must be heated under confinement before initiation; or materials that react explosively with water. *Explosives:* Division 1.2 – Explosive substances that have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but do not have a mass explosion hazard. *Compressed Gases:* Pressure \geq 514.7 psi absolute at 21.1°C (70°F) [500 psig]. *Pyrophorics:* No Rating. *Oxidizers:* Packing Group I *Solids:* any material that, in either concentration tested, exhibits a mean burning time less than the mean burning time of a 3:2 potassium bromate/cellulose mixture. *Liquids:* Any material that spontaneously ignites when mixed with cellulose in a 1:1 ratio, or which exhibits a mean pressure rise time less than the pressure rise time of a 1:1 perchloric acid (50%)/cellulose mixture.

NATIONAL FIRE PROTECTION ASSOCIATION HAZARD RATINGS

HEALTH HAZARD: 0 (materials that, under emergency conditions, would offer no hazard beyond that of ordinary combustible materials): Gases and vapors whose LC₅₀ for acute inhalation toxicity is greater than 10,000 ppm. Dusts and mists whose LC₅₀ for acute inhalation toxicity is greater than 200 mg/L. Materials whose LD₅₀ for acute dermal toxicity is greater than 2000 mg/kg. Materials whose LD₅₀ for acute oral toxicity is greater than 2000 mg/kg. Materials that are essentially non-irritating to the respiratory tract, eyes and skin. 1 (materials that, under emergency conditions, can cause significant irritation): Gases and vapors whose LC₅₀ for acute inhalation toxicity is greater than 5,000 ppm but less than or equal to 10,000 ppm. Dusts and mists whose LC₅₀ for acute inhalation toxicity is greater than 10 mg/L but less than or equal to 200 mg/L. Materials whose LD₅₀ for acute dermal toxicity is greater than 1000 mg/kg but less than or equal to 2000 mg/kg. Materials whose LD₅₀ for acute oral toxicity is greater than 500 mg/kg but less than or equal to 2000 mg/kg. Materials that cause slight to moderate irritation to the respiratory tract, eyes and skin.

NATIONAL FIRE PROTECTION ASSOCIATION HAZARD RATINGS (continued):

HEALTH HAZARD (continued): 2 (materials that, under emergency conditions, can cause temporary incapacitation or residual injury): Gases and vapors whose LC₅₀ for acute inhalation toxicity is greater than 3,000 ppm but less than or equal to 5,000 ppm. Dusts and mists whose LC₅₀ for acute inhalation toxicity is greater than 2 mg/L but less than or equal to 10 mg/L. Materials whose LD₅₀ for acute dermal toxicity is greater than 200 mg/kg but less than or equal to 1000 mg/kg. Materials whose LD₅₀ for acute oral toxicity is greater than 50 mg/kg but less than or equal to 500 mg/kg. Any liquid whose saturated vapor concentration at 20°C (68°F) is equal to or greater than one-fifth its LC₅₀ for acute inhalation toxicity, if its LC₅₀ is less than or equal to 5000 ppm and that does not meet the criteria for either degree of hazard 3 or degree of hazard 4. Compressed liquefied gases with boiling points between -30°C (-22°F) and -55°C (-66.5°F) that cause severe tissue damage, depending on duration of exposure. Materials that are respiratory irritants. Materials that cause severe, but reversible irritation to the eyes or are lachrymators. Materials that are primary skin irritants or sensitizers. 3 (materials that, under emergency conditions, can cause serious or permanent injury): Gases and vapors whose LC₅₀ for acute inhalation toxicity is greater than 1,000 ppm but less than or equal to 3,000 ppm. Dusts and mists whose LC₅₀ for acute inhalation toxicity is greater than 0.5 mg/L but less than or equal to 2 mg/L. Materials whose LD₅₀ for acute dermal toxicity is greater than 40 mg/kg but less than or equal to 200 mg/kg. Materials whose LD₅₀ for acute oral toxicity is greater than 5 mg/kg but less than or equal to 50 mg/kg. Any liquid whose saturated vapor concentration at 20°C (68°F) is equal to or greater than one-fifth its LC₅₀ for acute inhalation toxicity, if its LC₅₀ is less than or equal to 3000 ppm and that does not meet the criteria for degree of hazard 4. Compressed liquefied gases with boiling points between -30°C (-22°F) and -55°C (-66.5°F) that cause frostbite and irreversible tissue damage. Materials that are respiratory irritants. Cryogenic gases that cause frostbite and irreversible tissue damage. Materials that are corrosive to the respiratory tract. Materials that are corrosive to the eyes or cause irreversible corneal opacity. Materials that are corrosive to the skin. 4 (materials that, under emergency conditions, can be lethal): Gases and vapors whose LC₅₀ for acute inhalation toxicity less than or equal to 1,000 ppm. Dusts and mists whose LC₅₀ for acute inhalation toxicity is less than or equal to 0.5 mg/L. Materials whose LD₅₀ for acute dermal toxicity is less than or equal to 40 mg/kg. Materials whose LD₅₀ for acute oral toxicity is less than or equal to 5 mg/kg. Any liquid whose saturated vapor concentration at 20°C (68°F) is equal to or greater than one-fifth its LC₅₀ for acute inhalation toxicity, if its LC₅₀ is less than or equal to 1000 ppm.

FLAMMABILITY HAZARD: 0 Materials that will not burn under typical fire conditions, including intrinsically noncombustible materials such as concrete, stone, and sand: Materials that will not burn in air when exposed to a temperature of 816°C (1500°F) for a period of 5 minutes in accordance with Annex D. 1 Materials that must be preheated before ignition can occur. Materials in this degree require considerable preheating, under all ambient temperature conditions, before ignition and combustion can occur: Materials that will burn in air when exposed to a temperature of 816°C (1500°F) for a period of 5 minutes in accordance with Annex D. Liquids, solids and semisolids having a flash point at or above 93.4°C (200°F) (i.e. Class IIIB liquids). Liquids with a flash point greater than 35°C (95°F) that do not sustain combustion when tested using the *Method of Testing for Sustained Combustibility*, per 49 CFR 173, Appendix H or the *UN Recommendation on the Transport of Dangerous Goods, Model Regulations* (current edition) and the related *Manual of Tests and Criteria* (current edition). Liquids with a flash point greater than 35°C (95°F) in a water-miscible solution or dispersion with a water non-combustible liquid/solid content of more than 85 percent by weight. Liquids that have no fire point when tested by ASTM D 92 Standard Test Method for Flash and Fire Points by Cleveland Open Cup, up to a boiling point of the liquid or up to a temperature at which the sample being tested shows an obvious physical change. Combustible pellets with a representative diameter of greater than 2 mm (10 mesh). Solids containing greater than 0.5 percent by weight of a flammable or combustible solvent are rated by the closed up flash point of the solvent. Most ordinary combustible materials. 2 Materials that must be moderately heated or exposed to relatively high ambient temperatures before ignition can occur. Materials in this degree would not under normal conditions form hazardous atmospheres with air, but under high ambient temperatures or under moderate heating could release vapor in sufficient quantities to produce hazardous atmospheres with air: Liquids having a flash point at or above 37.8°C (100°F) and below 93.4°C (200°F) (i.e. Class II and Class IIIA liquids.) Solid materials in the form of powders or coarse dusts of representative diameter between 420 microns (40 mesh) and 2 mm (10 mesh) that burn rapidly but that generally do not form explosive mixtures in air. Solid materials in fibrous or shredded form that burn rapidly and create flash fire hazards, such as cotton, sisal and hemp. Solids and semisolids that readily give off flammable vapors. Solids containing greater than 0.5 percent by weight of a flammable or combustible solvent are rated by the closed cup flash point of the solvent. 3 Liquids and solids that can be ignited under almost all ambient temperature conditions. Materials in this degree produce hazardous atmospheres with air under almost all ambient temperatures or, though unaffected by ambient temperatures, are readily ignited under almost all conditions: Liquids having a flash point below 22.8°C (73°F) and having a boiling point at or above 37.8°C (100°F) and those liquids having a flash point at or above 22.8°C (73°F) and below 37.8°C (73°F) and below 37.8°C (100°F) (i.e. Class IB and IC liquids). Materials that, on account of their physical form or environmental conditions, can form explosive mixtures with air and are readily dispersed in air. Flammable or combustible dusts with a representative diameter less than 420 microns (40 mesh). Materials that burn with extreme rapidity, usually by reason of self-contained oxygen (e.g. dry nitrocellulose and many organic peroxides). Solids containing greater than 0.5 percent by weight of a flammable or combustible solvent are rated by the closed cup flash point of the solvent. 4 Materials that will rapidly or completely vaporize at atmospheric pressure and normal ambient temperature or that are readily dispersed in air and will burn readily: Flammable gases. Flammable cryogenic materials. Any liquid or gaseous materials that is liquid while under pressure and has a flash point below 22.8°C (73°F) and a boiling point below 37.8°C (100°F) (i.e. Class IA liquids). Materials that ignite when exposed to air, Solids containing greater than 0.5 percent by weight of a flammable or combustible solvent are rated by the closed cup flash point of the solvent.

DEFINITIONS OF TERMS (Continued)

NATIONAL FIRE PROTECTION ASSOCIATION HAZARD RATINGS (continued):

INSTABILITY HAZARD: 0 Materials that in themselves are normally stable, even under fire conditions: Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) below 0.01 W/mL. Materials that do not exhibit an exotherm at temperatures less than or equal to 500°C (932°F) when tested by differential scanning calorimetry. **1** Materials that in themselves are normally stable, but that can become unstable at elevated temperatures and pressures: Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) at or above 0.01 W/mL and below 10 W/mL. **2** Materials that readily undergo violent chemical change at elevated temperatures and pressures: Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) at or above 10 W/mL and below 100W/mL. **3** Materials that in themselves are capable of detonation or explosive decomposition or explosive reaction, but that require a strong initiating source or that must be heated under confinement before initiation: Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) at or above 100 W/mL and below 1000 W/mL. Materials that are sensitive to thermal or mechanical shock at elevated temperatures and pressures. **4** Materials that in themselves are readily capable of detonation or explosive decomposition or explosive reaction at normal temperatures and pressures: Materials that have an estimated instantaneous power density (product of heat of reaction and reaction rate) at 250°C (482°F) of 1000 W/mL or greater. Materials that are sensitive to localized thermal or mechanical shock at normal temperatures and pressures.

FLAMMABILITY LIMITS IN AIR:

Much of the information related to fire and explosion is derived from the **National Fire Protection Association (NFPA)**. **Flash Point** - Minimum temperature at which a liquid gives off sufficient vapors to form an ignitable mixture with air. **Autoignition Temperature**: The minimum temperature required to initiate combustion in air with no other source of ignition. **LEL** - the lowest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source. **UEL** - the highest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source.

TOXICOLOGICAL INFORMATION:

Human and Animal Toxicology: Possible health hazards as derived from human data, animal studies, or from the results of studies with similar compounds are presented. Definitions of some terms used in this section are: **LD₅₀** - Lethal Dose (solids & liquids) which kills 50% of the exposed animals; **LC₅₀** - Lethal Concentration (gases) which kills 50% of the exposed animals; **ppm** concentration expressed in parts of material per million parts of air or water; **mg/m³** concentration expressed in weight of substance per volume of air; **mg/kg** quantity of material, by weight, administered to a test subject, based on their body weight in kg. Other measures of toxicity include **TDLo**, the lowest dose to cause a symptom and **TCLo** the lowest concentration to cause a symptom; **TDo**, **LDLo**, and **LDo**, or **TC**, **TCo**, **LCLo**, and **LCo**, the lowest dose (or concentration) to cause lethal or toxic effects.

Cancer Information: The sources are: **IARC** - the International Agency for Research on Cancer; **NTP** - the National Toxicology Program, **RTECS** - the Registry of Toxic Effects of Chemical Substances, **OSHA** and **CAL/OSHA**. IARC and NTP rate chemicals on a scale of decreasing potential to cause human cancer with rankings from 1 to 4. Subrankings (2A, 2B, etc.) are also used. **Other Information:** **BEI** - ACGIH Biological Exposure Indices, represent the levels of determinants which are most likely to be observed in specimens collected from a healthy worker who has been exposed to chemicals to the same extent as a worker with inhalation exposure to the TLV.

REPRODUCTIVE TOXICITY INFORMATION:

A **mutagen** is a chemical that causes permanent changes to genetic material (DNA) such that the changes will propagate through generational lines. An **embryotoxin** is a chemical that causes damage to a developing embryo (i.e., within the first eight weeks of pregnancy in humans), but the damage does not propagate across generational lines. A **teratogen** is a chemical that causes damage to a developing fetus, but the damage does not propagate across generational lines. A **reproductive toxin** is any substance that interferes in any way with the reproductive process.

ECOLOGICAL INFORMATION:

EC is the effect concentration in water. **BCF** = Bioconcentration Factor, which is used to determine if a substance will concentrate in lifeforms which consume contaminated plant or animal matter. **TL_m** = median threshold limit; Coefficient of Oil/Water Distribution is represented by **log K_{ow}** or **log K_{oc}** and is used to assess a substance's behavior in the environment.

REGULATORY INFORMATION:**U.S. and CANADA:**

ACGIH: American Conference of Governmental Industrial Hygienists, a professional association which establishes exposure limits.

This section explains the impact of various laws and regulations on the material. **EPA** is the U.S. Environmental Protection Agency. **NIOSH** is the National Institute of Occupational Safety and Health, which is the research arm of the U.S. Occupational Safety and Health Administration (**OSHA**). **WHMIS** is the Canadian Workplace Hazardous Materials Information System. **DOT** and **TC** are the U.S. Department of Transportation and the Transport Canada, respectively. Superfund Amendments and Reauthorization Act (**SARA**); the Canadian Domestic/Non-Domestic Substances List (**DSL/NDSL**); the U.S. Toxic Substance Control Act (**TSCA**); Marine Pollutant status according to the **DOT**; the Comprehensive Environmental Response, Compensation, and Liability Act (**CERCLA** or **Superfund**); and various state regulations. This section also includes information on the precautionary warnings which appear on the material's package label. **OSHA** - U.S. Occupational Safety and Health Administration.



MATERIAL SAFETY DATA SHEET

1. Product and Company Identification

Material name	Harris 15 Low Fuming Bronze / Harris America Low Fuming Bronze
Version #	02
Issue date	07-October-2013
Revision date	12-March-2014
Supersedes date	07-October-2013
CAS #	Mixture
Product use	Metal brazing.
Manufacturer information	
Manufacturer/Supplier	Harris Products Group 4501 Quality Place Mason, Ohio 45040 US custservmason@jwharris.com
Telephone number	513-754-2000
Emergency Telephone Numbers	1-888-609-1762 (US, Canada, Mexico only) Please quote 333988

2. Hazards Identification

Physical state	Solid.
Appearance	Bronze rods.
Emergency overview	WARNING May cause eye, skin and respiratory tract irritation. Toxic: danger of serious damage to health by prolonged exposure through inhalation.
OSHA regulatory status	Under some use conditions, this material may be considered to be hazardous in accordance with OSHA 29 CFR 1910.1200.
Potential health effects	
Routes of exposure	Inhalation. Skin contact. Eye contact. Ingestion.
Eyes	Fumes from heated material may cause eye irritation. Dust may irritate the eyes. Exposure to hot material may cause thermal burns.
Skin	Dust may irritate skin. May cause allergic skin reaction. Exposure to hot material may cause thermal burns.
Inhalation	May cause respiratory tract irritation. Inhalation of fumes may cause a flu-like illness called metal fume fever.
Ingestion	Ingestion is not likely to be a primary route of occupational exposure.
Target organs	Respiratory system. Eyes. Skin. Central nervous system.
Chronic effects	Chronic inhalation of fumes or dust may cause irritation or other respiratory conditions (e.g., bronchitis). May cause lung damage. Overexposure to manganese fumes may affect the brain and central nervous system, resulting in poor coordination, difficulty speaking, and arm or leg tremor. This condition can be irreversible. Excessive Zinc intake has been associated with copper deficiency anemia. Long-term exposure to copper compounds may cause anemia. Individuals with Wilson's disease are at an increased risk of copper poisoning. Refer to Section 11 Toxicological Information for more details.
Signs and symptoms	Contact may cause irritation and redness. Dust may irritate respiratory system. Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting. Typical metal fume fever begins four to twelve hours after sufficient exposure to freshly formed fumes. The first symptoms are a metallic taste, dryness and irritation of the throat. Cough and shortness of breath may occur along with headache, fatigue, nausea, vomiting, muscle and joint pain, fever and chills. The syndrome runs its course in 24-48 hours.
Potential environmental effects	Alloys in massive forms present a limited hazard for the environment.

3. Composition / Information on Ingredients

Components	CAS #	Percent
Copper	7440-50-8	56 - 60.5
Tin	7440-31-5	0.3 - 1.1
Iron	7439-89-6	0.0 - 1.2
Manganese	7439-96-5	0.01 - 0.5
Silicon	7440-21-3	< 0.3
Zinc	7440-66-6	Balance

Coating(s)	CAS #	Percent
Borax decahydrate	1303-96-4	10 - 30
Boric acid	10043-35-3	50 - 80
Methacrylate polymer	-	1 - 5

Composition comments

Rods may be coated with flux containing Boric acid (CAS 10043-35-3) and Borax (CAS 1303-96-4). It can be reasonably assumed that on coated rods each of the flux constituents may comprise up to 30% by mass of the total mass.

All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

4. First Aid Measures

First aid procedures

Eye contact

Rinse immediately with plenty of water for at least 15 minutes. Remove any contact lenses. Get medical attention if irritation develops or persists.

Skin contact

Remove contaminated clothes and rinse skin thoroughly with water for at least 15 minutes. Get medical attention if irritation develops and persists.

Inhalation

Remove person from contaminated area to fresh air. Apply artificial respiration if needed. Call a physician if symptoms develop or persist.

Ingestion

Do NOT induce vomiting. Immediately rinse mouth and drink a cupful of water. Never give anything by mouth to an unconscious person. Get medical attention immediately.

Notes to physician

Treat symptomatically.

General advice

Show this safety data sheet to the doctor in attendance.

5. Fire Fighting Measures

Flammable properties

Solid metal is not flammable; however, finely divided metallic dust or powder may form an explosive mixture with air. Do not use water on molten metal: Explosion hazard could result.

Extinguishing media

Suitable extinguishing media

Extinguish with foam, carbon dioxide or dry powder.

Unsuitable extinguishing media

Do not use water jet as an extinguisher, as this will spread the fire.

Protection of firefighters

Specific hazards arising from the chemical

Fire or high temperatures create: Metal oxides.

Fire fighting equipment/instructions

Self-contained breathing apparatus and full protective clothing must be worn in case of fire. Move containers from fire area if you can do it without risk.

6. Accidental Release Measures

Personal precautions

Keep unnecessary personnel away. Avoid inhalation of dust from the spilled material. Wear protective clothing as described in Section 8 of this MSDS. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.

Environmental precautions

Do not contaminate water.

Methods for containment

Stop leak if you can do so without risk. Local authorities should be advised if significant spillages cannot be contained.

Methods for cleaning up

Collect for recycling. Avoid the generation of dusts during clean-up. For waste disposal, see Section 13 of the MSDS.

Other information

Clean up in accordance with all applicable regulations.

7. Handling and Storage**Handling**

Avoid inhalation of dust and fumes. Avoid contact with skin and eyes. Keep formation of airborne dusts to a minimum. Provide appropriate exhaust ventilation at places where dust is formed. Wear appropriate personal protective equipment (See Section 8). Do not eat, drink or smoke when using the product. Wash thoroughly after handling. Avoid release to the environment.

Storage

Store in tightly closed original container in a dry, cool and well-ventilated place. Store in a closed container away from incompatible materials. Keep away from food, drink and animal feedingstuffs.

8. Exposure Controls / Personal Protection**Occupational exposure limits****US. ACGIH Threshold Limit Values**

Components	Type	Value	Form
Copper (CAS 7440-50-8)	TWA	1 mg/m ³	Dust and mist.
		0.2 mg/m ³	Fume.
Iron oxide (CAS 1309-37-1)	TWA	5 mg/m ³	Respirable fraction.
Manganese (CAS 7439-96-5)	TWA	0.1 mg/m ³	Inhalable fraction.
		0.02 mg/m ³	Respirable fraction.
Tin (CAS 7440-31-5)	TWA	2 mg/m ³	
Zinc oxide (CAS 1314-13-2)	STEL	10 mg/m ³	Respirable fraction.
	TWA	2 mg/m ³	Respirable fraction.
Coating(s)	Type	Value	Form
Boric acid (CAS 10043-35-3)	STEL	6 mg/m ³	Inhalable fraction.
	TWA	2 mg/m ³	Inhalable fraction.
Borax decahydrate (CAS 1303-96-4)	STEL	6 mg/m ³	Inhalable fraction.
	TWA	2 mg/m ³	Inhalable fraction.

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value	Form
Copper (CAS 7440-50-8)	PEL	1 mg/m ³	Dust and mist.
		0.1 mg/m ³	Fume.
Iron oxide (CAS 1309-37-1)	PEL	10 mg/m ³	Fume.
Manganese (CAS 7439-96-5)	Ceiling	5 mg/m ³	Fume.
Silicon (CAS 7440-21-3)	PEL	5 mg/m ³	Respirable fraction.
		15 mg/m ³	Total dust.
Tin (CAS 7440-31-5)	PEL	2 mg/m ³	
Zinc oxide (CAS 1314-13-2)	PEL	5 mg/m ³	Respirable fraction.
		5 mg/m ³	Fume.
		15 mg/m ³	Total dust.

Canada. Alberta OELs (Occupational Health & Safety Code, Schedule 1, Table 2)

Components	Type	Value	Form
Copper (CAS 7440-50-8)	TWA	1 mg/m ³	Dust and mist.
		0.2 mg/m ³	Fume.
Iron oxide (CAS 1309-37-1)	TWA	5 mg/m ³	Respirable.
Manganese (CAS 7439-96-5)	TWA	0.2 mg/m ³	
Tin (CAS 7440-31-5)	TWA	2 mg/m ³	
Zinc oxide (CAS 1314-13-2)	STEL	10 mg/m ³	Respirable.
	TWA	2 mg/m ³	Respirable.

Canada. British Columbia OELs. (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended)

Components	Type	Value	Form
Copper (CAS 7440-50-8)	TWA	1 mg/m ³	Dust and mist.
		0.2 mg/m ³	Fume.
Iron oxide (CAS 1309-37-1)	STEL	10 mg/m ³	Fume.
	TWA	5 mg/m ³	Fume.
		5 mg/m ³	Dust.
		3 mg/m ³	Respirable fraction.
		10 mg/m ³	Total dust.
Manganese (CAS 7439-96-5)	TWA	0.2 mg/m ³	
Tin (CAS 7440-31-5)	TWA	2 mg/m ³	
Zinc oxide (CAS 1314-13-2)	STEL	10 mg/m ³	Respirable.
	TWA	2 mg/m ³	Respirable.
Coating(s)	Type	Value	Form
Boric acid (CAS 10043-35-3)	STEL	6 mg/m ³	Inhalable
	TWA	2 mg/m ³	Inhalable
Borax decahydrate (CAS 1303-96-4)	STEL	6 mg/m ³	Inhalable
	TWA	2 mg/m ³	Inhalable

Canada. Manitoba OELs (Reg. 217/2006, The Workplace Safety And Health Act)

Components	Type	Value	Form
Copper (CAS 7440-50-8)	TWA	1 mg/m ³	Dust and mist.
		0.2 mg/m ³	Fume.
Iron oxide (CAS 1309-37-1)	TWA	5 mg/m ³	Respirable fraction.
Manganese (CAS 7439-96-5)	TWA	0.1 mg/m ³	Inhalable fraction.
		0.02 mg/m ³	Respirable fraction.
Tin (CAS 7440-31-5)	TWA	2 mg/m ³	
Zinc oxide (CAS 1314-13-2)	STEL	10 mg/m ³	Respirable fraction.
	TWA	2 mg/m ³	Respirable fraction.
Coating(s)	Type	Value	Form
Boric acid (CAS 10043-35-3)	STEL	6 mg/m ³	Inhalable fraction.
	TWA	2 mg/m ³	Inhalable fraction.
Borax decahydrate (CAS 1303-96-4)	STEL	6 mg/m ³	Inhalable fraction.
	TWA	2 mg/m ³	Inhalable fraction.

Canada. Ontario OELs. (Control of Exposure to Biological or Chemical Agents)

Components	Type	Value	Form
Copper (CAS 7440-50-8)	TWA	0.2 mg/m ³	Fume.
Iron oxide (CAS 1309-37-1)	TWA	5 mg/m ³	Respirable fraction.
Manganese (CAS 7439-96-5)	TWA	0.2 mg/m ³	
Silicon (CAS 7440-21-3)	TWA	10 mg/m ³	Total dust.
Tin (CAS 7440-31-5)	TWA	2 mg/m ³	
Zinc oxide (CAS 1314-13-2)	STEL	10 mg/m ³	Respirable fraction.
	TWA	2 mg/m ³	Respirable fraction.
Coating(s)	Type	Value	Form
Boric acid (CAS 10043-35-3)	STEL	6 mg/m ³	Inhalable fraction.
	TWA	2 mg/m ³	Inhalable fraction.
Borax decahydrate (CAS 1303-96-4)	STEL	6 mg/m ³	Inhalable fraction.
	TWA	2 mg/m ³	Inhalable fraction.

Canada. Quebec OELs. (Ministry of Labor - Regulation Respecting the Quality of the Work Environment)

Components	Type	Value	Form
Copper (CAS 7440-50-8)	TWA	1 mg/m3	Dust and mist.
		0.2 mg/m3	Fume.
Iron oxide (CAS 1309-37-1)	TWA	5 mg/m3	Dust and fume.
		10 mg/m3	Total dust.
Manganese (CAS 7439-96-5)	STEL	3 mg/m3	Fume.
	TWA	5 mg/m3	Dust.
		1 mg/m3	Fume.
Silicon (CAS 7440-21-3)	TWA	10 mg/m3	Total dust.
Tin (CAS 7440-31-5)	TWA	2 mg/m3	
Zinc oxide (CAS 1314-13-2)	STEL	10 mg/m3	Fume.
	TWA	5 mg/m3	Fume.
		10 mg/m3	Total dust.
Coating(s)	Type	Value	
Borax decahydrate (CAS 1303-96-4)	TWA	5 mg/m3	

Mexico. Occupational Exposure Limit Values

Components	Type	Value	Form
Copper (CAS 7440-50-8)	STEL	2 mg/m3	Dust and mist.
		2 mg/m3	Fume.
	TWA	1 mg/m3	Dust and mist.
		0.2 mg/m3	Fume.
Iron oxide (CAS 1309-37-1)	STEL	10 mg/m3	
	TWA	5 mg/m3	
Manganese (CAS 7439-96-5)	STEL	3 mg/m3	Fume.
	TWA	1 mg/m3	Fume.
		0.2 mg/m3	
Silicon (CAS 7440-21-3)	STEL	20 mg/m3	
	TWA	10 mg/m3	
Tin (CAS 7440-31-5)	STEL	4 mg/m3	
	TWA	2 mg/m3	
Zinc oxide (CAS 1314-13-2)	STEL	10 mg/m3	Fume.
	TWA	5 mg/m3	Fume.
		10 mg/m3	Dust.
Coating(s)	Type	Value	
Borax decahydrate (CAS 1303-96-4)	TWA	5 mg/m3	

Engineering controls

Provide adequate ventilation. Observe occupational exposure limits and minimize the risk of inhalation of dust and fumes. Shower, hand and eye washing facilities near the workplace are recommended.

Personal protective equipment

Eye / face protection

Wear safety glasses with side shields (or goggles). When these products are used in conjunction with brazing, it is recommended that safety glasses, goggles, or face-shield with filter lens of appropriate shade number (per ANSI Z49.1-1988, "Safety in Welding and Cutting") be worn.

Skin protection

Protective clothing is recommended. When these products are used in conjunction with brazing, wear protective clothing that protects from sparks and flame (per ANSI Z49.1-1988, "Safety in Welding and Cutting").

Respiratory protection

Use a respirator when local exhaust or ventilation is not adequate to keep exposures below the TLV. In a confined space a supplied respirator may be required. Selection and use of respiratory protective equipment should be in accordance with OSHA General Industry Standard 29 CFR 1910.134; or in Canada with CSA Standard Z94.4. Use a NIOSH/MSHA approved respirator if there is a risk of exposure to dust/fume at levels exceeding the exposure limits.

General hygiene considerations

Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical & Chemical Properties

Appearance	Bronze rods.
Physical state	Solid.
Form	Solid.
Color	Bronze.
Odor	Odorless.
Odor threshold	Not available.
pH	Not available.
Vapor pressure	Not available.
Vapor density	Not available.
Boiling point	Not available.
Melting point/Freezing point	1680 °F (915.56 °C)
Solubility (water)	Not available.
Specific gravity	Not available.
Flash point	Not available.
Flammability limits in air, upper, % by volume	Not available.
Flammability limits in air, lower, % by volume	Not available.
Auto-ignition temperature	Not available.

10. Chemical Stability & Reactivity Information

Chemical stability	Material is stable under normal conditions.
Conditions to avoid	Contact with incompatible materials.
Incompatible materials	Strong oxidizing agents. Strong acids. Strong bases. Acetylene. Ammonia. Hydrogen peroxide (H ₂ O ₂). Chlorine. Bromine, iodine, turpentine, magnesium metal. Hydrogen sulfide. Ammonium nitrate.
Hazardous decomposition products	Toxic metal oxides are emitted when heated above the melting point. Coated rods may also release boric anhydride. Methacrylate polymer decomposes when heated and will release flammable vapors which irritate eyes and the respiratory system. They comprise mainly n-butyl methacrylate (CAS 97-88-1).
Possibility of hazardous reactions	Hazardous polymerization does not occur.

11. Toxicological Information

Toxicological data

Components	Species	Test Results
Iron (CAS 7439-89-6)		
Acute		
<i>Oral</i>		
LD50	Rat	30 g/kg
Manganese (CAS 7439-96-5)		
Acute		
<i>Oral</i>		
LD50	Rat	9000 mg/kg
Silicon (CAS 7440-21-3)		
Acute		
<i>Oral</i>		
LD50	Rat	3160 mg/kg
Zinc (CAS 7440-66-6)		
Acute		
<i>Oral</i>		
LD50	Rat	630 mg/kg

Coating(s)	Species	Test Results
Boric acid (CAS 10043-35-3)		
Acute		
<i>Dermal</i>		
LD50	Rabbit	> 2000 mg/kg
<i>Oral</i>		
LD50	Rat	2660 mg/kg
Borax decahydrate (CAS 1303-96-4)		
Acute		
<i>Dermal</i>		
LD50	Rabbit	> 10000 mg/kg
Sensitization	Rare cases of allergic contact dermatitis have been reported in people working with copper dust.	
Acute effects	When heated, the vapors/fumes given off may cause respiratory tract irritation. High concentrations of freshly formed fumes/dusts of metal oxides can produce symptoms of metal fume fever.	
Local effects	Elevated temperatures or mechanical action may form dust and fumes which may be irritating to the eye, mucous membranes and respiratory tract.	
Chronic effects	Overexposure to manganese fumes may affect the brain and central nervous system, resulting in poor coordination, difficulty speaking, and arm or leg tremor. This condition can be irreversible. Long-term exposure to copper compounds may cause anemia.	
Carcinogenicity	This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.	
ACGIH Carcinogens		
Borax decahydrate (CAS 1303-96-4)	A4 Not classifiable as a human carcinogen.	
Boric acid (CAS 10043-35-3)	A4 Not classifiable as a human carcinogen.	
Manganese (CAS 7439-96-5)	A4 Not classifiable as a human carcinogen.	
Epidemiology	Based on epidemiological studies, pre-existing pulmonary disorders may be aggravated by prolonged exposure to high concentrations of metal dust or fumes.	
Mutagenicity	No data available.	
Reproductive effects	This product is not reported to cause reproductive effects in humans. Clinical studies on test animals exposed to relatively high doses of the Boric Acid and Copper components of this product indicate adverse reproductive effects.	

12. Ecological Information

Ecotoxicological data

Components	Species	Test Results
Copper (CAS 7440-50-8)		
Aquatic		
Crustacea	EC50	Water flea (Daphnia obtusa)
		0.0076 - 0.026 mg/l, 48 hours
Iron (CAS 7439-89-6)		
Aquatic		
Fish	LC50	Channel catfish (Ictalurus punctatus)
		> 500 mg/l, 96 hours
Zinc (CAS 7440-66-6)		
Aquatic		
Crustacea	EC50	Water flea (Daphnia magna)
		2.8 mg/l, 48 hours
Fish	LC50	Rainbow trout, donaldson trout (Oncorhynchus mykiss)
		0.56 mg/l, 96 hours

Coating(s)	Species	Test Results
Boric acid (CAS 10043-35-3)		
Aquatic		
Fish	LC50	Razorback sucker (Xyrauchen texanus)
		> 100 mg/l, 96 hours
Ecotoxicity	Alloys in massive forms present a limited hazard for the environment.	
Environmental effects	Significant environmental persistence and bioaccumulation can be expected.	

Aquatic toxicity	If in form of particles or dust, some metals of the alloy are hazardous to aquatic organisms and/or may cause long-term adverse effects in the aquatic environment.
Persistence and degradability	The product is not biodegradable.
Bioaccumulation / Accumulation	The product contains potentially bioaccumulating substances.
Mobility in environmental media	Alloys in massive forms are not mobile in the environment.

13. Disposal Considerations

Disposal instructions	Dispose in accordance with all applicable regulations.
Waste from residues / unused products	Recover and recycle, if practical. Solid metal and alloys in the form of particles may be reactive. Its hazardous characteristics, including fire and explosion, should be determined prior to disposal.

14. Transport Information

DOT

Not regulated as a hazardous material by DOT.

IATA

Not regulated as dangerous goods.

IMDG

Not regulated as dangerous goods.

TDG

Not regulated as dangerous goods.

15. Regulatory Information

US federal regulations	Under some use conditions, this material may be considered to be hazardous in accordance with OSHA 29 CFR 1910.1200. All components are on the U.S. EPA TSCA Inventory List.
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TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Manganese (CAS 7439-96-5)

US EPCRA (SARA Title III) Section 313 - Toxic Chemical: De minimis concentration

Copper (CAS 7440-50-8) 1.0 %

Manganese (CAS 7439-96-5) 1.0 %

Zinc (CAS 7440-66-6) 1.0 %

US EPCRA (SARA Title III) Section 313 - Toxic Chemical: Listed substance

Copper (CAS 7440-50-8) Listed.

Manganese (CAS 7439-96-5) Listed.

Zinc (CAS 7440-66-6) Listed.

CERCLA (Superfund) reportable quantity (lbs) (40 CFR 302.4)

Copper: 5000

Zinc: 1000

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories	Immediate Hazard - Yes Delayed Hazard - Yes Fire Hazard - No Pressure Hazard - No Reactivity Hazard - No
--------------------------	--

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical	Yes
--	-----

Drug Enforcement Administration (DEA) (21 CFR 1308.11-15)	Not controlled
--	----------------

Canadian regulations	This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.
-----------------------------	---

WHMIS status	Controlled
---------------------	------------

WHMIS classification

D2A - Other Toxic Effects-VERY TOXIC

WHMIS labeling



Inventory status

Country(s) or region	Inventory name	On inventory (yes/no)*
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s).

A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

State regulations

This product does not contain a chemical known to the State of California to cause cancer, birth defects or other reproductive harm.

US - California Hazardous Substances (Director's): Listed substance

Borax decahydrate (CAS 1303-96-4)	Listed.
Copper (CAS 7440-50-8)	Listed.
Iron (CAS 7439-89-6)	Listed.
Manganese (CAS 7439-96-5)	Listed.
Tin (CAS 7440-31-5)	Listed.
Zinc (CAS 7440-66-6)	Listed.

US - California Proposition 65 - Carcinogens & Reproductive Toxicity (CRT): Listed substance

Not listed.

US. Massachusetts RTK - Substance List

Borax decahydrate (CAS 1303-96-4)	Listed.
Copper (CAS 7440-50-8)	Listed.
Manganese (CAS 7439-96-5)	Listed.
Silicon (CAS 7440-21-3)	Listed.
Tin (CAS 7440-31-5)	Listed.
Zinc (CAS 7440-66-6)	Listed.

US. New Jersey Worker and Community Right-to-Know Act

Borax decahydrate (CAS 1303-96-4)
Boric acid (CAS 10043-35-3)
Copper (CAS 7440-50-8)
Manganese (CAS 7439-96-5)
Silicon (CAS 7440-21-3)
Tin (CAS 7440-31-5)
Zinc (CAS 7440-66-6)

US. Pennsylvania Worker and Community Right-to-Know Law

Borax decahydrate (CAS 1303-96-4)
Copper (CAS 7440-50-8)
Manganese (CAS 7439-96-5)
Silicon (CAS 7440-21-3)
Tin (CAS 7440-31-5)
Zinc (CAS 7440-66-6)

Mexico regulations

This safety data sheet was prepared in accordance with the Official Mexican Standard (NOM-018-STPS-2000).

16. Other Information

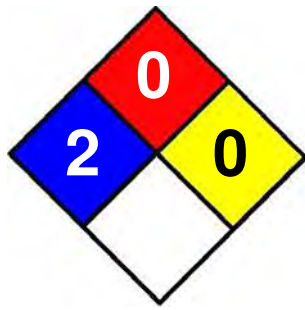
Further information

HMIS® is a registered trade and service mark of the NPCA.

HMIS® ratings

Health: 2*
Flammability: 0
Physical hazard: 0

NFPA Ratings



Disclaimer

The information in the sheet was written based on the best knowledge and experience currently available.

Material Safety Data Sheet

Printing date 07/10/2014

Version 6

Reviewed on 07/10/2014

1 Identification of substance

- **Product details**
 - **Trade name: Helium (Compressed Gas)**
 - **Article number:** 033-01-0001
 - **Creation date:** 08/14/2006
 - **Manufacturer/Supplier:**

Linde Canada Limited	Linde
5860 Chedworth Way	575 Mountain Avenue
Mississauga, Ontario L5R 0A2	Murray Hill, NJ 07974
Telephone (905) 501-1700	Telephone (908) 464-8100
24-HOUR EMERGENCY TELEPHONE NUMBER: (905) 501-0802	24-HOUR EMERGENCY TELEPHONE NUMBER: CHEMTREC (800) 424-9300 OR Linde National Operations Center (800) 232-4726
 - **Information department:** Customer Service Centre: 1-866-385-5349
- Pse ensure that this MSDS is received by the appropriate person.

2 Composition/Data on components

- **Chemical characterization:**
- **CAS No. Description**
7440-59-7 Helium
- **Identification number(s)**
- **EINECS Number:** 231-168-5

3 Hazards identification

- **Hazard description:**
- **WHMIS-symbols:**
A - Compressed gas



- **HMIS-ratings (scale 0 - 4)**

HEALTH	0	Health = 0
FIRE	0	Fire = 0
REACTIVITY	0	Reactivity = 0

- **NFPA ratings (scale 0 - 4)**

0	0	0	Health = 0
			Fire = 0
			Reactivity = 0

- **Information pertaining to particular dangers for man and environment:** Not applicable.
- **Classification system:**
The classification is in line with internationally approved calculation standards. It is expanded, however, by information from technical literature and by information furnished by supplier companies.

(Contd. on page 2)

Material Safety Data Sheet

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Trade name: Helium (Compressed Gas)

(Contd. of page 1)

· GHS label elements

**Warning**

2.5/C - Contains gas under pressure; may explode if heated.

· **Storage:**

Protect from sunlight. Store in a well-ventilated place.

* **4 First aid measures**

- **After inhalation:** Supply fresh air; consult doctor in case of complaints.
- **After skin contact:** Generally the product does not irritate the skin.
- **After eye contact:** Rinse opened eye for at least 15 minutes under running water. Then consult a doctor.
- **After swallowing:** Not applicable

* **5 Fire fighting measures**

- **Suitable extinguishing agents:**
CO₂, powder or water spray. Fight larger fires with water spray or alcohol resistant foam.
- **Protective equipment:** Wear self-contained respiratory protective device.

* **6 Accidental release measures**

- **Person-related safety precautions:**
Wear protective equipment. Keep unprotected persons away.
Ensure adequate ventilation.
Stop leak - ONLY if possible to do so without risk.
- **Measures for environmental protection:** Prevent seepage into sewage system, workpits and/or cellars.
- **Measures for cleaning/collecting:** Ensure adequate ventilation.
- **Additional information:** No dangerous substances are released.

* **7 Handling and storage**

- **Handling:**
- **Information for safe handling:**
Handle with care. Avoid jolting, friction, and impact.
Use only in well ventilated areas.
Store container in a secured area. Limit access to authorized personnel only. Report any incidents involving thefts, misuse, or inventory shortages to law enforcement and the supplier. Security shall be provided in accordance with all local, state (provincial) and federal regulations.
- **Information about protection against explosions and fires:**
Keep ignition sources away - Do not smoke.
Pressurized container: protect from sunlight and do not expose to temperatures exceeding 50°C. Do not pierce or burn, even after use.
- **Storage:**
- **Requirements to be met by storerooms and receptacles:**
Do not expose cylinder to temperatures higher than 50°C (122 °F)
Protect cylinders from physical damage. Store in cool, dry, well-ventilated area away from heavily trafficked areas and emergency exits. Do not allow the temperature where cylinders are stored to exceed 125°F (52°C).
Cylinders should be stored upright and firmly secured to prevent falling or being knocked over. Full and empty cylinders should be segregated. Use a "first in-first out" inventory system to prevent full cylinders being stored for excessive periods of time.
- **Information about storage in one common storage facility:**
Sources of ignition should be removed from storage area.

(Contd. on page 3)

CDN

Material Safety Data Sheet

Printing date 07/10/2014

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Trade name: Helium (Compressed Gas)

(Contd. of page 2)

- **Further information about storage conditions:**

Keep cylinder valve tightly closed.

Store in accordance with local fire code and/or building code or any pertaining regulations.

8 Exposure controls and personal protection

- **Additional information about design of technical systems:**

Adequate local ventilation.

Safety showers and eyewash stations should be nearby.

- **Components with limit values that require monitoring at the workplace:**

7440-59-7 Helium (60 - 100%)

EL	Simple asphyxiant
----	-------------------

- **Additional information:** The lists that were valid during the creation were used as basis.

- **Personal protective equipment:**

- **General protective and hygienic measures:**

Protective clothing and PPE should be kept free of oil and grease, generally in clean condition

PPE should be inspected and maintained regularly to retain effectiveness.

- **Breathing equipment:**

Use atmosphere-supplying respirators (e.g. supplied-air: demand, pressure-demand, or continuous-flow or self-contained breathing apparatus: demand or pressure-demand or combination supplied-air with auxiliary self-contained air supply atmosphere-supplying respirator) in case of insufficient ventilation.

- **Protection of hands:**



Protective gloves.

- **Material of gloves**

The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer.

- **Eye protection:** Safety glasses

9 Physical and chemical properties

- **General Information**

Form: Gaseous.

Color: Colorless

Odor: Odorless

- **Change in condition**

Melting point/Melting range: -272°C

Boiling point/Boiling range: -268°C

- **Flash point:** Not applicable.

- **Danger of explosion:** Product does not present an explosion hazard.

- **Solubility in / Miscibility with**

Water at 20°C: 8.6 g/l

10 Stability and reactivity

- **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.

- **Materials to be avoided:**

- **Dangerous reactions** No dangerous reactions known.

(Contd. on page 4)

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Trade name: Helium (Compressed Gas)

(Contd. of page 3)

- **Dangerous products of decomposition:** No dangerous decomposition products known.

11 Toxicological information

- **Acute toxicity:**
- **LD/LC50 values that are relevant for classification:** LC50 - None available
- **Primary irritant effect:**
- **on the skin:** No irritating effect.
- **on the eye:** No irritating effect.
- **Sensitization:** No sensitizing effects known.
- **Additional toxicological information:**
When used and handled according to specifications, the product does not have any harmful effects according to our experience and the information provided to us.
The substance is not subject to classification.

12 Ecological information

- **Additional ecological information:**
- **General notes:** Generally not hazardous for water

13 Disposal considerations

- **Product:**
- **Recommendation:** Unused product should be returned to vendor.
- **Uncleaned packagings:**
- **Recommendation:**
Cylinder and unused product should be returned to vendor. Disposable cylinder must be disposed of in accordance with local regulations.
- **Recommended cleansing agent:** None applicable.

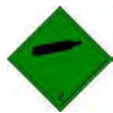
14 Transport information

- **TDG and DOT regulations:**



- **Hazard class:** 2
- **Identification number:** UN1046
- **Proper shipping name (technical name):** HELIUM, COMPRESSED
- **Label:** 2.2

- **Maritime transport IMDG:**



- **IMDG Class:** 2.2
- **UN Number:** 1046
- **Label:** 2.2
- **Marine pollutant:** No

(Contd. on page 5)

CDN

Material Safety Data Sheet

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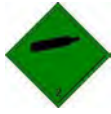
Reviewed on 07/10/2014

Trade name: Helium (Compressed Gas)

(Contd. of page 4)

· Proper shipping name: HELIUM, COMPRESSED

· Air transport ICAO-TI and IATA-DGR:



· ICAO/IATA Class: 2

· UN/ID Number: 1046

· Label: 2.2

· Proper shipping name: HELIUM, COMPRESSED

· UN "Model Regulation": UN1046, HELIUM, COMPRESSED, 2.2

15 Regulations

· Sara

· Section 355 (extremely hazardous substances):

Substance is not listed.

· Section 313 (Specific toxic chemical listings):

Substance is not listed.

· TSCA (Toxic Substances Control Act):

Substance is listed.

· Proposition 65

· Chemicals known to cause cancer:

Substance is not listed.

· Chemicals known to cause reproductive toxicity for females:

Substance is not listed.

· Chemicals known to cause reproductive toxicity for males:

Substance is not listed.

· Chemicals known to cause developmental toxicity:

Substance is not listed.

· Cancerogenity categories

· EPA (Environmental Protection Agency)

Substance is not listed.

· NTP (National Toxicology Program)

Substance is not listed.

· TLV (Threshold Limit Value established by ACGIH)

Substance is not listed.

· NIOSH-Ca (National Institute for Occupational Safety and Health)

Substance is not listed.

· OSHA-Ca (Occupational Safety & Health Administration)

Substance is not listed.

· Canadian substance listings:

· Canadian Domestic Substances List (DSL)

Substance is listed.

· Canadian Ingredient Disclosure list (limit 0.1%)

Substance is not listed.

(Contd. on page 6)

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Trade name: Helium (Compressed Gas)

(Contd. of page 5)

· Canadian Ingredient Disclosure list (limit 1%)

Substance is not listed.

· Product related hazard informations:

Observe the general safety regulations when handling chemicals.

The substance is not subject to classification according to the sources of literature known to us.

The product was classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

· Safety phrases:

Keep container tightly closed in a cool place.

16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

Please refer to the section 3 for NFPA and HMIS Hazard Codes.

DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES

Although reasonable care has been taken in the preparation of this document, we extend no warranties and make no representations as to the accuracy or completeness of the information contained herein, and assume no responsibility regarding the suitability of this information for the user's intended purposes or for the consequences of its use. Each individual should make a determination as to the suitability of the information for their particular purpose(s).

GENERAL DISCLAIMER

For terms and conditions, including limitation of liability, please refer to the purchase agreement in effect between Linde Inc. (or any of its affiliates and subsidiaries) and the purchaser.

· **Department issuing MSDS:** Customer Service Centre: 1-866-385-5349

· Abbreviations and Acronyms:

ACGIH: American Conference of Governmental Industrial Hygienists

CAS: Chemical Abstract Service (Division of the American Chemical Society)

DOT: US Department of Transportation

EINECS: European Inventory of Existing Commercial Chemical Substances

GHS: Globally Harmonized System of Classification and Labelling of Chemicals

HMIS: Hazardous Material Identification System

IATA: International Air Transportation Association

IATA-DGR: Dangerous Goods Regulations by the "International Air Transportation Association"

ICAO: International Civil Aviation Association

ICAO-TI: Technical Instructions by the "International Civil Aviation Organization (ICAO)"

IMDG: International Marine Code for Dangerous Goods

WHIMS: Workplace Hazardous Material Information System

LC50: Lethal Concentration, 50 Percent

LD50: Lethal Dose, 50 Percent

EL: Exposure Limit per ACGIH TLV

EV: Permissible Exposure Limit per OSHA

N/A: Not Applicable



MATERIAL SAFETY DATA SHEET

Page 1 of 5

HEWP200 - BLUESKIN WP SELF ADHERED WATERPROOFING 200

1. Product And Company Identification

Supplier HENRY COMPANY 999 N. Sepulveda Blvd., Suite 800 El Segundo, CA 90245-2716 Company Contact: Technical Services Telephone Number: (800) 486-1278 Web Site: www.henry.com www.bakor.com	Manufacturer HENRY COMPANY 999 N. Sepulveda Blvd., Suite 800 El Segundo, CA 90245-2716 Company Contact: Technical Services Telephone Number: (800) 486-1278 Web Site: www.henry.com www.bakor.com
Supplier Emergency Contacts & Phone Number CHEMTREC: (800) 424-9300 CHEMTREC: (703) 527-3887 CANUTEC: (613) 996-6666	Manufacturer Emergency Contacts & Phone Number CHEMTREC: (800) 424-9300 CHEMTREC: (703) 527-3887 CANUTEC: (613) 996-6666

Issue Date: 08/05/2014

Product Name: HEWP200 - BLUESKIN WP SELF ADHERED WATERPROOFING 200

Product Code: HEWP200

Product/Material Uses

Roofing Membrane

2. Composition/Information On Ingredients

Ingredient Name	CAS Number	Percent Of Total Weight
asphalt, petroleum	8052-42-4	55 - 75
mineral oil	64742-52-5	1 - 5
siliconized release paper	Not Establis	5 - 10
high density polyethylene	9002-88-4	5 - 10
rubber compounds	NA - Mixture	5 - 15

EMERGENCY OVERVIEW

CAUTION! This product contains asphalt. Some asphalt contains sulfur compounds which may form hydrogen sulfide when heated or burned. Prolonged direct skin and eye contact may cause irritation.

Appearance/Odor: Rolled material.

3. Hazards Identification

Primary Routes(s) Of Entry

Inhalation - possible if product becomes airborne, but considered unlikely.

Eye Hazards

Particles may cause eye irritation.

Skin Hazards

May cause skin irritation and contact dermatitis upon prolonged contact.

Ingestion Hazards

Not a probable route of exposure.



HEWP200 - BLUESKIN WP SELF ADHERED WATERPROOFING 200

3. Hazards Identification - Continued

Inhalation Hazards

Not a probable route of exposure under normal conditions of use.

Chronic/Carcinogenicity Effects

None of the ingredients of this product comprising over 0.1% are classified as carcinogenic according to OSHA, National Toxicology Program (NTP), International Agency for Research on Cancer (IARC) or the American Conference of Governmental Industrial Hygienists (ACGIH).

4. First Aid Measures

Eye

In case of contact, hold eyelids apart and immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention immediately if irritation develops and persists.

Skin

Remove contaminated clothing and shoes. Wash affected areas with soap and water.

Ingestion

Get medical attention immediately. DO NOT INDUCE VOMITING. Never give anything by mouth to an unconscious victim.

Inhalation

Inhalation not likely due to nature of material. If particles generated from grinding or sanding are inhaled, remove the person from the contaminated area to fresh air.

5. Fire Fighting Measures

Flammability Class: Non Flammable

Fire And Explosion Hazards

During a fire carbon monoxide, carbon dioxide, oxides of nitrogen and sulfur, hydrogen sulfide, and irritating and/or toxic gases may be generated.

Extinguishing Media

Carbon dioxide, water, or dry chemical.

Fire Fighting Instructions

Firefighters should wear self-contained breathing apparatus and full protective gear.

6. Accidental Release Measures

Collect and dispose in accordance with applicable regulations. Avoid release to waterways and sewers.

7. Handling And Storage

Handling And Storage Precautions

Keep containers tightly closed. Store in a cool, dry, well-ventilated area. Protect from heat sparks, or flame. Use only with adequate ventilation.

8. Exposure Controls/Personal Protection

Engineering Controls

Use with adequate general and local exhaust ventilation.

Eye/Face Protection

Safety glasses with side shields recommended.

Skin Protection

Use with protective gloves and apron to prevent skin contact.



HEWP200 - BLUESKIN WP SELF ADHERED WATERPROOFING 200

8. Exposure Controls/Personal Protection - Continued

Respiratory Protection

None normally required. Respirator use may be required due to secondary operations such as cutting, sanding, buffing, etc. The level of respiratory protection needed should be based on the evaluation of chemical exposures by a health or safety professional.

Occupational Exposure Limits for individual ingredients (if available) are listed below.

Asphalt fume
ACGIH TLV-TWA 0.5 mg/m3 (Inhalable fraction and vapor)

Ingredient(s) - Exposure Limits

asphalt, petroleum
OSHA PEL-TWA 5mg/m3
ACGIH TLV-TWA 0.5mg/m3 (Benzene soluble aerosol)
mineral oil
OSHA (PEL-TWA): 5 mg/m3 (mineral oil mist)
ACGIH (PEL-TLV): 5 mg/m3 (mineral oil mist)

9. Physical And Chemical Properties

Appearance

Flexible sheet

Chemical Type: Mixture

Physical State: Solid

Boiling Point: 650-1000 °F 343-538 °C

Specific Gravity: >1.0

Percent Volatiles: <0.5%

Vapor Pressure: not applicable

Vapor Density: not available

pH Factor: not available

Solubility: not available

Evaporation Rate: not available

10. Stability And Reactivity

Stability: Stable

Hazardous Polymerization: Not expected to occur

Conditions To Avoid (Stability)

Extreme temperatures, open flames, and strong oxidants.

Hazardous Decomposition Products

Decomposition not expected to occur if handled and stored properly.

Conditions To Avoid (Polymerization)

Incomplete combustion

11. Toxicological Information

Chronic/Carcinogenicity

None of the ingredients present in this product, at concentrations equal to or greater than 0.1%, have been determined to be carcinogenic by IARC, NTP, OSHA, or ACGIH.

Miscellaneous Toxicological Information

Toxicological testing has not been conducted for this product overall. Available toxicological data for individual ingredients are summarized below.

HEWP200 - BLUESKIN WP SELF ADHERED WATERPROOFING 200

11. Toxicological Information - Continued

Ingredient(s) - Carcinogenicity
 high density polyethylene
 Listed In The IARC Monographs

12. Ecological Information

None identified.

13. Disposal Considerations

Dispose in accordance with applicable federal, state and local government regulations.

14. Transport Information

Ground Not restricted

IMDG Not restricted

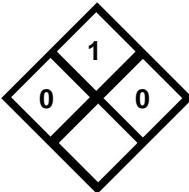
IATA Not restricted

15. Regulatory Information

U.S. Regulatory Information
 Asphalt may contain detectable amounts of chemicals known to the State of California to cause cancer or reproductive harm.

Ingredient(s) - State Regulations
 asphalt, petroleum
 California - Proposition 65
 siliconized release paper
 New Jersey - Workplace Hazard
 New York City - Hazardous Substance

Canadian Regulatory Information
 This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR. WHMIS Classification: Not classified or controlled.

<u>NFPA</u>	<u>HMIS</u>								
	<table border="1"> <tr> <td>HEALTH</td> <td style="text-align: center;">0</td> </tr> <tr> <td>FLAMMABILITY</td> <td style="text-align: center;">1</td> </tr> <tr> <td>REACTIVITY</td> <td style="text-align: center;">0</td> </tr> <tr> <td>PERSONAL PROTECTION</td> <td style="text-align: center;"> </td> </tr> </table>	HEALTH	0	FLAMMABILITY	1	REACTIVITY	0	PERSONAL PROTECTION	
HEALTH	0								
FLAMMABILITY	1								
REACTIVITY	0								
PERSONAL PROTECTION									

16. Other Information

Revision/Preparer Information
 This MSDS Supersedes A Previous MSDS Dated: 09/06/2011

Disclaimer

Although reasonable care has been taken in the preparation of this document, we extend no warranties and make no representations as to the accuracy or completeness of the information contained therein, and assume no responsibility regarding the suitability of this information for the user's intended purposes or for the consequences of its use. Each individual should make a determination as to the suitability of the information for their particular purposes(s).



MATERIAL SAFETY DATA SHEET

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**HEWP200 - BLUESKIN WP SELF ADHERED
WATERPROOFING 200**

Disclaimer - Continued

HENRY COMPANY

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**MATERIAL SAFETY DATA SHEET**

Product identifier: **DX Cartridges** (Also called shots, loads, powerloads, safety cartridges, or safety boosters)
Product description / use: 22, 25 and 27 calibre blank cartridges for use in powder actuated tools
Supplier: Hilti (Canada) Corporation, 2360 Meadowpine Blvd., Mississauga, Ontario L5N 6S2
Originator: Hilti, Inc., P. O. Box 21148, Tulsa, Oklahoma, USA 74121
Emergency phone number: **Chem-Trec: 1 800 424 9300**

INGREDIENTS INFORMATION

Ingredient	CAS Number	% (wt.)	LC ₅₀ , (rat)	LD ₅₀ (rat)	TLV	STEL
Nitroglycerin	00055-63-0	5 -10	N/Av	105 mg/kg	0.05 mg/m ³ (S)	0.1 mg/m ³ (S)
Nitrocellulose	09004-70-0	7 -13	N/Av	>5000 mg/kg	N/E	N/E
Lead styphnate	15245-44-0	0.1-1	N/Av	N/Av	N/E	N/E
Barium nitrate	10022-31-8	< 0.1	N/Av	355 mg/kg	0.5 mg/m ³	N/E
Tetracene	00109-27-3	< 0.1	N/Av	N/Av	N/E	N/E

PHYSICAL PROPERTIES

Appearance / Physical state:	Blank brass cartridges.	Odour:	Not applicable.
Specific gravity (at 20°C):	Not applicable.	Odour threshold:	Not applicable.
Vapour pressure (at 20°C):	Not applicable.	Vapour density:	Not applicable.
Evaporation rate:	Not applicable.	Boiling point:	Not applicable.
Freezing point:	Not applicable.	pH:	Not applicable.
Coefficient of H₂O / oil distrib:	Not applicable.	Solubility in water:	Not applicable.

FIRE AND EXPLOSION DATA

Flash point / Method:	Not applicable.	Flammable limits:	Not applicable.
Conditions of flammability:	Not applicable.	Auto-ignition temperature:	Not applicable.
Means of extinction:	Water.		
Special fire fighting procedures:	Flood area with water or keep cartridges cool with water spray.		
Hazardous combustion products:	Oxides of nitrogen, oxides of carbon, oxides of lead, metallic lead and acrid fumes.		
Sensitivity to mechanical impact / static discharge:	Susceptible to mechanical impact.		

REACTIVITY DATA

Stability:	Explosive material.	Conditions of reactivity:	Explosive material.
Incompatible materials:	Strong acids and oxidizing materials.		
Conditions to avoid:	Acids, excess heat, crushing and electrical currents.		
Hazardous decomposition products:	Oxides of nitrogen, oxides of carbon, oxides of lead, metallic lead and acrid fumes.		

TOXICOLOGICAL PROPERTIES

Routes of exposure:	<input type="checkbox"/> N/Ap <input checked="" type="checkbox"/> Skin contact <input checked="" type="checkbox"/> Skin absorption <input checked="" type="checkbox"/> Eye contact <input checked="" type="checkbox"/> Inhalation <input type="checkbox"/> Ingestion
Exposure limits:	See "Ingredients" section above.
Acute effects of exposure:	Excessive exposure to gases might cause irritation to the eyes, skin, and respiratory system. Adverse health effects are not expected from acute exposure to fumes and gases; however, adequate ventilation, personal protective equipment, and/or good personal hygiene practices are essential to keep exposure to a minimum.
Chronic effects of exposure:	Chronic (long-term) overexposure to lead can result in damage to blood-forming, nervous, urinary and reproductive systems. Organic lead compounds are not classified by IARC or NTP as carcinogens. Lead styphnate is converted to metallic lead and lead oxide during combustion. Metallic lead and lead oxide have not been tested adequately. A study by Goyer and Rhyne (1973) concluded that "there is no evidence that lead produces cancer in man".
Synergistic materials:	None known.

FIRST AID MEASURES

Eyes:	If irritation occurs, flush with plenty of water. Consult a physician if symptoms persist.
Skin:	Practice good hygiene; i.e. wash with soap and water after using and before meals.
Inhalation:	Move victim to fresh air. Get medical attention if symptoms persist.
Ingestion:	Get immediate medical attention.
Other:	Seek prompt medical attention if physical injury occurs from pins, rivets, debris, etc. For bleeding wounds, place a clean cloth or similar absorbent material on the wound and apply firm pressure. Elevate the wound and transport immediately to a medical facility.

PREVENTIVE MEASURES

Engineering controls:	General (i.e., natural or mechanically induced fresh air movements).
Eye protection:	Suitable safety glasses with side-shields, or safety goggles.
Skin protection:	Cleaning powder actuated tools can result in some exposure to lead compounds. Impermeable gloves are recommended for cleaning, otherwise wash hands thoroughly when finished and before eating or smoking.
Respiratory protection:	Not normally required. Where air movement is inadequate to maintain exposure below recommended levels, wear a high efficiency particulate respirator.
Other:	Hearing protection should be worn when firing powder actuated tools
Handling procedures and equipment:	For industrial use only. Keep out of reach of children. Use with adequate ventilation. Use only in powder actuated tools designed to handle these boosters. All employees should be familiarized with the safe operating procedures and requirements for powder operated tools as described in ANSI A10.3. Practice good hygiene; i.e. wash after using and before eating or smoking.
Storage requirements:	Store in a cool dry place. Do not crush or drop. Keep away from excessive heat (such as extremely hot surfaces and flames), electrical current, strong acids and oxidizers.
Spill, leak or release:	Not applicable.
Waste disposal:	Misfires should be stored in a closed container until disposal or as otherwise required by local, state, and provincial safety, health and environmental regulations. The recommended disposal method is in a burner specifically designed to destroy ammunition. Consult with regulatory agencies or your corporate personnel for disposal methods that comply with local, provincial, and federal safety, health and environmental regulations.
Special shipping instructions:	None known.

REGULATORY INFORMATION

WHMIS classification:	None (Exempt - Explosives)
HMIS codes:	Health 1, Flammability 1, Reactivity 3, PPE B (Glasses with side-shields, Gloves)
ICAO/IATA Shipping Name:	Cartridges, power device, Class 1.4S, UN0323
TDG shipping name:	Cartridges, power device, Class 1.4S, UN0323

PREPARATION INFORMATION / CONTACTS

Prepared by:	Hilti, Inc., Tulsa, OK USA	Date of Preparation: Dec. 20, 2013	Emergency phone number:	1 800 424 9300
Customer Service:	Hilti (Canada) Corporation, Mississauga, Ontario; 1 800 363 4458			
Health / Safety contacts:	Hilti, Inc., Tulsa, OK USA; 1 800 879 6000, Jerry Metcalf (x1003704)			
Abbreviations used:	N/E = None Established. N/A = Not Applicable. N/Av = Not Available. (S) indicates exposure should be controlled for the cutaneous routes including the mucous membranes, eyes, and skin. Airborne exposures as well as direct contact must be considered. IARC: International Agency for Research on Cancer. HMIS: Hazardous Materials Identification System			

The information and recommendations contained herein are based upon data believed to be correct; however, no guarantee or warranty of any kind expressed or implied is made with respect to the information provided.

**MATERIAL SAFETY DATA SHEET**

Product identifier: Spray Lubricant
Product description / use: Petroleum derivatives / Spray lubricant for cleaning Hilti powder actuated tools
Supplier: Hilti (Canada) Corporation, 2360 Meadowpine Blvd., Mississauga, Ontario L5N 6S2
Originator: Hilti, Inc., P. O. Box 21148, Tulsa, Oklahoma, USA 74121
Emergency phone number: Chem-Trec: 1 800 424 9300

INGREDIENTS INFORMATION

Ingredient	CAS Number	% (wt.)	LC ₅₀ , (rat)	LD ₅₀ (rat)	TLV	STEL
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Not a hazardous chemical as defined by the Controlled Products Regulations SOR/88-66

PHYSICAL PROPERTIES

Appearance / Physical state:	Clear liquid.	Odour:	Mild oil-like odour.
Specific gravity (at 20°C):	0.94	Odour threshold:	Not determined.
Vapour pressure (at 20°C):	Not applicable.	Vapour density:	Not applicable.
Evaporation rate:	Not determined.	Boiling point:	Not determined.
Freezing point:	Not determined.	pH:	Not determined.
Coefficient of H₂O / oil distrib:	Not determined.	Solubility in water:	Slightly soluble.

FIRE AND EXPLOSION DATA

Flash point / Method:	> 215 C / DIN 53213	Flammable limits:	Not applicable.
Conditions of flammability:	Exposure to direct flame.	Auto-ignition temperature:	Not applicable.
Means of extinction:	CO ₂ , Dry Chemical, Foam.		
Special fire fighting procedures:	None known. A NIOSH-approved self-contained breathing apparatus (SCBA) should be worn when fighting fires involving chemicals.		
Hazardous combustion products:	Normal products of combustion are expected including CO and CO ₂ .		
Sensitivity to mechanical impact / static discharge:	Not susceptible to mechanical impact or to a static discharge.		

REACTIVITY DATA

Stability:	Stable.	Conditions of reactivity:	None known.
Incompatible materials:	Strong oxidizing agents.		
Hazardous decomposition products:	None known. Thermal decomposition can yield oxides of carbon.		

TOXICOLOGICAL PROPERTIES

Routes of exposure:	<input type="checkbox"/> N/Ap <input checked="" type="checkbox"/> Skin contact <input type="checkbox"/> Skin absorption <input checked="" type="checkbox"/> Eye contact <input type="checkbox"/> Inhalation <input type="checkbox"/> Ingestion		
Exposure limits:	None established. See "Ingredients" section above.		
Acute effects of exposure:	Eyes - Slight irritation is possible. Corneal injury is not expected. Skin - No effects expected. Irritation is possible with some individuals. Inhalation - No effects expected. Ingestion - Not a likely route of exposure. Effects of ingestion have not been determined. Considered to have a low acute oral toxicity.		
Chronic effects of exposure:	None known.		
Synergistic materials:	None known.		

FIRST AID MEASURES

Eyes:	Flush with plenty of water. Call a physician if symptoms occur.
Skin:	Wash with soap and water. Seek medical attention if any effects persist.
Inhalation:	No ill effects expected. Should discomfort occur, move to fresh air.
Ingestion:	Not a likely route of exposure. Do not induce vomiting unless recommended by a physician. Seek medical attention immediately.
Other:	Referral to a physician is recommended if there is any question about the seriousness of the injury/exposure

PREVENTIVE MEASURES

Engineering controls:	General (natural or mechanically induced fresh air movements).
Eye protection:	Safety glasses with side shields are recommended.
Skin protection:	Impermeable gloves recommended.
Respiratory protection:	None normally required.
Other:	No additional measures are normally required.
Handling procedures and equipment:	For industrial use only. Do not heat can or expose to direct flame. Do not get into the eyes. Avoid prolonged or repeated contact with the skin. Practice good hygiene; i.e., wash after using and before eating or smoking.
Storage requirements:	Keep out of reach of children. Store in a cool dry place out of direct rays of the sun. Recommended storage temperature range is between 5° and 30° C.
Spill, leak or release:	Wipe away spilled material with a cloth or other absorbent material. Place in a container for proper disposal in accordance with all applicable local, state, or federal requirements. Do not allow into waterways.
Waste disposal:	Consult with regulatory agencies or your corporate personnel for disposal methods that comply with local, provincial, and federal safety, health and environmental regulations.
Special shipping instructions:	None known.

REGULATORY INFORMATION

WHMIS classification:	Not a controlled product according to WHMIS definitions
HMIS codes:	Health 0, Flammability 0, Reactivity 0, PPE B
TDG shipping name:	Not regulated.

PREPARATION INFORMATION / CONTACTS

Prepared by:	Hilti, Inc., Tulsa, OK USA	Date of Preparation:	Jan. 9,2014	Emergency phone number:	1 800 424 9300
Customer Service:	Hilti (Canada) Corporation, Mississauga, Ontario; 1 800 363 4458				
Health / Safety contacts:	Hilti, Inc., Tulsa, OK USA; 1 800 879 6000, Jerry Metcalf (x1003704)				
Abbreviations used:	N/E = None Established. N/Ap = Not Applicable. N/Av = Not Available. HMIS: Hazardous Materials Identification System				

The information and recommendations contained herein are based upon data believed to be correct; however, no guarantee or warranty of any kind expressed or implied is made with respect to the information provided.



Hilti (Canada) Corporation

MSDS No.: 276C
 Revision No.: 008
 Revision Date: 05/22/12
 Page: 1 of 2

MATERIAL SAFETY DATA SHEET

Product identifier: HIT-RE 500
Product description / use: 2-part high strength epoxy adhesive for anchoring in concrete. (Part A is the larger tube)
Supplier: Hilti (Canada) Corporation, 2360 Meadowpine Blvd., Mississauga, Ontario L5N 6S2
Originator: Hilti, Inc., P. O. Box 21148, Tulsa, Oklahoma, USA 74121
Emergency phone number: Chem-Trec: 1 800 424 9300

INGREDIENTS INFORMATION

Ingredient	CAS Number	% (wt.)	LC ₅₀ , (rat)	LD ₅₀ (rat)	TLV (mg/m ³)	STEL(mg/m ³)
Part A:						
Bisphenol A epoxy resin	25068-38-6	30 - 40	791 mg/m ³ 4H	30,000 mg/kg	N/E	N/E
Quartz sand	14808-60-7	30 - 40	N/Av	N/Av	0.025 (R)	N/E
Bisphenol F epoxy resin	28064-14-4	10 - 20	N/Av	N/Av	N/E	N/E
Alkylglycidyl ether	proprietary *	10 - 20	N/Av	N/Av	N/E	N/E
Diglycidyl ether	proprietary *	05 - 10	N/Av	N/Av	N/E	N/E
Siloxanes & silicones	67762-90-7	01 - 05	N/Av	N/Av	N/E	N/E
Part B:						
m-xylene diamine	01477-55-0	30 - 40	700 ppm/1H	930 mg/kg	C: 0.1 / S	N/E
Aliphatic polyamine	proprietary *	20 - 30	N/Av	N/Av	N/E	N/E
Quartz sand	14808-60-7	20 - 30	N/Av	N/Av	0.025 (R)	N/E
Cement	65997-16-2	05 - 10	N/Av	N/Av	N/E	N/E
Aluminum oxide	01344-28-1	05 - 10	N/Av	>3600 mg/kg	NA (10)	N/E
Siloxanes & silicones	67762-90-7	01 - 05	N/Av	N/Av	N/E	N/E

* HMIRC registration pending

PHYSICAL PROPERTIES

Appearance / Physical state:	Pt. A: Gray; Pt. B: red / paste.	Odour:	Amine-like (Part B).
Specific gravity (at 20°C):	1.5	VOC Content:	4.0 g/l
Vapour pressure (at 20°C):	Not applicable.	Vapour density:	Not applicable.
Evaporation rate:	Not determined.	Boiling point:	Approx. 100° C.
Freezing point:	Not determined.	pH:	11 (Pt. B with 1:1 water)
Coefficient of H₂O / oil distrib:	Not determined.	Solubility in water:	Insoluble.

FIRE AND EXPLOSION DATA

Flash point / Method:	> 100° C (200° F) / DIN 53 213	Flammable limits:	Not applicable.
Conditions of flammability:	Not determined.	Auto-ignition temperature:	Not applicable.
Means of extinction:	Water, CO ₂ , Dry Chemical, Foam.		
Special fire fighting procedures:	None known. A NIOSH-approved self-contained breathing apparatus (SCBA) should be worn when fighting fires involving chemicals.		
Hazardous combustion products:	Thermal decomposition products such as oxides of carbon and nitrogen can be produced under fire conditions.		
Sensitivity to mechanical impact / static discharge:	Not susceptible to mechanical impact or to a static discharge.		

REACTIVITY DATA

Stability:	Stable.
Conditions of reactivity:	Contact with incompatible materials.
Incompatible materials:	Strong oxidizers, peroxides and acids.
Hazardous decomposition products:	None known. Thermal decomposition products such as oxides of carbon and nitrogen can be produced under fire conditions.

TOXICOLOGICAL PROPERTIES

Routes of exposure: N/Ap Skin contact Skin absorption Eye contact Inhalation Ingestion

Acute effects of exposure:	Part A: Can be irritating to the eyes and skin. Part B: Corrosive; Can cause eye and skin burns. Vapors can be irritating. If swallowed, can cause burns.
Chronic effects of exposure:	Can cause skin sensitization in susceptible individuals. IARC has classified silica as a Group 1 carcinogen based upon chronic exposure to silica dust. <i>In vitro</i> studies of quartz sand have shown mutagenic effects in mammalian and human cells. The nature and intended use of this product does not pose an increased risk to cancer or biological mutations.
Synergistic materials:	None known.

FIRST AID MEASURES

Eyes:	Flush immediately with plenty of water. Call a physician if symptoms occur.
Skin:	Wash immediately with soap and water. Seek medical attention if any effects persist.
Inhalation:	If symptoms occur, move to fresh air. Call a physician if symptoms persist.
Ingestion:	Do not induce vomiting unless directed by a Physician. Contact a physician immediately.
Other:	Referral to a physician is recommended if there is any question about the seriousness of the injury/exposure.

PREVENTIVE MEASURES

Engineering controls:	General (natural or mechanically induced fresh air movements).
Eye protection:	Safety glasses with side shields are recommended.
Skin protection:	Impermeable gloves recommended.
Respiratory protection:	None normally required.
Other:	No additional measures are normally required.
Handling procedures and equipment:	For industrial use only. Use with adequate ventilation. Practice good hygiene; i.e., wash after using and before eating or smoking.
Storage requirements:	Keep out of reach of children. Store in a cool dry area and out of direct sunlight. Store between 41 and 77° F (5 - 25° C). Do not use beyond expiration date shown on product packaging.
Spill, leak or release:	Immediately wipe away spilled material before it hardens. Do not get into the eyes or on the skin. Wear appropriate personal protective equipment. Place in a container for proper disposal.
Waste disposal:	Consult with regulatory agencies or your corporate personnel for disposal methods that comply with local, provincial, and federal safety, health and environmental regulations.
Special shipping instructions:	Avoid temperature extremes.

REGULATORY INFORMATION

WHMIS classification:	D2A, D2B, E
HMIS codes:	Health 3, Flammability 1, Reactivity 1, PPE B (Gloves, Glasses)
TDG shipping name (land):	Consumer commodity, ORM-D

PREPARATION INFORMATION / CONTACTS

Prepared by:	Hilti, Inc., Tulsa, OK USA	Date of Preparation:	May 22, 2012	Emergency phone number:	1 800 424 9300
Customer Service:	Hilti (Canada) Corporation, Mississauga, Ontario; 1 800 363 4458				
Health / Safety contacts:	Hilti, Inc., Tulsa, OK USA; 1 800 879 6000 Jerry Metcalf (x1003704)				
Abbreviations used:	N/E = None Established. N/Av = Not Available. C = Ceiling. R = as "respirable dust". S = Skin exposure including the mucous membranes, eyes, and skin. IARC : International Agency for Research on Cancer. HMIS : Hazardous Materials Information System. TLV : ACGIH Threshold Limit Values. STEL : ACGIH Short Term Exposure Limit.				

The information and recommendations contained herein are based upon data believed to be correct; however, no guarantee or warranty of any kind expressed or implied is made with respect to the information provided.



Hilti (Canada) Corporation

MSDS No.: 260C
 Revision No.: 010
 Revision Date: 05/22/12
 Page: 1 of 2

MATERIAL SAFETY DATA SHEET

Product identifier: HVU Adhesive Capsules
Product description / use: 2 part foil-encapsulated adhesive anchoring system
Supplier: Hilti (Canada) Corporation, 2360 Meadowpine Blvd., Mississauga, Ontario L5N 6S2
Originator: Hilti, Inc., P. O. Box 21148, Tulsa, Oklahoma, USA 74121
Emergency phone number: Chem-Trec: 1 800 424 9300

INGREDIENTS INFORMATION

Ingredient	CAS Number	% (wt.)	LC ₅₀ , (rat)	LD ₅₀ (rat)	TLV	STEL
Part A:						
Silicon dioxide (quartz sand)	14808-60-7	70 - 80	N/Av	N/Av	0.025 (R) mg/m ³	N/E
Urethane methacrylate resin	Confidential *	05 - 10	N/Av	N/Av	N/E	N/E
Methacrylate ester	Confidential *	05 - 10	N/Av	N/Av	N/E	N/E
Hydroxypropyl methacrylate (HPMA)	27813-02-1	05 - 10	N/Av	11,200 mg/kg	NE	N/E
Silica filled polydimethylsiloxane	67762-90-7	01 - 05	N/Av	N/Av	NE	N/E
Part B:						
Dicyclohexyl phthalate	00084-61-7	01 - 05	N/Av	41,490 mg/kg	N/E	N/E
Dibenzoyl peroxide	00094-36-0	0.5 - 1.5	N/Av	7,710 mg/kg	5 mg/m ³	N/E

* HMIRC registration number 5756 granted; 14 February, 2006

PHYSICAL PROPERTIES

Appearance / Physical state:	Sealed foil capsule.	Odour:	Ester-like.
Specific gravity (at 20°C):	1.1 - 1.3	VOC content:	39.0 g/l
Vapour pressure (at 20°C):	Not applicable.	Vapour density:	Not applicable.
Evaporation rate:	Not determined.	Boiling point:	Not determined.
Freezing point:	Not determined.	pH:	Not determined.
Coefficient of H₂O / oil distrib:	Not determined.	Solubility in water:	Pt. A: soluble; Pt. B: insoluble.

FIRE AND EXPLOSION DATA

Flash point / Method:	> 200° F (100° C) / DIN 53 213	Flammable limits:	Not applicable.
Conditions of flammability:	Not determined.	Auto-ignition temperature:	Not applicable.
Means of extinction:	Water, CO ₂ , Dry Chemical, Foam.		
Special fire fighting procedures:	None known. A NIOSH-approved self-contained breathing apparatus (SCBA) should be worn when fighting fires involving chemicals.		
Hazardous combustion products:	Thermal decomposition products such as oxides of carbon and nitrogen can be produced under fire conditions.		
Sensitivity to mechanical impact / static discharge:	Not susceptible to mechanical impact or to a static discharge.		

REACTIVITY DATA

Stability:	Dibenzoyl peroxide polymerizes / decomposes at temperatures above 50° C.
Conditions of reactivity:	High temperatures and incompatible materials.
Incompatible materials:	Strong oxidizers, peroxides and acids.
Hazardous decomposition products:	When stored at temperatures greater than 30° C, dibenzoyl peroxide can begin to release carbon dioxide. This will cause swelling of the foil pouches.

TOXICOLOGICAL PROPERTIES

Routes of exposure:	<input type="checkbox"/> N/Ap <input checked="" type="checkbox"/> Skin contact <input checked="" type="checkbox"/> Skin absorption <input checked="" type="checkbox"/> Eye contact <input type="checkbox"/> Inhalation <input type="checkbox"/> Ingestion
Acute effects of exposure:	Eyes: Can cause temporary discomfort (itching, dryness, redness, etc.). Skin: No effects expected from normal use. Sensitization is possible with some individuals. HPMA causes irritation and can be absorbed through the skin. Inhalation: No effects expected. Ingestion: Not a likely route of exposure. Ingestion of HPMA can cause CNS depression.
Exposure limits:	See "Ingredients" section above.
Chronic effects of exposure:	Can cause skin sensitization in susceptible individuals. IARC has classified silica as a Group 1 carcinogen based upon chronic exposure to silica dust. <i>In vitro</i> studies of quartz sand have shown mutagenic effects in mammalian and human cells. The nature and intended use of this product does not pose an increased risk to cancer or biological mutations.
Synergistic materials:	None known.

FIRST AID MEASURES

Eyes:	Flush immediately with plenty of water. Call a physician if symptoms occur.
Skin:	Wash with soap and water. Seek medical attention if any effects persist.
Inhalation:	No ill effects expected. Should discomfort occur, move to fresh air.
Ingestion:	Do not induce vomiting unless directed by a Physician. Contact a Physician immediately.
Other:	Referral to a physician is recommended if there is any question about the seriousness of the injury/exposure

PREVENTIVE MEASURES

Engineering controls:	General (natural or mechanically induced fresh air movements).
Eye protection:	Safety glasses with side shields are recommended.
Skin protection:	Impermeable (rubber or neoprene) gloves recommended.
Respiratory protection:	None normally required.
Other:	No additional measures are normally required.
Handling procedures and equipment:	For industrial use only. Keep out of reach of children. Use with adequate ventilation. Do not open foil capsule. Practice good hygiene; i.e., wash after using and before eating or smoking.
Storage requirements:	Store in a cool dry area and out of direct sunlight. Do not store above 77° F (25° C). Do not use beyond expiration date shown on the box label.
Spill, leak or release:	Immediately wipe away spilled material before it hardens. Do not get into the eyes or on the skin. Wear appropriate personal protective equipment. Place in a container for proper disposal.
Waste disposal:	Consult with regulatory agencies or your corporate personnel for disposal methods that comply with local, provincial, and federal safety, health and environmental regulations.
Special shipping instructions:	Avoid temperature extremes.
TDG shipping name:	Not regulated.

REGULATORY INFORMATION

WHMIS classification:	D2A, D2B
HMIS codes:	Health 3, Flammability 1, Reactivity 1, PPE B (Gloves, Glasses)

PREPARATION INFORMATION / CONTACTS

Prepared by:	Hilti, Inc., Tulsa, OK USA	Date of Preparation:	Emergency phone number:
		May 22, 2012	1 800 424 9300
Customer Service:	Hilti (Canada) Corporation, Mississauga, Ontario; 1 800 363 4458		
Health / Safety contacts:	Hilti, Inc., Tulsa, OK USA; 1 800 879 6000, Jerry Metcalf (x1003704)		
Abbreviations used:	N/E = None Established. N/A = Not Applicable. N/Av = Not Available. CNS = central nervous system. IARC: International Agency for Research on Cancer. HMIS: Hazardous Materials Information System		

The information and recommendations contained herein are based upon data believed to be correct; however, no guarantee or warranty of any kind expressed or implied is made with respect to the information provided.

Material Safety Data Sheet



CHEMTRADE

Hydrogen Sulfide

1. Product and company identification

Product name	: Hydrogen Sulfide
Material uses	: Purification of acids, and wastewater and in the manufacture of sulfur and organosulfur compounds.
Headquarters	: CHEMTRADE LOGISTICS 155 Gordon Baker Road Suite 300 Toronto, Ontario M2H 3N5 For MSDS Info: (416) 496-5856 www.chemtradelogistics.com
MSDS authored by	: KMK Regulatory Services Inc.
<u>In case of emergency</u>	: Canada: CANUTEC +1-613-996-6666 US: CHEMTREC +1-800-424-9300 Chemtrade Emergency Contact: (866) 416-4404

2. Hazards identification

Emergency overview

Color	: Colorless.
Physical state	: Gas.
Odor	: Rotten eggs. [Strong]
Signal word	: DANGER!
Hazard statements	: FLAMMABLE GAS. MAY CAUSE FLASH FIRE. HIGH PRESSURE GAS. MAY BE FATAL IF INHALED. CAUSES RESPIRATORY TRACT AND EYE IRRITATION. CAN CAUSE TARGET ORGAN DAMAGE.
Precautions	: Keep away from heat, sparks and flame. Do not puncture or incinerate container. Do not breathe gas. Do not get on skin or clothing. Avoid contact with eyes. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. Wash thoroughly after handling.
OSHA/HCS status	: This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
Routes of entry	: Dermal contact. Eye contact. Inhalation.
<u>Potential acute health effects</u>	
<u>Inhalation</u>	: At concentrations of 0.13 to 30 ppm, the odor is obvious and unpleasant. At 50 ppm, marked dryness and irritation of the nose and throat occurs. Prolonged exposure may cause a runny nose, cough, hoarseness, shortness of breath and pneumonia. At 100-150 ppm, there is a temporary loss of smell. At 200 to 250 ppm, H ₂ S causes severe irritation as well as symptoms such as headache, nausea, vomiting and dizziness. Prolonged exposure may cause lung damage (build-up of fluid in the lungs). Exposure for 4 to 8 hours can cause death. Concentrations of 300-500 ppm cause these same effects sooner and more severely. Death can occur in 1 to 4 hours. At 500 ppm, excitement, headache, dizziness, staggering, unconsciousness and respiratory failure occur in 5 minutes to 1 hour. Death can occur in 30 minutes to 1 hour. Exposures above 500 ppm rapidly cause unconsciousness and death. Severe exposures, which do not result in death, may cause long-term symptoms such as memory loss, paralysis of facial muscles or nerve tissue damage.
<u>Ingestion</u>	: Since the product is a gas it is more probable that it will be inhaled rather than ingested.
<u>Skin</u>	: The first action is to look at treating and/or preventing inhalation of the material. Rarely, the gas may irritate the skin. Contact with liquid H ₂ S can cause frostbite (freezing of the tissue).

2. Hazards identification

Eyes : Inflammation and irritation of the eyes can occur at very low airborne concentrations (sometimes less than 10 ppm). Exposure over several hours or days may result in "gas eyes" or "sore eyes" with symptoms of scratchiness, irritation, tearing and burning. Above 50 ppm, there is intense tearing, blurring of vision and pain when looking at light. The victim may see rings around bright lights. Most symptoms disappear when exposure ceases. However, in serious cases the eye may be permanently damaged. Contact with liquid H₂S may freeze the eye and cause severe damage or blindness.

Potential chronic health effects

Chronic effects : Can cause target organ damage.
Carcinogenicity : No known significant effects or critical hazards.
Mutagenicity : No known significant effects or critical hazards.
Teratogenicity : No known significant effects or critical hazards.
Developmental effects : No known significant effects or critical hazards.
Fertility effects : No known significant effects or critical hazards.
Target organs : May cause damage to the following organs: lungs, upper respiratory tract, eyes, central nervous system (CNS).

Over-exposure signs/symptoms

Inhalation : Adverse symptoms may include the following:
respiratory tract irritation
coughing

Ingestion : No specific data.

Skin : No specific data.

Eyes : Adverse symptoms may include the following:
pain or irritation
watering
redness

Medical conditions aggravated by overexposure : Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

See toxicological information (Section 11)

3. Composition/information on ingredients

United States

Name	CAS number	%
Hydrogen sulfide	7783-06-4	99.9

Canada

Name	CAS number	%
Hydrogen sulfide	7783-06-4	99.9

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

4. First aid measures

Eye contact : If irritation occurs, immediately flush eyes with running water for a minimum of 20 minutes. Hold eyelids open during flushing. Obtain medical attention IMMEDIATELY.

Skin contact : If the liquid is splashed on the skin, flush contaminated area with lukewarm, gently running water for at least 20 minutes. Under running water, carefully cut around clothing that sticks to damaged skin and remove rest of garment. Obtain medical attention immediately. Completely decontaminate clothing, shoes and leather goods before re-use, or discard.

4. First aid measures

- Inhalation** : Remove source of contamination or move victim to fresh air. Give artificial respiration ONLY if breathing has stopped. Give Cardiopulmonary Resuscitation (CPR) only if there is no pulse AND no breathing. Oxygen may be beneficial if administered by a person trained in its use, preferably on a physician's advice. Obtain medical attention IMMEDIATELY.
- Ingestion** : Not a typical route of exposure. Refer to the above 'Inhalation' sub-section.
- Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.
- Notes to physician** : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

5. Fire-fighting measures

- Flammability of the product** : Contains gas under pressure. Flammable gas. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion.
- Extinguishing media**
- Suitable** : SMALL FIRE: Use dry chemical powder.
LARGE FIRE: Use water spray, fog or foam. Move vessels containing H₂S from fire area if without risk. Cool H₂S containing vessels with flooding quantities of water until well after fire is out. Cool H₂S containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion. Do not extinguish a leaking gas flame unless leak can be stopped. Extinguish secondary fire. Handle damaged cylinders with extreme care. Use extinguishing media suitable for surrounding materials.
- Not suitable** : Do not use water jet or water-based fire extinguishers.
- Special exposure hazards** : Contact supplier immediately for specialist advice. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool. If involved in fire, shut off flow immediately if it can be done without risk. If this is impossible, withdraw from area and allow fire to burn. Fight fire from protected location or maximum possible distance.
- Hazardous thermal decomposition products** : Decomposition products may include the following materials:
sulfur oxides
- Special protective equipment for fire-fighters** : H₂S is extremely toxic. Fight fires from safe distance or protected location. Stay upwind. Wear full protective equipment. H₂S may travel some distance along the ground to a source of ignition and flash back. It may collect in lower, poorly ventilated areas. Water or foam may cause frothing. Use water to keep fire-exposed containers cool, to flush spills away from populated areas and to dilute spills to non-combustible mixtures. Stop escaping flow of gas rather than extinguish the fire. If fire is extinguished and gas continues to escape, an explosive mixture could form. If necessary to extinguish the fire, use carbon dioxide or dry chemical extinguishers
- Special remarks on fire hazards** : Extremely flammable in the presence of the following materials or conditions: open flames, sparks and static discharge.
Highly flammable in the presence of the following materials or conditions: heat.
- Special remarks on explosion hazards** : Not available.

6. Accidental release measures

- Personal precautions** : Accidental releases pose a serious fire or explosion hazard. Immediately contact emergency personnel. No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Shut off all ignition sources. No flares, smoking or flames in hazard area. Do not breathe gas. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see Section 8).
- Environmental precautions** : Ensure emergency procedures to deal with accidental gas releases are in place to avoid contamination of the environment. Hazardous to aquatic environment. May cause long-term adverse effects in the aquatic environment. Prevent leaking substances from running into the aquatic environment or the sewage system.
- Small spill** : See instructions below.
- Large spill** : Evacuate area immediately. Restrict access to area until completion of clean up. Ensure clean up is conducted by trained personnel only. Remove all ignition sources (no smoking, flares, sparks or flames). All equipment should be grounded. Ventilate area and stay upwind. Use appropriate Personal Protection Equipment. Stop or reduce leak if safe to do so.
Liquid H₂S: Do not touch spilled material. Prevent material from entering sewers or confined spaces. Stop or reduce leak if safe to do so. If not, allow liquid to vaporize.
Gaseous H₂S: Stop or reduce leak if safe to do so. If source of the leak is a cylinder and the leak cannot be stopped safely, move the cylinder to a safe place in the open air. If possible, repair the leak or allow the cylinder to empty.
In the case of a large spill, evacuation of populated areas downwind may have to be considered. Deliberate ignition and controlled burn of escaping hydrogen sulfide should be considered in order to reduce the risk to adjacent areas.
Comply with Federal, Provincial/State and local regulations on reporting releases.

7. Handling and storage

- Handling** : Keep away from heat, sparks and flame. Do not puncture or incinerate. Keep container closed. Use only with adequate ventilation. To avoid fire, eliminate ignition sources. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Never work alone when handling H₂S. Someone must be in communication at all times and be equipped and trained to rescue. If H₂S is released, immediately put on a respirator and leave the area until the severity of the release is determined. If necessary to enter an area contaminated with H₂S, follow precautions for confined space entry including use of a supplied-air respirator with full facepiece, adequate communication, safety belts and lifelines. People working with this chemical should be properly trained regarding its hazards and its safe use.
- Storage** : Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Segregate from oxidizing materials. Avoid all possible sources of ignition (spark or flame). Outside or detached storage is preferred. Store away from heat and ignition sources, incompatible materials, and cylinders or other containers under high pressure. Use grounded, non-sparking ventilation systems and electrical equipment that does not provide a source of ignition. Use corrosion-resistant structural materials, lighting and ventilation systems in storage area. Store cylinders at or above ground level, upright on a level, fireproof floor. Keep cylinders secured in position and protected from damage. Keep cylinder valve cover on. Label empty cylinders. Store full cylinders separately from empty ones. Consider leak detection and alarm systems, as required. Limit quantity in storage. Restrict access to storage area and post warning signs. Keep storage area separate from populated work areas. Inspect periodically for deficiencies such as damage or leaks. Have fire extinguishers available in and near the storage area. Comply with all applicable regulations for the storage and handling of compressed gases and flammable material.

8. Exposure controls/personal protection

United States

Ingredient	Exposure limits
Hydrogen sulfide	<p>ACGIH TLV (United States, 1/2011). STEL: 5 ppm 15 minute(s). TWA: 1 ppm 8 hour(s).</p> <p>NIOSH REL (United States, 6/2009). CEIL: 15 mg/m³ 10 minute(s). CEIL: 10 ppm 10 minute(s).</p> <p>OSHA PEL Z2 (United States, 11/2006). AMP: 50 ppm 10 minute(s). CEIL: 20 ppm</p>

Canada

Occupational exposure limits		TWA (8 hours)			STEL (15 mins)			Ceiling			
Ingredient	List name	ppm	mg/m ³	Other	ppm	mg/m ³	Other	ppm	mg/m ³	Other	Notations
Hydrogen sulfide	US ACGIH 1/2011	1	-	-	5	-	-	-	-	-	
	AB 4/2009	10	14	-	-	-	-	15	21	-	
	BC 9/2011	-	-	-	-	-	-	10	-	-	
	ON 7/2010	10	-	-	15	-	-	-	-	-	
	QC 9/2011	10	14	-	15	21	-	-	-	-	

Consult local authorities for acceptable exposure limits.

Recommended monitoring procedures : Personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.

Engineering measures : Engineering control methods to reduce hazardous exposures are preferred. Methods include mechanical ventilation (dilution and local exhaust) and process or personnel enclosure. Administrative controls and personal protective equipment may also be required. Because of the high potential hazard associated with this substance, stringent control measures such as enclosure or isolation may be necessary. A continuous monitoring system with alarm is recommended in areas where H₂S is used. Use a nonsparking, grounded, corrosion-resistant ventilation system separate from other exhaust ventilation systems. Exhaust through a scrubber directly to the outside. Supply sufficient replacement air to make up for air removed by exhaust systems.

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal protection

Respiratory

- : NIOSH recommendations for hydrogen sulfide concentrations in air.
 - Up to 100 ppm: Powered air-purifying respirator with cartridge(s) to protect against hydrogen sulfide; or gas mask with canister to protect against hydrogen sulfide; or SAR*; or full-facepiece SCBA.
 - Emergency or planned entry into unknown concentrations or IDLH conditions: Positive pressure, full-facepiece SCBA; or positive pressure, full-facepiece SAR with an auxiliary positive pressure SCBA.
 - ESCAPE: Gas mask with canister to protect against hydrogen sulfide; or a bite-type escape respirator, a NIOSH approved APR for escape or SCBA.
 - NOTE: The IDLH concentration for hydrogen sulfide is 100 ppm.
 - *NOTE: Substance reported to cause eye irritation or damage; may require eye protection.
- ABBREVIATIONS: SAR = supplied-air respirator; SCBA = self-contained breathing apparatus.
- IDLH = Immediately Dangerous to Life or Health.

Hands

- : Use gloves appropriate for work or task being performed. Recommended: Neoprene, PVC, vinyl or rubber.

8. Exposure controls/personal protection

- Eyes** : A face shield may also be necessary if there is potential for contact with liquid H₂S.
- Skin** : Recommendations are valid for permeation rates reaching 0.1 ug/cm²/min or 1 mg/m²/min and over. Resistance of specific materials can vary from product to product. Breakthrough times are obtained under conditions of continuous contact, generally at room temperature. Evaluate resistance under conditions of use and maintain clothing carefully.
- Environmental exposure controls** : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

9. Physical and chemical properties

- Physical state** : Gas.
- Auto-ignition temperature** : 259.85°C (499.7°F)
- Flammable limits** : Lower: 4%
Upper: 44%
- Color** : Colorless.
- Odor** : Rotten eggs. [Strong]
- Molecular weight** : 34.08 g/mole
- Molecular formula** : H₂S
- Boiling/condensation point** : -59.99°C (-76°F)
- Melting/freezing point** : -82.77°C (-117°F)
- Vapor pressure** : 250 kPa (1875 mm Hg)
- Vapor density** : 1.19 [Air = 1]
- Odor threshold** : 0.13 ppm
- Solubility** : 437 mL of gas in 100 mL of water at 0°C; 186 mL of gas in 100 mL of water at 40°C. Soluble in hydrocarbon solvents, ether, alcohol, glycerol and carbon disulfide.

10. Stability and reactivity

- Chemical stability** : The product is stable.
- Conditions to avoid** : Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition.
- Materials to avoid** : Reactive or incompatible with the following materials: oxidizing materials, acids and alkalis.
- Hazardous decomposition products** : Toxic oxides of sulfur.
- Possibility of hazardous reactions** : Under normal conditions of storage and use, hazardous reactions will not occur.
- Hazardous polymerization** : Under normal conditions of storage and use, hazardous polymerization will not occur.

11. Toxicological information

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Hydrogen sulfide	LC50 Inhalation Vapor	Rat	700 mg/m ³	4 hours

Irritation/Corrosion

- Skin** : There is no data available.
- Eyes** : There is no data available.

11. Toxicological information

Respiratory	: There is no data available.
Sensitizer	
Skin	: There is no data available.
Respiratory	: There is no data available.
Chronic toxicity	: No specific data.
IDLH	: 100 ppm

12. Ecological information

Environmental effects : Very toxic to aquatic organisms. May cause long-term adverse effects in the aquatic environment.

Aquatic ecotoxicity

Product/ingredient name	Result	Species	Exposure
Hydrogen sulfide	Acute EC50 540 ug/L Fresh water	Crustaceans - Crangonyx richmondensis lauren - 10 mm	48 hours
	Acute LC50 <2 ug/L Fresh water	Fish - Perca flavescens - Yolk-sac fry	96 hours

Mobility : When it is spilled onto soil, much will evaporate. However, since it is very soluble in water, the presence of water in soil or falling as precipitation at the time of the spill may contribute to movement in the soil. If the soil surface is saturated with moisture at the time of the spill as might be the case after a rainfall, the spilled chemical will run off and/or evaporate away.

Products of degradation : Products of degradation: sulfur oxides (SO₂, SO₃ etc.).

Special remarks on the products of biodegradation : Microorganisms in soil and water are involved in oxidation-reduction reactions, which oxidize hydrogen sulfide to elemental sulfur. Abiotic Degradation: Hydrogen sulfide does not absorb solar radiation reaching the troposphere. It does not, therefore, undergo photolysis or react photochemically with oxygen. The primary chemical transformation of hydrogen sulfide in the atmosphere is oxidation by oxygen containing radicals to sulfur dioxide and sulfates.



13. Disposal considerations

Waste disposal : The generation of waste should be avoided or minimized wherever possible. This material and its container must be disposed of in a safe way. Do not puncture or incinerate container. Empty pressure vessels should be returned to the supplier. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements.










Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

14. Transport information

Regulatory information	UN number	Proper shipping name	Classes	PG*	Label	Additional information
DOT Classification	UN1053	HYDROGEN SULFIDE	2.3 (2.1)	-	 	<p>Reportable quantity 100 lbs. (45.4 kg)</p> <p>Limited quantity Yes.</p> <p>Packaging instruction Passenger aircraft Quantity limitation: Forbidden.</p>

14 . Transport information

						Cargo aircraft Quantity limitation: Forbidden. Special provisions 2, B9, B14
TDG Classification	UN1053	HYDROGEN SULFIDE	2.3 (2.1)	-	  	Special provisions 102
IMDG Class	UN1053	HYDROGEN SULFIDE. Marine pollutant	2.3 (2.1)	-	  	-
IATA-DGR Class	UN1053	HYDROGEN SULFIDE	2.3 (2.1)	-	  	Passenger and Cargo Aircraft Quantity limitation: Forbidden Cargo Aircraft Only Quantity limitation: Forbidden

PG* : Packing group

Exemption to the above classification may apply.

AERG : 117

15 . Regulatory information

United States

HCS Classification : Highly toxic material
 Flammable gas
 Compressed gas
 Irritating material
 Target organ effects

U.S. Federal regulations : **United States inventory (TSCA 8b)**: This material is listed or exempted.
SARA 302/304/311/312 extremely hazardous substances: Hydrogen sulfide
SARA 302/304 emergency planning and notification: Hydrogen sulfide
SARA 302/304/311/312 hazardous chemicals: Hydrogen sulfide
SARA 311/312 MSDS distribution - chemical inventory - hazard identification:
 Hydrogen sulfide: Fire hazard, Sudden release of pressure, Immediate (acute) health hazard, Delayed (chronic) health hazard
Clean Water Act (CWA) 307: No products were found.
Clean Water Act (CWA) 311: No products were found.

15 . Regulatory information

Clean Air Act (CAA) 112 accidental release prevention: Hydrogen sulfide

Clean Air Act (CAA) 112 regulated flammable substances: No products were found.

Clean Air Act (CAA) 112 regulated toxic substances: Hydrogen sulfide

Clean Air Act Section 112(b) Hazardous Air Pollutants (HAPs) : Listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 313

	<u>Product name</u>	<u>CAS number</u>	<u>Concentration</u>
Form R - Reporting requirements	: Hydrogen sulfide	7783-06-4	99.9
Supplier notification	: Hydrogen sulfide	7783-06-4	99.9

SARA 313 notifications must not be detached from the MSDS and any copying and redistribution of the MSDS shall include copying and redistribution of the notice attached to copies of the MSDS subsequently redistributed.

State regulations :

- Connecticut Carcinogen Reporting:** This material is not listed.
- Connecticut Hazardous Material Survey:** This material is not listed.
- Florida substances:** This material is not listed.
- Illinois Chemical Safety Act:** This material is not listed.
- Illinois Toxic Substances Disclosure to Employee Act:** This material is not listed.
- Louisiana Reporting:** This material is not listed.
- Louisiana Spill:** This material is not listed.
- Massachusetts Spill:** This material is not listed.
- Massachusetts Substances:** This material is listed.
- Michigan Critical Material:** This material is not listed.
- Minnesota Hazardous Substances:** This material is not listed.
- New Jersey Hazardous Substances:** This material is listed.
- New Jersey Spill:** This material is not listed.
- New Jersey Toxic Catastrophe Prevention Act:** This material is not listed.
- New York Acutely Hazardous Substances:** This material is listed.
- New York Toxic Chemical Release Reporting:** This material is not listed.
- Pennsylvania RTK Hazardous Substances:** This material is listed.
- Rhode Island Hazardous Substances:** This material is not listed.

California Prop. 65

No products were found.

Canada

WHMIS (Canada) :

- Class A: Compressed gas.
- Class B-1: Flammable gas.
- Class D-1A: Material causing immediate and serious toxic effects (Very toxic).
- Class D-2B: Material causing other toxic effects (Toxic).

Canadian lists :

- CEPA Toxic substances:** This material is not listed.
- Canadian ARET:** This material is not listed.
- Canadian NPRI:** This material is listed.
- Alberta Designated Substances:** This material is not listed.
- Ontario Designated Substances:** This material is not listed.
- Quebec Designated Substances:** This material is not listed.

15 . Regulatory information

Canada inventory : This material is listed or exempted.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

International regulations

International lists : **Australia inventory (AICS)**: This material is listed or exempted.
China inventory (IECSC): This material is listed or exempted.
Japan inventory: This material is listed or exempted.
Korea inventory: This material is listed or exempted.
New Zealand Inventory of Chemicals (NZIoC): This material is listed or exempted.
Philippines inventory (PICCS): This material is listed or exempted.

Chemical Weapons Convention List Schedule I Chemicals : Not listed

Chemical Weapons Convention List Schedule II Chemicals : Not listed

Chemical Weapons Convention List Schedule III Chemicals : Not listed

16 . Other information

United States

Label requirements : FLAMMABLE GAS. MAY CAUSE FLASH FIRE. HIGH PRESSURE GAS. MAY BE FATAL IF INHALED. CAUSES RESPIRATORY TRACT AND EYE IRRITATION. CAN CAUSE TARGET ORGAN DAMAGE.

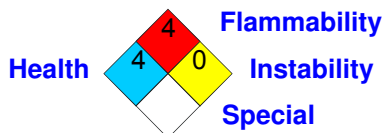
Hazardous Material Information System (U.S.A.) :

Health	*	4
Flammability		4
Physical hazards		0

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings are not required on MSDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

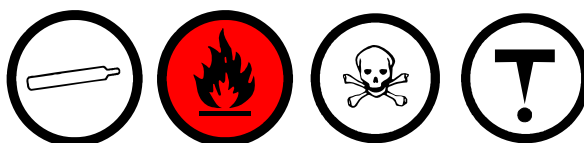
The customer is responsible for determining the PPE code for this material.

National Fire Protection Association (U.S.A.) :



Canada

WHMIS (Canada) :



16 . Other information

References	: - 29CFR Part1910.1200 OSHA MSDS Requirements. - 49CFR Table List of Hazardous Materials, UN#, Proper Shipping Names, PG. ANSI Z400.1, MSDS Standard, 2004. - Canada Gazette Part II, Vol. 122, No. 2. Registration SOR/88-64, 31 December 1987. Hazardous Products Act "Ingredient Disclosure List" - Canadian Transport of Dangerous Goods, Regulations and Schedules, Clear Language version 2005. - Manufacturer's Material Safety Data Sheet.
Date of issue	: 07/15/2012
Date of previous issue	: 03/01/2011
Version	: 7
Revised Section(s)	: 1, 8, 11, 16

Notice to reader

HANDLE PRODUCT WITH DUE CARE AND AVOID UNNECESSARY CONTACT. THIS INFORMATION IS SUPPLIED UNDER U.S. OSHA'S "RIGHT TO KNOW" (29 CFR 1910.1200) AND CANADA'S WHMIS REGULATIONS. ALTHOUGH CERTAIN HAZARDS ARE DESCRIBED HEREIN, WE CANNOT GUARANTEE THESE ARE THE ONLY HAZARDS THAT EXIST. THE INFORMATION CONTAINED HEREIN IS BASED ON DATA AVAILABLE TO US AND IS BELIEVED TO BE TRUE AND ACCURATE BUT IT IS NOT OFFERED AS A PRODUCT SPECIFICATION. NO WARRANTY, EXPRESSED OR IMPLIED, REGARDING THE ACCURACY OF THIS DATA, THE HAZARDS CONNECTED WITH THE USE OF THE PRODUCT, OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF, IS MADE AND CHEMTRADE AND ITS AFFILIATES ASSUME NO RESPONSIBILITY. CHEMTRADE IS A MEMBER OF THE CIAC (CHEMISTRY INDUSTRY ASSOCIATION OF CANADA) AND ADHERES TO THE CODES AND PRINCIPLES OF RESPONSIBLE CARE™.



Material Safety Data Sheet

Issue No.: SMC-11.07

Date: September 16, 2011

1.1 PRODUCT INFORMATION:

This MSDS covers the following Special Metals Corporation alloy families and individual products identified as:

INCONEL®, **INCOLOY®**, **INCOCLAD®**, **MONEL®**, **UDIMET®**, **UDIMAR®**, **NILO®**, **NILOMAG®**, **NIMONIC®**, **NIMOLOY**, **NI-SPAN-C®**, **BRIGHTRAY®**, **KOTHERM®** & **NIOTHERM®** alloys; **Nitinol**, **Nickel**, **DEPOLARIZED & DURVANIC nickel**, **Electroformed nickel foil**, **Cupro 107**; **Miscellaneous designations**, **Mixed nickel alloy revert**.

These are corrosion or heat resisting alloys, or alloys with special physical properties, which are primarily used in process, industrial, aerospace, automotive, marine, electrical or electronic equipment. Alloys not described in this document may be proprietary; contact one of the SMC locations below for more information.

1.2 COMPANY INFORMATION

The products are supplied by the main manufacturing companies in the Special Metals Corporation Group and/or their subsidiaries*:

USA
Special Metals Corporation
3200 Riverside Drive
Huntington, WV, USA 25705
EMERGENCY TELEPHONE NUMBER: +1(304) 526-5780
GENERAL INFORMATION: +1(304) 526-5100

EUROPE
Special Metals Wiggin Ltd.
Holmer Road
Hereford, HR4 9SL, UK
EMERGENCY TELEPHONE NUMBER: +44 (0)1432 382200
GENERAL INFORMATION: +44 (0) 1432 382200
FAX: +44 (0) 1432 264030

Special Metals Corporation
4317 Middle Settlement Road
New Hartford, NY, USA 13413-5392
EMERGENCY TELEPHONE NUMBER: +1(315) 798-2900
GENERAL INFORMATION: +1(314) 798-2900

This document does not cover Welding Products.

For Welding Products MSDS, contact:

Special Metals Welding Products Company
1401 Burris Road
Newton, NC, USA 28658
Tel: +1(828) 465-0352
www.specialmetalswelding.com

*For a full list of subsidiary companies, please refer to our website www.specialmetals.com or call +1(304) 526-5100 or toll-free in the USA +1(800) 334-4626.

2. COMPONENT INFORMATION:

The compositions of individual products in the alloy families or categories listed under 1.1 are given in the product composition tables in APPENDIX 1. Please refer to the appropriate alloy name or designation.

3. HAZARDS IDENTIFICATION:

Description of hazards:

As shipped, these complex alloys in massive form have no known toxicological properties other than causing allergic reactions in individuals sensitive to the metals contained in the alloys. Nickel, Cobalt, and some forms of Chromium are known skin sensitizers. Nickel and Cobalt also are classified as suspected carcinogens (EU Category 3). Absent specific test data for the alloy, mixtures (including alloys) that contain more than 1% of a substance are classified in the same manner as that substance.

Hazardous fume or dust emissions may be released during remelting, grinding, cutting or welding. In addition to Nickel and Cobalt, Hexavalent Chromium (a known human inhalation carcinogen – EU Category 2) may be generated during processing activities. If airborne emissions are excessive, inhalation may affect worker health. Further information is given in Section 8 – Exposure Controls / Personal Protection.

In addition, individual products in the above alloy families may contain one or more of the following ingredients, which may be considered hazardous under the legislation indicated:

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USA: SARA SECTION 313 SUPPLIER NOTIFICATION: Emergency Planning and Community Right-To-Know Act of 1986 and of 40 CFR 372.

Aluminum	CAS No. 7429-90-5
Chromium	CAS No. 7440-47-3
Cobalt	CAS No. 7440-48-4
Copper	CAS No. 7440-50-8
Iron	CAS No. 7439-89-6
Manganese	CAS No. 7439-96-5
Molybdenum	CAS No. 7439-98-7
Nickel	CAS No. 7440-02-0
Niobium	CAS No. 7440-03-1
Tantalum	CAS No. 7440-25-7
Titanium	CAS No. 7440-32-6
Tungsten	CAS No. 7440-33-7
Yttrium Oxide	CAS No. 1314-36-9

EUROPE

Nickel EC Label No. 231-111-4
Index No. 028-002-00-7
Designation: Xn Harmful
Risk Phrases: R40 Possible risk of irreversible effects.
R43 May cause sensitization by skin contact.

Cobalt EC Label No. 231-158-0
Index No. 027-001-00-9
Designation: Xn Harmful
Risk Phrases: R42/43 May cause sensitization by inhalation and skin contact.
R53 May cause long-term adverse effects in the aquatic environment.

Refer to APPENDIX 1 of this MSDS for the individual alloy name and the percent by weight of the various ingredients in each alloy.
Refer to APPENDIX 2 for detailed information on the toxicological properties of these ingredients.

4. FIRST AID MEASURES:

Eye contact: Flush particles from the eyes with clean water for at least 15 minutes. If irritation persists, seek medical help.
Skin contact: Wash skin with soap and water to remove any metallic particles. If a rash develops, seek medical attention.
Inhalation: Remove from exposure. If respiratory irritation persists, seek medical help.
Ingestion: If symptoms of ingestion arise, seek medical help.

5. FIRE or EXPLOSION HAZARD: Nonflammable, however sparks from welding or grinding in user operations could ignite flammable or combustible liquids, vapors and solids.

6. ACCIDENTAL RELEASE MEASURES:

Vacuum or shovel any spilled material into a suitable container. Alloy wastes are normally collected to recover metal values.

7. HANDLING AND STORAGE:

Under normal circumstances the materials do not produce any hazardous products and as such do not require any special precautions. However, see Section 10, "STABILITY AND REACTIVITY". The transient handling of the materials would not be expected to produce any sensitization but it is good practice to use gloves for handling. The normal precautions for handling heavy objects with possible sharp edges should also be observed.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION:

Respiratory Protection: Respiratory protection is necessary when exposure limits for airborne contaminants are exceeded during cutting, grinding or welding on these alloys. Use air-supplied respirator in confined spaces. In the USA, use only NIOSH-approved respirators in accordance with 29 CFR 1910.134, or other nationally approved respirators. In the EU if required use protection to EN136 (full face respirators), EN140 (half mask respirators), EN149 (filtered half masks (disposable)) or other appropriate EN standard. In the rest of the world use respiratory protection to the appropriate national standard.

Ventilation: Use local exhaust ventilation when cutting, grinding or welding. Maintain exposures below published exposure limits. Confined spaces require special attention to provision of adequate ventilation and/or air-supplied respirators.

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Eye Protection and Protective Clothing: Eye protection is recommended when cutting, grinding and welding. Wear gloves, face protection and flame retardant clothing. Do not expose skin or eyes to the heat and radiation from welding operations.

IMPORTANT

Maintain exposures below the published exposure levels. Use industrial hygiene air monitoring to ensure that your use of this material does not create exposures that exceed the recommended exposure limits. Always use exhaust ventilation in user operations such as high temperature cutting, welding and grinding. Refer to the following sources for important additional information:

In U.S.A.: 29 CFR 1910, ANSI Z49.1, American Welding Society, OSHA, U.S. Dept of Labor
In Canada: Canadian Standards Association, CAN/CSA – W17.2-M87
In UK: Current exposure limits under Health & Safety Executive EH40 are given in Appendix 2.

9. PHYSICAL AND CHEMICAL PROPERTIES:

Physical State: Solid Specific Gravity: 8-9 gm/cc Melting Point: >1260° C Odor: Odorless
Appearance: Silver-colored metal shaped as plate, bar, wire, tube, rod, strip, sheet or some intermediate form.

Other physical and chemical properties, e.g. as described in 91/155/EEC and in the Approved Code of Practice, ref. 11 (viscosity, flash point, auto flammability, vapor pressure, solubility and partition coefficient), have no safety implications in relation to these materials.

10. STABILITY AND REACTIVITY:

These alloys are very stable and no hazardous decomposition products are formed upon exposure to water or the atmosphere. Nickel can react with carbon monoxide in reducing atmospheres to form nickel carbonyl, an extremely toxic gas.

11. TOXICOLOGICAL PROPERTIES:

Nickel and cobalt are classified as Category 3 carcinogens. The exposure route of concern is inhalation. Hexavalent Chromium (a known human inhalation carcinogen – EU Category 2) may be generated during processing activities.

As shipped, these complex alloys in massive form have no known toxicological properties other than causing allergic reactions in individuals sensitive to the metal(s) contained in the alloys. However, user-generated dusts and fumes may on contact with the skin or eyes produce mechanical irritation. Chronic exposures coupled with sweat could cause dermatitis (skin) or conjunctivitis (eyes). Excessive inhalation of user-generated fumes from high temperature cutting, remelting or welding of these alloys may, depending on the specific features of the process used, pose a long-term health hazard. The International Agency for Research on Cancer (IARC) has concluded that welding fumes are possibly carcinogenic to humans.

The ingredients of fumes and gases generated in user welding, grind and high temperature cutting operations will depend on the base metal, electrode, flux and the specific process being used. Ingredients may include metals, metal oxides, chromates, fluorides, carbon monoxide, ozone, and oxides of nitrogen. Phosgene can be produced if chlorinated solvent vapors are present in user operations.

More detailed toxicological information is given in APPENDIX 2.

12. ECOLOGICAL EFFECTS:

These alloys are not soluble in water and react only very slowly with natural environments. No special precautions are necessary.

13. DISPOSAL:

Alloy wastes are normally collected to recover metal values. However, if disposal is necessary, dispose of in accordance with national, federal, state or local regulations. In the UK, most alloy material would be classified as special waste.

14. TRANSPORTATION:

No special precautions are necessary for the transport of these materials.

15. REGULATORY INFORMATION:

Classification and labeling requirements

Alloys containing less than 1% of nickel or cobalt are not classified as “dangerous for supply”. Alloys containing more than 1% of either metal are classified as the metals themselves (see Section 3). However, in recognition of their essentially non-hazardous nature, these alloys in the massive form are not required to be labeled as hazardous.

16. OTHER INFORMATION:

Bibliography:

1. U.S. National Toxicology Program – 10th Report On carcinogens
2. Health and Safety Executive UK – EH40 – Occupational exposure limits; EH42 – Monitoring Strategies for toxic substances; EH44 – Dust the Workplace – general principles of protection; EH54 – Assessment of Exposure to Fume from Welding and Allied Processes; EH55 – The Control of Exposure to Fume from Welding, Brazing and Similar Processes; EH60 – Nickel and its inorganic compounds.
3. EH Health and Safety Executive's publications (www.hse.gov.uk)
4. HSC. Information approved for the classification, packaging and labeling of dangerous substances for supply and conveyance by road
5. European Commission Directive 5/3/91 – 91/155/EEC
6. European Commission Directive 10/12/93 – 93/112/EEC
7. Twelfth adaptation of Council Directive 67/548/EEC – 91/325/EEC
8. Sixth amendment of Council Directive 67/548/EEC – 79/831/EEC
9. The Chemicals (Hazard Information and Packaging for Supply) Regulations 2002 No. 1689
10. International Agency for Research on Cancer. Monographs on the evaluation of carcinogenic risks to humans. Vol. 49 Chromium Nickel and Welding, 1990.
11. Approved Code of Practice ISBN 0 7176 0859X
12. European Norm – EN 1811

17. PREPARATION INFORMATION: Prepared By: Health & Environmental Safety Department
Special Metals Corporation
Huntington, WV USA 25705
+1 304 526-5100

It is Special Metals' belief that information set forth in this Material Safety Data Sheet is accurate. Special Metals makes no warranty, expressed or implied, with respect thereto and disclaims any liability from reliance thereon. Users should make their own assessment of workplace risks as required by other health and safety legislation.

APPENDIX 1 – HAZARDOUS INGREDIENTS

The nominal compositions of individual alloys are given in the tables below. The MSDS covers all products thus identified.

Table 1. INCONEL® alloys
Tradename and Nominal Composition (% weight)

Alloy Designation	Aluminum	Chromium	Cobalt	Copper	Iron	Manganese	Molybdenum	Nickel	Niobium	Silicon	Tantalum	Titanium	Tungsten	Yttrium Oxide
INCONEL® alloy 050		20	3		18		9	50	1					
INCONEL® alloy 22	0.2	22			2.5		14	58					3	
INCONEL® alloy 600 & 600T		16			8			76						
INCONEL® alloy 600SP		15			8			77						
INCONEL® alloy 601	1	24			14			61						
INCONEL® alloy 601GC	1	24			14			61						
INCONEL® alloy 603XL		22					3	73		2				
INCONEL® alloy 604		16			8			72	2					
INCONEL® alloy 606		20			1	3		73	3					
INCONEL® alloy 613	1	16			6	1		76						
INCONEL® alloy 617	1	22	13		1		10	53						
INCONEL® alloy 618		23			16			55					6	
INCONEL® alloy 622	0.2	22			2.5		14	58					3	
INCONEL® alloy 625		22			4		9	61	4					
INCONEL® alloy 625LCF		22			4		9	61	4					
INCONEL® alloy 672		45						54			1			
INCONEL® alloy 673	1	37	1		1			58	1			0.5		
INCONEL® alloy 686		21			1		16	58					4	
INCONEL® alloy 690 & 690T		29			9			62						
INCONEL® alloy 691	1	30			9			59			1			
INCONEL® alloy 692	1	30			9	1		57				1		
INCONEL® alloy 693	3	30			5			60	2					
INCONEL® alloy 702	3	16			1			79				1		
INCONEL® alloy 706		16			37			42	3			2		
INCONEL® alloy 718	1	18			18		3	54	5			1		
INCONEL® alloy 718SPF	1	18			18		3	54	5			1		
INCONEL® alloy 721		16			7	2		71				3		
INCONEL® alloy 722	1	16			7			74				3		
INCONEL® alloy 725		21			9		8	58	3			1		
INCONEL® alloy 725HS		21			9		8	58	3			1		
INCONEL® alloy 740	1	25	20		1			49	2			2		
INCONEL® alloy 740H	1.5	25	20		1			49	1.5			1.5		
INCONEL® alloy X-750	1	16			7			72	1			3		
INCONEL® alloy 751	1	15			7			73	1			3		
INCONEL® alloy 783	6	3	35		25			28	3					
INCONEL® alloy C-276		16			6	1	16	57					4	
INCONEL® alloy G		22	1	2	20	1	7	44	2					
INCONEL® alloy G-3		22	3	2	20	1	7	44					1	
INCONEL® alloy HX		22	2		18		9	48					1	
INCONEL® alloy MA754		20						78				1		1
INCONEL® alloy MA758		30						68				1		1
INCONEL® alloy MA6000	5	15					2	69		2	3	4		1
INCONEL® alloy N06230	0.3	22	1		1	0.5	2	60					14	
INCOTHERM® alloy TD		22					3	73			2			

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Table 2. INCOLOY®, NILO® and NI-SPAN-C® alloys
 Tradename and Nominal Composition (% weight)

Alloy Designation	Aluminum	Chromium	Cobalt	Copper	Iron	Manganese	Molybdenum	Nickel	Niobium	Silicon	Titanium	Yttrium Oxide	Nitrogen
INCOLOY® alloy 20		20		4	38		3	34	1				
INCOLOY® alloy 28		27			37		4	32					
INCOLOY® alloy 25-6HN		20		0.3	45	0.5	6	25					0.2
INCOLOY® alloy 25-6MO		20		1	45	0.5	6	25					
INCOLOY® alloy 27-7MO		22		1	41	1	7	27					0.35
INCOLOY® alloy 330		19			44			36		1			
INCOLOY® alloy 330Cb		19			42			36	1	1			
INCOLOY® alloy 330HC		19			48			34		1			
INCOLOY® alloy 800		20			45	1		33		1			
INCOLOY® alloy 800H		20			45			33			1		
INCOLOY® alloy 800HT		20			45			33			1		
INCOLOY® alloy 801		20			46	1		32			1		
INCOLOY® alloy 802		21			44	1		33			1		
INCOLOY® alloy 803		27			36	1		35			1		
INCOLOY® alloy 805		8			55	1	1	36			1		
INCOLOY® alloy 825		22		2	29	1	3	42			1		
INCOLOY® alloy 832		20			65			14		1			
INCOLOY® alloy 840		20			59			20		1			
INCOLOY® alloy 864		21			40		4	34		1			
INCOLOY® alloy 865		24			52	0.8	2	21		1.2			0.2
INCOLOY® alloy 890		25			27	1	2	43		2			
INCOLOY® alloy 901		13			36		6	42			3		
INCOLOY® alloy 903	1		15		42			38	3		1		
INCOLOY® alloy 904			15		51			33			2		
INCOLOY® alloy 907			13		42			38	5		2		
INCOLOY® alloy 908	1	4			41			49	3		2		
INCOLOY® alloy 909			13		42			38	5		2		
INCOLOY® alloy 925		21		2	28		3	44			2		
INCOLOY® alloy 945	0.5	21		2	18	0.5	3	50	3		1.5		
INCOLOY® alloy 945X	0.5	21		2	14	0.5	3	53	4		1.5		
INCOLOY® alloy A-286		14			58		1	25			2		
INCOLOY® alloy DS		18			42	1		37		2			
INCOLOY® alloy MA956	5	20			74							1	
INCOLOY® alloy MA957		14			85						1		
NI-SPAN-C® alloy 902		5			49			43		1	2		
NILO® alloy 36					64			36					
NILO® alloy 42					58			42					
NILO® alloy 45					55			45					
NILO® alloy 475		5			48			47					
NILO® alloy 48					52			51					
NILO® alloy 51					49			51					
NILO® alloy 55					44			5					
NILO® alloy K			17		53			30					
NILO® alloy 365					50			44	3.5		1.5		
NILOMAG® alloy 77				5	14		4	77					

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Table 3. NIMONIC® and NIMOLOY alloys
 Tradename and Nominal Composition (% weight)

Alloy Designation	Aluminum	Chromium	Cobalt	Iron	Manganese	Molybdenum	Nickel	Niobium	Titanium
NIMONIC® alloy 70	1	20		25			51	2	1
NIMONIC® alloy 75		20		4	1		75		
NIMONIC® alloy 80a	1	20					76		2
NIMONIC® alloy 81	1	30		1			66		2
NIMONIC® alloy 86		25				10	65		
NIMONIC® alloy 90	2	20	16	1			58		3
NIMONIC® alloy 91	1	29	20				48		2
NIMONIC® alloy 101	1	24	20			2	49	1	3
NIMONIC® alloy 105		15	20			5	54		1
NIMONIC® alloy 108	5	15	20			5	53		1
NIMONIC® alloy 115	5	15	13			4	59		4
NIMONIC® alloy 263	1	20	20			6	51		2
NIMONIC® alloy 901		13		35		6	43		3
NIMONIC® alloy PE11	1	18		35		5	38		2
NIMONIC® alloy PE16	1	17		34		3	44		1
NIMONIC® alloy PK31		20	14			5	53	5	2
NIMONIC® alloy PK33	2	19	14	1		7	55		2
NIMOLOY alloy PK37	1	19	17				60		2

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Table 4. BRIGHTRAY®, KOTHERM® and NIOOTHERM® alloys
 Tradename and Nominal Composition (% weight)

Alloy Designation	Chromium	Iron	Nickel	Silicon	Manganese	Copper
BRIGHTRAY® alloy B	16	24	59	1		
BRIGHTRAY® alloy C	20		78	2		
BRIGHTRAY® alloy F	18	42	37	2	1	
BRIGHTRAY® alloy S	20		78	1	1	
BRIGHTRAY® alloy 35	20	42	36	2		
KOTHERM® Positive	10		90			
KOTHERM® Negative			94	3		2
NIOOTHERM® Positive	14		85	1		
NIOOTHERM® Negative			96	4		

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Table 5A. Miscellaneous Designations
Tradename and Nominal Composition (% weight)

Alloy Designation	Aluminum	Chromium	Cobalt	Iron	Manganese	Molybdenum	Nickel	Niobium	Rhenium	Tantalum	Titanium	Tungsten	Calcium	Silicon
JBK		15		52		1	30				2			
Nickel 200							99							
Nickel 201							99							
Nickel 205							99							
Nickel 208							96				3			
Nickel 209							95				4			
Nickel 211					4.7		95							
Nickel 212					2		97							
Nickel 213					1		97							
Nickel 222							99							
Nickel 229							99							
Nickel 240		2			2		96							
Nickel 243		2			2		96							
Nickel 270							99							
Nickel-Iron 258	0.3			40	0.5		60				0.3			0.3
Electroformed nickel							99							
DEPOLARIZED nickel							99							
DURVANIC nickel							99							
Mixed nickel alloy revert	0-3	0-20	0-5	20-40	0-1	0-5	30-60	0-1		0-0.5	1-4	0-1	1-4	

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Table 5B. Miscellaneous Designations
Tradename and Nominal Composition (% weight)

Alloy Designation	Aluminum	Chromium	Cobalt	Iron	Manganese	Molybdenum	Nickel	Niobium	Tantalum	Titanium	Tungsten	Copper	Nitrogen
13-8	1	13		76		2	8						
304SS		19		71	1		9						
713C	6	14				5	73	2		1			
B300			9	67		5	19						
C1023	4	15	10			8	60			4			
Crutonite	2	16		45			32	2		2			
G255		24		13		7	52				2	1	
GMR235	4	15		4		5	70			3			
GTD222	1	23	19				51		1	2	2		
IN738LC	4	16	8			2	62		2	3	3		
IN738	3	16	9			2	61	1	2	4	3		
M252	1	19	10			10	57			3			
MERC76	5	13	19			3	55	1		4			
NICOCRALY	13	22	23				43						
NiTiFe				2			54			45			
Rene 220		19	12			3	56	5	3				
Rene 77	4	15	15			4	58	5	3				
SR50A		22		50		6	21						0.25
Waspaloy	2	19	13			4	59			3			
X40		26	54				11			8			

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Table 6. MONEL® alloys, FERRY® alloy and Cupro 107
Tradename and Nominal Composition (% weight)

Alloy Designation	Aluminum	Copper	Iron	Manganese	Nickel	Silicon	Titanium
MONEL® alloy 400		32	1	1	66		
MONEL® alloy 401		55	1	2	43		
MONEL® alloy 404		46			54		
MONEL® alloy R-405		32	1	1	66		
MONEL® alloy 413		67	1	1	31		
MONEL® alloy 416	1	30		1		2	
MONEL® alloy 418		27		4	66	1	2
MONEL® alloy 450		67	1	1	31		
MONEL® alloy K-500	3	30	1	1	65		1
FERRY® alloy		54			44		
Cupro 107		67	1	1	31		

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Table 7. UDIMET® and UDIMAR® alloys
Tradename and Nominal Composition (% weight)

Alloy Designation	Aluminum	Chromium	Cobalt	Iron	Manganese	Molybdenum	Nickel	Niobium	Titanium	Tungsten
UDIMET® alloy R41	2	19	11			10	55		3	
UDIMET® alloy 188		22	40		1		23			14
UDIMET® alloy 500	3	19	18			4	53		3	
UDIMET® alloy 520	2	19	12			6	57		3	1
UDIMET® alloy 700	5	15	19			5	53		4	
UDIMET® alloy 713	6	14				5	73	2		
UDIMET® alloy 718		18		19		3	54	5	1	
UDIMET® alloy 720	3	18	15			3	56		5	1
UDIMET® alloy 706		16		37			42	3	2	
UDIMET® alloy L-605		20	53		2		10			15
UDIMET® alloy D301	5						95			
UDIMET® alloy D979	1	15		28		4	45		3	4
UDIMAR® alloy 250	0.1		8	Bal		5	18		0.5	
UDIMAR® alloy 300	0.1		9	Bal		5	18		0.7	

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Table 8. Nitinol alloys
Tradename and Nominal Composition (% weight)

Alloy Designation	Chromium	Cobalt	Copper	Iron	Nickel	Niobium	Titanium
Nickel-Titanium					54-57		43-46
Ni-Ti-Fe				1-7	48-50		43-51
Ni-Ti-Cu			5-10		43-45		46-52
Ni-Ti-Cr	0.2-0.3				54-57		43-46
Ni-Ti-Nb					45-51	13-15	34-42
Ni-Ti-Co		1-2			54-57		41-45

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Special Metals Corporation Material Safety Data Sheet

Table 9. INCOCLAD® products

(N.B. these are products containing more than one alloy or component. Nominal compositions are given for each component.)
 Tradename and Nominal Composition (% weight)

Alloy Designation	Chromium	Cobalt	Copper	Iron	Molybdenum	Nickel	Niobium	Titanium
INCOCLAD® 625/steel	22			4 95	9	61	4	
INCOCLAD® 671/800H/HT	49 20			45		51 33		

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APPENDIX 2

TOXICOLOGICAL AND EXPOSURE LIMIT INFORMATION

The following information is primarily directed to the ingredients of the complex alloys listed in APPENDIX 1. Although it is the user's responsibility to assess end products, intermediates or fugitive emissions arising out of the use of these alloys, information is also provided for common fume ingredients. *UK EH40 limits for the ingredients are shown in italics at the end of each section.*

Aluminum (Al)

Exposure Limits⁽¹⁾: **TVL: 10 mg/m³ (Metal dust); 5 mg/m³ (Welding fumes)**
PEL: 15 mg/m³ (Total metal dust); 5 mg/m³ (Metal dust – respirable fraction)
CAS No.⁽²⁾: 7429-90-5
LD₅₀: Not Available

Aluminum is not readily absorbed through the skin or the GI tract and only poorly through the lungs. Foreign literature between 1958 and 1962 reported cases of severe and sometimes fatal pulmonary fibrosis in workers exposed to aluminum dust. In one of the fatal cases, the worker developed fibrosis and encephalopathy after 13.5 years of exposure to aluminum dust.

In rodent studies and currently in US industry, no fibrosis or encephalopathy have been reported from the inhalation of aluminum powder. Acute exposure to alumina fume may cause bronchial irritation, however reports of pulmonary fibrosis and emphysema in alumina abrasive workers are no longer seen, owing to improved environmental control.

EH40- Aluminum metal:

Total inhalable dust OES 10 mg/m³ (8 hours TWA) Total respirable dust OES 4 mg/m³ (8 hours TWA)

Chromium (Cr)

Exposure Limits⁽¹⁾: **TLV: 0.5 mg/m³**
PEL: 1.0 mg/m³ (Metal as CR); 5 µg/m³ (8 hours TWA) (Chromium VI compounds)
CAS No.⁽²⁾: 7440-47-3
LD₅₀: Not Available

Chromium metal is relatively nontoxic. Chromium metal and insoluble salts are said to be involved in fibrosis of the lungs. When the metal is heated to a high temperature, fumes produced may be damaging to the lungs if inhaled. The International Agency for Research on Cancer has concluded that the evidence for carcinogenicity in humans and animals is inadequate for chromium metal and trivalent chromium compounds, but sufficient for hexavalent chromium compounds. Fumes from welding chromium-containing stainless steel or certain chromium-containing rods can trigger eczematous eruptions on the palms of the hands of chromium-sensitized individuals.

EH40 – Chromium:

Chromium VI compounds (as Chrome) MEL 0.05 mg/m³ (8 hours TWA)

Chromium II compounds (as Chrome) OES 0.5 mg/m³ (8 hours TWA)

Chromium III compounds (as Chrome) OES 0.5 mg/m³ (8 hours TWA)

Chromium OES 0.5 mg/m³ (8 hours TWA)

Cobalt (Co)

Exposure Limits: **TVL: 0.02 mg/m³ (Dust & fume as Co)**
PEL: 0.1 mg/m³ (As Co metal)
CAS No.⁽²⁾: 7440-48-4
LD₅₀: 6,170 mg/kg, rat, oral

Asthmatic symptoms and pulmonary fibrosis occurring in the tungsten carbide industry may be related to the inhalation of metallic cobalt dust. Evidence of polycythemia (an increase in the total red cell mass of the blood in the body) and altered thyroid, kidney and liver function have also been found. Excessive inhalation of metallic cobalt have produced cardiac changes in miniature swine. Eye contact may cause conjunctivitis. Symptoms of excessive ingestion may be a sensation of hotness with vomiting, diarrhea and nausea along with the potential for causing damage to blood, heart, thyroid and pancreas. Repeated skin contact can cause sensitivity and allergic skin rashes. Cobalt powders have caused tumors at the site of injection in rodents. However, studies of cobalt-containing prostheses do not suggest a significant risk for humans.

EH40 – MEL 0.1 mg/m³ (8 hours TWA)

Copper (Cu)

Exposure Limits⁽¹⁾: TLV: 1 mg/m³ (Dusts & mists, as Cu), 0.2 mg/m³ (Fume)
 PEL: 1 mg/m³ (Dusts & mists, as Cu); 0.1mg/m³ (Fume as Cu)
 CAS No. ⁽²⁾: 7440-50-8
 LD₅₀: 35 mg/kg, mouse, intraperitoneal

Copper metal dust and fume may be irritating to the respiratory tract. In user operations where copper fume is generated, inhalation of the fume can result in symptoms of "Metal Fume Fever" such as chills, fever and sweating. A few instances of allergic skin rashes have been reported in workers with skin exposure to metallic copper. In the eyes, copper metal as foreign body can provoke an inflammatory reaction resulting in pus formation in the conjunctiva, cornea or sclera. Ingestion of copper metal may cause gastrointestinal upset. Wilson's disease can occur in certain individuals with a rare, inherited metabolic disorder characterized by retention of excessive amounts of copper in the liver, brain, kidneys and corneas. These deposits eventually lead to tissue necrosis and fibrosis, causing a variety of clinical effects, especially liver disease and neurological changes. Wilson's disease is progressive and, if untreated, leads to fatal liver failure.

EH40: Fume OES 0.2 mg/m³ (8 hours TWA)

Dusts & mists (as Cu) 1.0 mg/m³ (8hours TWA, 2.0 mg/m³ (15 minute reference period)

Iron (Fe)

Exposure Limits⁽¹⁾: TLV: No limit set (For Fe₂O₃ fume the TLV is 5 mg/m³ as Fe)
 PEL: No limit set (For Fe₂O₃ dust & fume the PEL is 10 mg/m³ as Fe)
 CAS No. ⁽²⁾: 7439-89-6
 LD₅₀: Not Available

Inhalation of the excessive oxide fumes or dusts can lead to irritation of the respiratory tract. Prolonged inhalation of iron oxide for periods of 6 to 10 years is known to cause siderosis which appears to be a benign pneumonconiosis. Prolonged eye contact with the metal dust could cause rust brown colored spots forming around the particles and if left for several years, permanent damage could result.

EH40 – Iron Oxide, fume (as Fe) OES 5.0 mg/m³ (8 hours TWA), 10 mg/m³ (15 minute reference period)

Manganese (Mn)

Exposure Limits⁽¹⁾: TLV: 0.2 mg/m³ elemental and inorganic compounds, as Mn
 PEL: 5 mg/m³ (Ceiling, as Mn compounds); 5 mg/m³ (Fume, as Mn)
 CAS No. ⁽²⁾: 7439-96-5
 LD₅₀: 9,000 mg/kg, rat, oral

Excessive inhalation or ingestion of manganese can produce manganese poisoning. Chronic exposures can lead to neurological problems such as apathy, drowsiness, weakness, spastic gait, paralysis, and other neurological problems resembling Parkinsonism. These symptoms can become progressive and permanent if not treated. Excessive inhalation of fumes may cause "Metal Fume Fever" with its flu-like symptoms, such as chills, fever, body aches, vomiting, sweating, etc.

EH40 – Fume (as Mn) OES 1.0 mg/m³ (8hours TWA, 3.0 mg/m³ (15 minute reference period)

Manganese and compounds (as Mn) OES 5.0 mg/m³ (8 hours TWA)

Molybdenum (Mo)

Exposure Limits⁽¹⁾: TLV: 10 mg/m³ (Insoluble and metal compounds, as Mo)
 PEL: 15 mg/m³ (Insoluble compounds, total dust as Mo)
 CAS No. ⁽²⁾: 7439-98-7
 LD₅₀: Not Available

Molybdenum and its insoluble compounds are reported to have low toxicity. High dietary intake may produce a gout-like disease and high blood uric acid. Inhalation of fumes has caused kidney damage, respiratory irritation and liver damage in animals. Skin and eye contact may cause irritation.

EH40 – Molybdenum compounds (as Mo):

Soluble – OES 5.0 mg/m³ (8 hours TWA), 10 mg/m³ (15 minute reference period)

Insoluble – OES 10 mg/m³ (8 hours TWA), 20 mg/m³ (15 minute reference period)

Nickel (Ni)

Exposure Limits⁽¹⁾: TLV: 1.5 mg/m³ as metal (Inhalable Fraction)
 PEL: 1 mg/m³ for metal and insoluble compounds as Ni

CAS No. ⁽²⁾: 7440-02-0**LD₅₀: >9,000 mg/kg, rat, oral**

The U.S. National Toxicology Program (NTP) 10th Report on Carcinogens has listed "metallic nickel" as "reasonably anticipated to be a human carcinogen" and "nickel compounds" as "known human carcinogens". "Nickel Alloys" were reviewed but not listed. The International Agency for Research on Cancer (IARC) concluded that nickel compounds were carcinogenic to humans and that metallic nickel is possibly carcinogenic to humans. Epidemiological studies of workers exposed to nickel powder and to dust and fume generated in the production of nickel alloys and of stainless steel have not indicated the presence of a significant respiratory cancer hazard.

The inhalation of nickel powder has not resulted in an increased incidence of malignant tumors in rodents. Repeated intratracheal instillation of nickel powder produced an increased incidence of malignant lung tumors in rats, but did not produce an increased incidence in hamsters when administered at the maximum tolerated dose. However, single intratracheal instillations of nickel powder in hamsters at doses near the LD₅₀ have produced an increased incidence of fibrosarcomas, mesotheliomas and rhabdomyosarcomas. Inhalation of nickel powder at concentrations 15 times the PEL irritated the respiratory tract in rodents. Nickel is a known sensitizer and may produce allergic reactions.

EH40 – Nickel and its inorganic compounds (except nickel carbonyl)

Water soluble nickel compounds (as nickel) MEL 0.1 mg/m³ (8 hours TWA)

Niobium (Nb)**Exposure Limits⁽¹⁾:****TLV: No limit set****PEL: No limit set****CAS No. ⁽²⁾: 7440-03-1****LD₅₀: Not Available**

Also known as Columbium (Cb), there is almost no information on the toxicity of this metal or its fumes. Russian medical literature has described early chest x-ray changes in welders and chemical workers handling niobium and tantalum, but no specific data has been found. It is expected that the metal dust and fumes could cause irritation to the skin, eyes and respiratory tract upon acute exposure.

EH40-40: No limit set.

Tantalum (Ta)**Exposure Limits⁽¹⁾:****TLV: 5 mg/m³ (Metal & oxide dusts)****PEL: 5 mg/m³ (Metal & oxide dusts)****CAS No. ⁽²⁾: 7440-25-7****LD₅₀: Not Available**

There are no reports of adverse health effects in industrially exposed workers. Massive doses of tantalum given by the intratracheal route to rats have produced respiratory tract lesions. In contact with tissue, metallic tantalum is inert. Tantalum pentoxide has an LD₅₀ of >8 g/kg, orally in rats.

EH40 – OES 0.5 mg/m³ (8 hours TWA), 10 mg/m³ (15 minute reference period)

Titanium (Ti)**Exposure Limits⁽¹⁾:****TLV: No limit set; 10 mg/m³ (8 hours TWA) (titanium dioxide)****PEL: No limit set; 15 mg/m³ (8 hours TWA) (titanium dioxide)****CAS No. ⁽²⁾: 7440-32-6****LD₅₀: Not Available**

Inhalation of titanium could cause mild irritation to the respiratory tract. Inhalation of titanium dioxide dust or fume could produce lung fibrosis and chronic bronchitis.

EH40 – As Titanium dioxide:

Total inhalable dust OES 10 mg/m³ (8 hours TWA), Total respirable dust OES 4 mg/m³ (8 hours TWA)

Tungsten (W)**Exposure Limits⁽¹⁾:****TLV: 5 mg/m³ insoluble compounds, as W****STEL: 10 mg/m³ for insoluble compounds, as W****PEL: No limit set****CAS No. ⁽²⁾: 7440-33-7****LD₅₀: 2,000 mg/kg, rat, unreported route**

Inhalation of tungsten dust may cause irritation of the respiratory tract. Skin or eye contact could cause abrasion or irritation of the respective surfaces. No hazards have been identified for tungsten fume except that it may aggravate an existing chronic respiratory disease.

EH40 – No limit set.

Yttrium Oxide (Y₂O₃)

Exposure Limits⁽¹⁾:

TLV: 1 mg/m³ (as Y)

PEL: 1 mg/m³

CAS No. ⁽²⁾: 1314-36-9

LD₅₀: 230 mg/kg, rat, intraperitoneal

Short term inhalation in large amounts could cause discomfort, coughing and nasal discharge similar to the symptoms of a bad cold. Drying of the mucous membranes might be experienced. After intratracheal administration in rats, emphysema and diffused modular fibrosis in the lungs have been reported. The oral toxicity of this material is low as it is poorly absorbed from the gastrointestinal tract. Skin and eye contact should produce no problems other than mechanical irritation.

EH40 – No limit set.

Silicon (Si)

Exposure Limits⁽¹⁾:

PEL: 15 mg/m³ (Total inhalable dust); 5 mg/m³ (Total respirable dust)

Eh40 – Total inhalable dust OES 10 mg/m³ (8 hours TWA). Total respirable dust OES 4 mg/m³ (8 hours TWA).

Rhenium (Rh)

EH4 – No limit set.

Calcium (Ca)

EH40 – As oxide OES 2 mg/m³ (8 hours TWA).

- Notes: (1) TLV = Threshold Limit Values – American Conference of Governmental Industrial Hygienists
 PEL = Permissible Exposure Limit – OSHA 29 CFR 1910.1000
 C = Ceiling value
 STEL = Short Term Exposure Limit – a time-weighted 15-minute exposure limit, not to be exceeded at any time during a workday
 (2) CAS No. = Chemical Abstracts Services Number



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MATERIAL SAFETY DATA SHEET**INDUSOL / 2214****APRIL 2012****PAGE 1**

HEALTH	2
FIRE	0
REACTIVITY	0
P.P.E.	B

Complies With USDL Safety and Health Regulations, (29 CFR 1910.1200)

SECTION 1 – Chemical and Company Identification**PRODUCT USE:** Degreaser**SECTION 2 – Composition on Ingredients**

CAS #	CHEMICAL NAMES	WT %	TLV (UNITS)
111-76-2	2-butoxyethanol	< 10	25 (PPM) skin N/E = not established

SECTION 3 – Hazards Information**PRIMARY ROUTE(S) OF ENTRY:** Skin contact/absorption and inhalation**SIGNS AND SYMPTOMS OF OVEREXPOSURE:** Gastrointestinal irritation (nausea, vomiting, diarrhea), irritation to nose, throat, and respiratory tract**TARGET ORGAN EFFECTS:** Overexposure to this material (or its components) has been suggested as a cause of the following effects in laboratory animals and may aggravate pre-existing disorders or these organs in humans: chronic ingestion may cause kidney and liver lesions at high doses.**IMMEDIATE HEALTH EFFECTS:****EYES:** Exposure may cause noticeable pain, and severe irritation and transient corneal injury.**SKIN:** Harmful contact may not cause immediate pain. 2-butoxyethanol may be absorbed through the skin.**INHALATION:** Exposure to vapor or mist is possible. Short term inhalation is not likely to cause harmful effects: breathing large amounts may be harmful. Symptoms are more typically seen at air concentrations exceeding the recommended exposure limits.**INGESTION:** Harmful or fatal if swallowed. Causes chemical burns to the mouth, throat and stomach.**REPRODUCTIVE/DEVELOPMENTAL INFORMATION:** No data.**CARCINOGENIC INFORMATION:** This material is not listed as a carcinogen by IARC, NTP, or OSHA.**LONG TERM EFFECTS:** No data.**SECTION 4 – First Aid Measures****EYES:** Immediately flush with water. Remove contact lenses, if applicable, and continue flushing with water for 15 minutes. Call a physician immediately.**SKIN:** Immediately flush with water for 15 minutes. Call physician if irritation persists. Completely decontaminate clothing, shoes, and leather goods before reuse or discard.**INHALATION:** If symptoms develop move victim to fresh air. If symptoms persist, call a physician.**INGESTION:** Do not induce vomiting. Rinse mouth with water, then drink one or two glasses of water or milk. Call a physician immediately. Never give anything by mouth if victim is unconscious, is rapidly losing consciousness or is convulsing.**SECTION 5 – Fire Fighting Measures****FLASH POINT:** No flash at boil**EXPLOSIVE LIMITS:****AUTOIGNITION TEMPERATURE:****HAZARDOUS PRODUCTS OF COMBUSTION:** Oxides of carbon, oxides of nitrogen, and ammonia**EXTINGUISHING MEDIA:** Not Applicable**FIRE FIGHTING INSTRUCTIONS:****METHOD USED:** C.C. Method

Not Applicable

Not Applicable

Not Applicable

Avoid contact with this material. Avoid walking in spilled material. Wear protective clothing for skin and eyes.

SECTION 6 – Accidental Release Measures**SMALL SPILL:** Absorb with an inert solid and scoop up for disposal, then rinse soiled area with water down the drain.**LARGE SPILL:** Stop leak at the source and collect into a suitable container, then treat as a small spill.**SECTION 7 – Handling and Storage****HANDLING:** Containers of this material may be hazardous when emptied. Since emptied containers retain product residues (vapor, liquid, and/or solid), all hazard precautions given in the data sheet must be observed.**STORAGE:** Store in a cool, dry place. Keep container closed when not in use.**SECTION 8 – Exposure Controls/Personal Protection****EYE PROTECTION:** Chemical Splash goggle in compliance with OSHA regulations are advised; however, OSHA regulations also permit other type safety glasses. Consult your safety representative.**SKIN PROTECTION:** Wear rubber gloves (consult your safety equipment supplier). To prevent repeated or prolonged skin contact, wear impervious clothing and boots.**RESPIRATORY PROTECTION:** If workplace exposure limits of product or any component are exceeded (see exposure guidelines), NIOSH/OSHA approved air-supplied respirator is advised in the absence of proper environmental control. OSHA relations also permit other NIOSH/OSHA respirators (negative pressure type) under specific conditions (see your industrial hygienist). Engineering or administrative controls should be implemented to reduce exposure.**ENGINEERING CONTROLS:** Provide sufficient mechanical (general and local exhaust) ventilation to maintain exposure below level of overexposure (from known, suspected or apparent adverse effects).**SECTION 9 – Physical and Chemical Properties****APPEARANCE/ODOR:** Thin, purple liquid with a solvent odor**pH CONCENTRATE:** 12.5-13.5**VAPOR PRESSURE:** Unknown**VAPOR DENSITY:** Unknown**BOILING POINT:** 212°F**SOLUBILITY IN WATER:** Complete**PERCENT VOLATILE:** 90%**SPECIFIC GRAVITY (H20=1):** 1.05 +/- 0.02**SECTION 10 – Stability and Reactivity****CHEMICAL STABILITY:** Stable**CONDITIONS TO AVOID:** Temperature extremes.**INCOMPATIBILITY:** Chlorine Bleach, oxidizers, acids.**HAZARDOUS DECOMPOSITION:** Will not occur.**HAZARDOUS POLYMERIZATION:** Will not occur.**SECTION 11 – Toxicological Information**

No data available.

SECTION 12 – Ecological Information

No data available.

SECTION 13 – Disposal Consideration**WASTE DISPOSAL INFORMATION:** Dispose of in accordance with all applicable Federal, State, and Local regulations.**RCRA INFORMATION:** If this material becomes a waste, it would be considered hazardous under 40 CFR 261.22. and would be classified as EPA Waste Number D002.

THIS INFORMATION MUST BE ON ALL MSDS'S COPIED AND DISTRIBUTED FOR THIS MATERIAL.
NO WARRANTY IS EXPRESSED/IMPLIED REGARDING THE ACCURACY OF THIS DATA OR
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MATERIAL SAFETY DATA SHEET**INDUSOL / 2214****APRIL 2012****PAGE 2**

HEALTH	2
FIRE	0
REACTIVITY	0
P.P.E.	B

Complies With USDL Safety and Health Regulations, (29 CFR 1910.1200)

SECTION 14 – Transport Information

DOT INFORMATION: 49 CFR 172.101
 DOT DESCRIPTION: 33440 Class 55
REPORTABLE QUANTITY (RQ): 49 CFR 172.101
 NOT APPLICABLE

SECTION 15 – Regulatory Information**US Federal Regulations:**

TSCA (Toxic Substances Control Act) Status
 TSCA (United States) The intentional ingredients of this product are listed.
 CERCLA RQ – 40 CFR 355 Appendix A: None
 SARA 302 Components 40 CFR Appendix A: None
 Section 311/312 Hazard Class 40 CFR 370.2: Immediate (X) Delayed (X) Fire () Reactivity ()
 Sudden Release of Pressure ()
 SARA 313 Components – 40 CFR 372.65
 CAS # Chemical Names %
 N/A *Glycol Ethers < 10.0
 * Listed in Section 2 as 2-butoxyethanol

State and Local Regulation:

California Proposition 65: None
 California SCAQMD Rule 443.1 VOC's: > 250 g/L
 North Carolina Administrative Code 2D.1104 and 2B.0610: None
 South Carolina Regulation 62.5 Standard Number 8: 2-butoxyethanol < 10.0%

SECTION 16 – Other Information

The information accumulated herein is believed to be accurate but is not warranted to be whether originating with the company or not. Recipients are advised to confirm in advance of need that the information is current, applicable and suitable to their circumstances. This information was compiled from current manufacturer's MSDS's of the component parts of the product.

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M A T E R I A L S A F E T Y D A T A S H E E T

Prod.ID:
74163

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***** SECTION I - PRODUCT IDENTIFICATION *****

PRODUCT NAME: INDUSTRIAL ENAMEL - B.P. HMIS H P H P
YELLOW CODES:

PRODUCT IDENTIFIER: 74163 1 3 1 G
*
PRODUCT USE: General purpose coating.

PRODUCT IDENTIFICATION NUMBER: UN1263

WHMIS INFO: B2, D2A

MANUFACTURER'S NAME: Cloverdale Paint Inc
ADDRESS : 6950 King George Boulevard

Surrey, BC.

EMERGENCY PHONE : 613-996-6666

REVISION DATE: 22-Mar-13

INFORMATION PHONE : 604-596-6261

ABBREVIATIONS N/AP - NOT APPLICABLE N/AV - NOT AVAILABLE

:

***** SECTION II - HAZARDOUS INGREDIENTS *****

REPORTABLE COMPONENTS	CAS NUMBER	WEIGHT PERCENT	O.E.L.
STODDARD SOLVENT	8052-41-3	15-40	ACGIH TLV: 100 ppm LD50: ORAL:>5g/kg(RAT), LC50:>5g/M3/4H(RAT)
LIGHT NAPHTHA - HYDROTREATED	64742-89-8	5-10	ACGIH TLV: 400 ppm LD50:ORAL:>25000 mg/kg(RAT),LC50:16000 ppm/4H(RAT)
TITANIUM DIOXIDE	13463-67-7	1-5	TLV (ACGIH): 10 mg/m3, total dust, 8 hr. TWA
ETHYLBENZENE	100-41-4	0.1-1	TWA: 100ppm LD50 (ORAL-RAT): 3500 mg/kg LD50: SKIN:17800 mg/kg(RABBIT)

* Indicates toxic chemical(s) subject to the reporting requirements of section 313 of Title III and of 40 CFR 372.

***** SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS *****

BOILING POINT: 99.0 deg C SPECIFIC GRAVITY (H2O=1): 0.92

VAPOR DENSITY: Heavier than air. PHYSICAL STATE: Liquid.

EVAPORATION RATE: Faster than n-Butyl Acetate.

COATING V.O.C.: 488 g/l (before thinning)

SOLUBILITY IN WATER: Insoluble.

APPEARANCE AND ODOR: Moderately thick liquid; Aromatic odor.

FREEZING POINT: Not available. pH: Not available.

COEFFICIENT OF WATER/OIL DIST: N/AV ODOR THRESHOLD: 1-30 ppm

***** SECTION IV - FIRE AND EXPLOSION HAZARD DATA *****

FLASH POINT: -7 C METHOD USED: Not available.

FLAMMABLE LIMITS IN AIR BY VOLUME- LOWER: Not available.

UPPER: Not available.

EXTINGUISHING MEDIA:
Foam, CO2, dry chemical, water fog.

SPECIAL FIREFIGHTING PROCEDURES

Respiratory equipment should be worn to avoid inhalation of concentrated vapours. Water should not be used except as a fog to keep nearby containers cool.

UNUSUAL FIRE AND EXPLOSION HAZARDS

Handle as a flammable liquid. Vapours form an explosive mixture in air between the upper and lower explosive limits, which, can be ignited by many sources such as pilot lights, open flames, electrical boxes and switches. Vapour may travel along the ground and flashback along vapour trail may occur.

FLAMMABILITY - T.D.G.P. CLASS:
TDG CLASS 3

SENSITIVITY TO IMPACT: NO

AUTO-IGNITION TEMPERATURE:
Not available

SENSITIVITY TO STATIC DISCHARGE: Yes

HAZARDOUS COMBUSTION PRODUCTS:
Carbon Monoxide, Carbon Dioxide and Oxides of Nitrogen.

===== SECTION V - REACTIVITY DATA
=====

CHEMICAL STABILITY: STABLE

CONDITIONS TO AVOID:
Excessive heat, poor ventilation, corrosive atmospheres, excessive aging.

INCOMPATIBILITY (MATERIALS TO AVOID)
Alkaline materials, strong acids and oxidizing agents.

HAZARDOUS DECOMPOSITION OR BYPRODUCTS: Not available.

HAZARDOUS POLYMERIZATION:
Will not occur.

===== SECTION VI - TOXICOLOGICAL DATA
=====

INHALATION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
May cause respiratory irritation, dizziness, breathing difficulty, headaches and loss of co-ordination.

SKIN AND EYE CONTACT HEALTH RISKS AND SYMPTOMS OF EXPOSURE
Eye Contact: May cause severe irritation, tearing, redness and blurred vision.
Skin Contact: May cause irritation.

SKIN ABSORPTION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
May dry and defat skin causing cracks, irritation and dermatitis.

INGESTION HEALTH RISKS AND SYMPTOMS OF EXPOSURE
May cause gastrointestinal irritation, vomiting, nausea and diarrhea.

HEALTH HAZARDS (ACUTE AND CHRONIC)
Acute health hazards are as listed above. No chronic health hazards.

SENSITIZING CAPABILITY: Not available.

CARCINOGENICITY: NTP CARCINOGEN:No IARC MONOGRAPHS:Yes OSHA REGULATED:No

Ethylbenzene has been classified by the IARC as a Group 2B substance on the basis of sufficient evidence for carcinogenicity in laboratory animals but inadequate evidence for cancer in humans. In a lifetime inhalation study, exposure to 250 mg/m³ titanium dioxide dust resulted in the development of lung tumors in rats. These tumors occurred only at dust levels that overwhelmed the animals' lung clearance mechanisms and were different from common human lung tumors in both type and location. The relevance of these findings to humans is unknown. The International Agency for Research on Cancer (IARC) has classified Titanium Dioxide as possibly carcinogenic to humans (Group 2B) based on inadequate evidence of carcinogenicity in humans and sufficient evidence of carcinogenicity in experimental

animals.

TERATOGENICITY AND EMBRYOTOXICITY

High exposures to xylenes in some animal studies have been reported to cause health effects on the developing embryo/fetus. These effects were often at levels toxic to the mother. The significance of these findings to humans has not been determined.

REPRODUCTIVE TOXICITY

Not Available.

MUTAGENICITY

Not available.

TOXICOLOGICALLY SYNERGISTIC PRODUCTS

None known.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE

Anesthesia, respiratory tract irritation, dermatitis, nausea, vomiting.

===== SECTION VII - PREVENTIVE MEASURES =====

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Eliminate ignition sources. Provide good ventilation or wear appropriate breathing apparatus. Absorb small spills with non-flammable absorbent. Contain spills by diking with non-flammable absorbent. Notify environmental agency.

WASTE DISPOSAL METHOD

Reclaim or dispose of through a licensed waste disposal company according to Federal, Provincial and local regulations.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Flammable. Store in a cool, dry, well ventilated area away from heat and ignition sources. Keep containers closed when not in use. Avoid breathing vapours or mist and prolonged or repeated contact with skin. Launder contaminated clothing prior to re-use. Use good personal hygiene. Product is a static accumulator. Transfer equipment should be grounded or bonded.

OTHER PRECAUTIONS: Smoking in the area where this material is used must be strictly prohibited.

RESPIRATORY PROTECTION

NIOSH approved for organic vapours and particulate matter.

VENTILATION

General mechanical ventilation or local exhaust should be suitable to keep vapour concentrations below TLV. Ventilation equipment must be explosion proof. Make up air should be supplied to balance air exhausted.

PROTECTIVE GLOVES

Solvent impervious e.g. Viton, Nitrile, PVC.

EYE PROTECTION

Chemical safety glasses, goggles or face shield.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT

Use impermeable aprons and protective clothing whenever possible to prevent skin contact.

WORK/HYGIENIC PRACTICES

Eye washes and safety showers in the workplace are recommended.

===== SECTION VIII - FIRST AID MEASURES =====

INHALATION OVEREXPOSURE: Move person to fresh air. If breathing stops, apply artificial respiration and seek immediate medical attention.

EYE CONTACT: Flush with water for at least 15 minutes. Seek medical attention.



Material Safety Data Sheet

Issue Date: 19-SEP-2013
Supersedes: 21-SEP-2011

INHIBITOR AZ8101

1 Identification

Identification of substance or preparation
INHIBITOR AZ8101

Product Application Area
Water-based corrosion inhibitor.

Company/Undertaking Identification
GE Water & Process Technologies Canada
3239 Dundas Street West
Oakville, Ontario, L6M 4B2
T 905-465-3030

Emergency Telephone
(800) 877-1940

Prepared by Product Stewardship Group: T 215-355-3300 Prepared on: 19-SEP-2013

2 Hazard(s) identification

EMERGENCY OVERVIEW

May cause slight irritation to the skin. May cause moderate irritation to the eyes. Mists/aerosols may cause irritation to upper respiratory tract.

Odor: Mild; Appearance: Light Amber, Liquid

Fire fighters should wear positive pressure self-contained breathing apparatus(full face-piece type). Proper fire-extinguishing media: dry chemical/CO2/foam or water--slippery condition; use sand/grit.

POTENTIAL HEALTH EFFECTS

ACUTE SKIN EFFECTS:

Primary route of exposure; May cause slight irritation to the skin.

ACUTE EYE EFFECTS:

May cause moderate irritation to the eyes.

ACUTE RESPIRATORY EFFECTS:

Mists/aerosols may cause irritation to upper respiratory tract.

INGESTION EFFECTS:

May cause slight gastrointestinal irritation.

TARGET ORGANS:

Prolonged or repeated exposures may cause primary irritant dermatitis.

MEDICAL CONDITIONS AGGRAVATED:

Not known.

SYMPTOMS OF EXPOSURE:

May cause redness or itching of skin.

3 Composition / information on ingredients

Information for specific product ingredients as required by the WHMIS Regulations is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation.

HAZARDOUS INGREDIENTS:

Cas#	Chemical Name	Range (w/w%)
64665-57-2	BENZOTRIAZOLE, METHYL, SODIUM SALT (SODIUM TOLYLTRIAZOLE), (TTA) Corrosive (skin) ORAL LD50-RAT: 1980 MG/KG DERMAL LD50-RABBIT: >2000 MG/KG INHL. : NO DATA	15-40
1310-73-2	SODIUM HYDROXIDE Corrosive ORAL LD50-RABBIT: 500 MG/KG DERMAL LD50-RABBIT: 1350 MG/KG INHL. : NO DATA	1-5

4 First-aid measures

SKIN CONTACT:

Wash thoroughly with soap and water. Remove contaminated clothing. Get medical attention if irritation develops or persists.

EYE CONTACT:

Remove contact lenses. Hold eyelids apart. Immediately flush eyes with plenty of low-pressure water for at least 15 minutes. Get immediate medical attention.

INHALATION:

If nasal, throat or lung irritation develops - remove to fresh air and get medical attention.

INGESTION:

Do not feed anything by mouth to an unconscious or convulsive victim. Do not induce vomiting. Immediately contact physician. Dilute contents of stomach using 2-8 fluid ounces (60-240 mL) of milk or water.

NOTES TO PHYSICIANS:

No special instructions

5 Fire-fighting measures

FIRE FIGHTING INSTRUCTIONS:

Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).

EXTINGUISHING MEDIA:

dry chemical/CO2/foam or water--slippery condition; use sand/grit.

HAZARDOUS DECOMPOSITION PRODUCTS:

oxides of carbon and nitrogen

FLASH POINT:

> 200F > 93C SETA(CC)

6 Accidental release measures

PROTECTION AND SPILL CONTAINMENT:

Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container. Flush area with water. Wet area may be slippery. Spread sand/grit.

DISPOSAL INSTRUCTIONS:

The waste characteristics of the absorbed material, or any contaminated soil, should be determined in accordance with provincial regulations. Water contaminated with this product may be sent to a sanitary sewer treatment facility, in accordance with any local agreement or discharged under provincial regulations. Incinerate or land dispose in an approved landfill.

7 Handling and storage

HANDLING:

Alkaline. Do not mix with acidic material.

STORAGE:

Keep containers closed when not in use. If frozen, thaw completely and mix thoroughly prior to use. Do not store in aluminum containers.

8 Exposure controls / personal protection

EXPOSURE LIMITS

Consult local authorities for acceptable provincial values.

CHEMICAL NAME

BENZOTRIAZOLE, METHYL, SODIUM SALT (SODIUM TOLYLTRIAZOLE), (TTA)

PEL (OSHA): LIMITS HAVE NOT BEEN ESTABLISHED BY US OSHA.

TLV (ACGIH): LIMITS HAVE NOT BEEN ESTABLISHED BY ACGIH.

SODIUM HYDROXIDE

PEL (OSHA): 2 MG/M3

TLV (ACGIH): TWA (Ceiling) = 2 MG/M3

ENGINEERING CONTROLS:

Adequate ventilation to maintain air contaminants below exposure limits.

RESPIRATORY PROTECTION:

If air-purifying respirator use is appropriate, use any of the following particulate respirators: N95, N99, N100, R95, R99, R100, P95, P99 or P100.

SKIN PROTECTION:

rubber, butyl, viton or neoprene gloves -- Wash off after each use.
Replace as necessary.

EYE PROTECTION:

splash proof chemical goggles

9 Physical and chemical properties

Spec. Grav. (70F, 21C)	1.077	Vapor Pressure (mmHG)	~ 18.0
Freeze Point (F)	13	Vapor Density (air=1)	< 1.00
Freeze Point (C)	-11		
Viscosity (cps 70F, 21C)	6	% Solubility (water)	100.0
Odor		Mild	
Appearance		Light Amber	
Physical State		Liquid	
Flash Point	SETA(CC)	> 200F > 93C	
pH As Is (approx.)		12.8	
Evaporation Rate (Water=1)		< 1.00	
Percent VOC:		0.0	

NA = not applicable ND = not determined

10 Stability and reactivity

CHEMICAL STABILITY:

Stable under normal storage conditions.

POSSIBILITY OF HAZARDOUS REACTIONS:

Contact with water reactive compounds may cause fire or explosion.
Contact with strong acids may cause a violent reaction releasing heat.

INCOMPATIBILITIES:

May react with acids or strong oxidizers.

DECOMPOSITION PRODUCTS:

oxides of carbon and nitrogen

11 Toxicological information

Oral LD50 RAT: 2760 mg/kg
NOTE - Calculated according to GHS additivity formula
Dermal LD50 RABBIT: >5000 mg/kg
NOTE - Calculated according to GHS additivity formula

12 Ecological information

AQUATIC TOXICOLOGY

Daphnia magna 48 Hour Static Screen
0% Mortality= 500 mg/L
Fathead Minnow 96 Hour Acute Toxicity (Estimated)
LC50= 520; No Effect Level= 380 mg/L
Rainbow Trout 96 Hour Static Acute Bioassay
LC50= 88.1; No Effect Level= 42 mg/L

BIODEGRADATION

BOD-28 (mg/g): 9
BOD-5 (mg/g): 0
COD (mg/g): 293
TOC (mg/g): 94

13 Disposal considerations

Incinerate or bury in approved landfill. Please be advised that there may be additional local or provincial requirements relating to the disposal of waste. Consult provincial and local regulations regarding the proper disposal of this material.

14 Transport information

Transportation of Dangerous Goods:

CORROSIVE LIQUID, BASIC, INORGANIC, N.O.S. (SODIUM HYDROXIDE;
BENZOTRIAZOLE, METHYL, SODIUM SALT)
8, UN3266, PG III

DOT EMERGENCY RESPONSE GUIDE #: 154

15 Regulatory information

This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

CEPA:

All components of this product comply with substance notification requirements under CEPA.

WHMIS CLASSIFICATION:

D2B E

16 Other information

HMIS vII		CODE TRANSLATION
Health	1	Slight Hazard
Fire	0	Minimal Hazard
Reactivity	0	Minimal Hazard
Special	ALK	pH above 12.0
(1) Protective Equipment	B	Goggles, Gloves

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

CHANGE LOG

EFFECTIVE DATE	REVISIONS TO SECTION:	SUPERCEDES
MSDS status: 30-JAN-1997		** NEW **
17-JAN-2000		30-JAN-1997
21-JAN-2002	15	17-JAN-2000
10-JAN-2005	16	21-JAN-2002
26-MAY-2006	8	10-JAN-2005
15-SEP-2006	14	26-MAY-2006
13-JUL-2007	2, 3, 4, 5, 8, 9, 10, 16	15-SEP-2006

02-JUL-2010 7,8,10
21-SEP-2011 7,8,10
19-SEP-2013 14

13-JUL-2007
02-JUL-2010
21-SEP-2011

SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION**PRODUCT NAME:** IPEX 636 ORG Low VOC Cement for CPVC Plastic Pipe**PRODUCT USE:** Low VOC Solvent Cement for CPVC Plastic Pipe**SUPPLIER:** IPEX Inc.
807 Pharmacy Avenue
Scarborough, Ontario M1L 3K2, CAN**MANUFACTURER:** IPS Corporation
17109 South Main Street, Carson, CA 90248-3127
P.O. Box 379, Gardena, CA 90247-0379
Tel. 1-310-898-3300**EMERGENCY:** Transportation: CHEMTEL Tel. 800.255-3924, 813-248-0585 (International)**Medical:** Tel. 800.451.8346, 760.602.8703 3E Company (International)**SECTION 2 - HAZARDS IDENTIFICATION****GHS CLASSIFICATION:**

Health		Environmental		Physical	
Acute Toxicity:	Category 4	Acute Toxicity:	None Known	Flammable Liquid	Category 2
Skin Irritation:	Category 3	Chronic Toxicity:	None Known		
Skin Sensitization:	NO				
Eye:	Category 2B				

GHS LABEL:

OR

**Signal Word:**
Danger**WHMIS CLASSIFICATION:** CLASS B, DIVISION 2Hazard Statements

H225: Highly flammable liquid and vapor
 H319: Causes serious eye irritation
 H335: May cause respiratory irritation
 H336: May cause drowsiness or dizziness
 EUH019: May form explosive peroxides

Precautionary Statements

P210: Keep away from heat/sparks/open flames/hot surfaces – No smoking
 P261: Avoid breathing dust/fume/gas/mist/vapors/spray
 P280: Wear protective gloves/protective clothing/eye protection/face protection
 P337+P313: Get medical advice/attention
 P403+P233: Store in a well ventilated place. Keep container tightly closed
 P501: Dispose of contents/container in accordance with local regulation

SECTION 3 - COMPOSITION/INFORMATION ON INGREDIENTS

	CAS#	EINECS #	REACH	CONCENTRATION
			Pre-registration Number	% by Weight
Tetrahydrofuran (THF)	109-99-9	203-726-8	05-2116297729-22-0000	30 - 60
Methyl Ethyl Ketone (MEK)	78-93-3	201-159-0	05-2116297728-24-0000	5 - 25
Cyclohexanone	108-94-1	203-631-1	05-2116297718-25-0000	5 - 20

All of the constituents of this adhesive product are listed on the TSCA inventory of chemical substances maintained by the US EPA, or are exempt from that listing.
 * Indicates this chemical is subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986 (40CFR372).
 # indicates that this chemical is found on Proposition 65's List of chemicals known to the State of California to cause cancer or reproductive toxicity.

SECTION 4 - FIRST AID MEASURES

Contact with eyes: Flush eyes immediately with plenty of water for 15 minutes and seek medical advice immediately.
Skin contact: Remove contaminated clothing and shoes. Wash skin thoroughly with soap and water. If irritation develops, seek medical advice.
Inhalation: Remove to fresh air. If breathing is stopped, give artificial respiration. If breathing is difficult, give oxygen. Seek medical advice.
Ingestion: Rinse mouth with water. Give 1 or 2 glasses of water or milk to dilute. Do not induce vomiting. Seek medical advice immediately.

SECTION 5 - FIREFIGHTING MEASURES

Suitable Extinguishing Media: Dry chemical powder, carbon dioxide gas, foam, Halon, water fog.
Unsuitable Extinguishing Media: Water spray or stream.
Exposure Hazards: Inhalation and dermal contact
Combustion Products: Oxides of carbon, hydrogen chloride and smoke

	HMIS	NFPA	
Health	2	2	0-Minimal
Flammability	3	3	1-Slight
Reactivity	0	0	2-Moderate
PPE	B		3-Serious
			4-Severe

Protection for Firefighters: Self-contained breathing apparatus or full-face positive pressure airline masks.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Personal precautions: Keep away from heat, sparks and open flame.
 Provide sufficient ventilation, use explosion-proof exhaust ventilation equipment or wear suitable respiratory protective equipment.
 Prevent contact with skin or eyes (see section 8).
Environmental Precautions: Prevent product or liquids contaminated with product from entering sewers, drains, soil or open water course.
Methods for Cleaning up: Clean up with sand or other inert absorbent material. Transfer to a closable steel vessel.
Materials not to be used for clean up: Aluminum or plastic containers

SECTION 7 - HANDLING AND STORAGE

Handling: Avoid breathing of vapor, avoid contact with eyes, skin and clothing.
 Keep away from ignition sources, use only electrically grounded handling equipment and ensure adequate ventilation/fume exhaust hoods.
 Do not eat, drink or smoke while handling.
Storage: Store in ventilated room or shade below 33°C (90°F) and away from direct sunlight.
 Keep away from ignition sources and incompatible materials: caustics, ammonia, inorganic acids, chlorinated compounds, strong oxidizers and isocyanates.
 Follow all precautionary information on container label, product bulletins and solvent cementing literature.

SECTION 8 - PRECAUTIONS TO CONTROL EXPOSURE / PERSONAL PROTECTION

EXPOSURE LIMITS:	Component	ACGIH TLV	ACGIH STEL	OSHA PEL	OSHA STEL:
	Tetrahydrofuran (THF)	50 ppm	100 ppm	200 ppm	
	Methyl Ethyl Ketone (MEK)	200 ppm	300 ppm	200 ppm	
	Cyclohexanone	20 ppm	50 ppm	50 ppm	

Engineering Controls: Use local exhaust as needed.
Monitoring: Maintain breathing zone airborne concentrations below exposure limits.
Personal Protective Equipment (PPE):
Eye Protection: Avoid contact with eyes, wear splash-proof chemical goggles, face shield, safety glasses (spectacles) with brow guards and side shields, etc. as may be appropriate for the exposure.
Skin Protection: Prevent contact with the skin as much as possible. Butyl rubber gloves should be used for frequent immersion.
 Use of solvent-resistant gloves or solvent-resistant barrier cream should provide adequate protection when normal adhesive application practices and procedures are used for making structural bonds.
Respiratory Protection: Prevent inhalation of the solvents. Use in a well-ventilated room. Open doors and/or windows to ensure airflow and air changes. Use local exhaust ventilation to remove airborne contaminants from employee breathing zone and to keep contaminants below levels listed above.
 With normal use, the Exposure Limit Value will not usually be reached. When limits approached, use respiratory protection equipment.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Orange, heavy syrupy liquid	Odor Threshold:	0.88 ppm (Cyclohexanone)
Odor:	Ketone	Boiling Range:	66°C (151 °F) to 156°C (313 °F)
pH:	Not Applicable	Evaporation Rate:	> 1.0 (BUAC = 1)
Melting/Freezing Point:	-108.5°C (-163.3°F) Based on first melting component: THF	Flammability:	Category 2
Boiling Point:	66°C (151 °F) Based on first boiling component: THF	Flammability Limits:	LEL: 1.1% based on Cyclohexanone UEL: 11.8% based on THF
Flash Point:	-20°C (-4 °F) TCC based on THF	Vapor Pressure:	129 mm Hg @ 20°C (68 °F) based on THF
Specific Gravity:	0.995 @23°C (73 °F)	Vapor Density:	<2 (Air = 1)
Solubility:	Solvent portion soluble in water. Resin portion separates out.	Other Data: Viscosity:	Heavy bodied
Partition Coefficient n-octanol/water:	Not Available		
Auto-ignition Temperature:	321°C (610 °F) based on THF		
Decomposition Temperature:	Not Applicable		
VOC Content:	When applied as directed, per SCAQMD Rule 1168, Test Method 316A, VOC content is: ≤ 490 g/l.		

SECTION 10 - STABILITY AND REACTIVITY

Stability:	Stable
Hazardous decomposition products:	None in normal use. When forced to burn, this product gives off oxides of carbon, hydrogen chloride and smoke.
Conditions to avoid:	Keep away from heat, sparks, open flame and other ignition sources.
Incompatible Materials:	Oxidizers, strong acids and bases, amines, ammonia

SECTION 11 - TOXICOLOGICAL INFORMATION

Likely Routes of Exposure: Inhalation, Eye and Skin Contact

Acute symptoms and effects:

Inhalation:	Severe overexposure may result in nausea, dizziness, headache. Can cause drowsiness, irritation of eyes and nasal passages.
Eye Contact:	Vapors slightly uncomfortable. Overexposure may result in severe eye injury with corneal or conjunctival inflammation on contact with the liquid.
Skin Contact:	Liquid contact may remove natural skin oils resulting in skin irritation. Dermatitis may occur with prolonged contact.
Ingestion:	May cause nausea, vomiting, diarrhea and mental sluggishness.

Chronic (long-term) effects: None known to humans

Toxicity:LD₅₀LC₅₀

Tetrahydrofuran (THF)	Oral: 2842 mg/kg (rat)	Inhalation 3 hrs. 21,000 mg/m ³ (rat)
Methyl Ethyl Ketone (MEK)	Oral: 2737 mg/kg (rat), Dermal: 6480 mg/kg (rabbit)	Inhalation 8 hrs. 23,500 mg/m ³ (rat)
Cyclohexanone	Oral: 1535 mg/kg (rat), Dermal: 948 mg/kg (rabbit)	Inhalation 4 hrs. 8,000 PPM (rat)

Reproductive Effects	Teratogenicity	Mutagenicity	Embryotoxicity	Sensitization to Product	Synergistic Products
Not Established	Not Established	Not Established	Not Established	Not Established	Not Established

SECTION 12 - ECOLOGICAL INFORMATION

Ecotoxicity:	None Known
Mobility:	In normal use, emission of volatile organic compounds (VOC's) to the air takes place, typically at a rate of ≤ 490 g/l.
Degradability:	Biodegradable
Bioaccumulation:	Minimal to none.

SECTION 13 - WASTE DISPOSAL CONSIDERATIONS

Follow local and national regulations. Consult disposal expert.

SECTION 14 - TRANSPORT INFORMATION

Proper Shipping Name:	Adhesives
Hazard Class:	3
Secondary Risk:	None
Identification Number:	UN 1133
Packing Group:	PG II
Label Required:	Class 3 Flammable Liquid
Marine Pollutant:	NO

EXCEPTION for Ground Shipping

DOT Limited Quantity: Up to 5L per inner packaging, 30 kg gross weight per package.
Consumer Commodity: Depending on packaging, these quantities may qualify under DOT as "ORM-D".

TDG INFORMATION

TDG CLASS:	FLAMMABLE LIQUID 3
SHIPPING NAME:	ADHESIVES
UN NUMBER/PACKING GROUP:	UN 1133, PG II

SECTION 15 - REGULATORY INFORMATION

Precautionary Label Information:	Highly Flammable, Irritant	Ingredient Listings: USA TSCA, Europe EINECS, Canada DSL, Australia AICS, Korea ECL/TCCL, Japan MITI (ENCS)
Symbols:	F, Xi	
Risk Phrases:	R11: Highly flammable. R36/37: Irritating to eyes and respiratory system.	R66: Repeated exposure may cause skin dryness or cracking R67: Vapors may cause drowsiness and dizziness
Safety Phrases:	S2: Keep out of the reach of children S9: Keep container in a well-ventilated place. S16: Keep away from sources of ignition - No smoking.	S25: Avoid contact with eyes. S26: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S33: Take precautionary measures against static discharges.

SECTION 16 - OTHER INFORMATION

Specification Information:		
Department issuing data sheet:	IPS, Safety Health & Environmental Affairs	All ingredients are compliant with the requirements of the European Directive on RoHS (Restriction of Hazardous Substances).
E-mail address:	<EHSinfo@ipscorp.com>	
Training necessary:	Yes, training in practices and procedures contained in product literature.	
Reissue date / reason for reissue:	1/4/2012 / Updated GHS Standard Format	
Intended Use of Product:	Solvent Cement for CPVC Plastic Pipe	

This product is intended for use by skilled individuals at their own risk. The information contained herein is based on data considered accurate based on current state of knowledge and experience. However, no warranty is expressed or implied regarding the accuracy of this data or the results to be obtained from the use thereof.

MATERIAL SAFETY DATA SHEET
IPEX 100T PRIMER (Low VOC)

Page : 1

SLUYTER COMPANY LTD.

375 Steelcase Road East
Markham, Ontario L3R 1G3 Canada
Tel (905) 475-6011 Fax (905) 475-3119

SECTION 01: CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

MANUFACTURER-----SLUYTER COMPANY LTD.
375 Steelcase Road East
Markham, Ontario L3R 1G3
Canada
Tel (905) 475-6011
PRODUCT NAME-----IPEX 100T PRIMER .
MANUFACTURED FOR-----Iplex Electrical Inc. 2441 Royal Windsor Drive, Mississauga,
ON L5J 4C7
PRODUCT USES-----Primer used with PVC Solvent Cements.
CHEMICAL FAMILY-----Solvent Blend.

SECTION 02: COMPOSITION / INFORMATION ON INGREDIENTS

INGREDIENTS / %	CAS / TLV	LD/50, ROUTE, SPECIES	LC/50, ROUTE, SPECIES
TETRAHYDROFURAN 15 - 40	109-99-9 200 ppm	1650 mg/kg Oral (Rat)	18000 ppm 4 hours Inhalation (Rat)
ACETONE 15 - 40	67-64-1 750 ppm	9750 mg/kg Oral (Rat)	16000 ppm 4 hours Inhalation (Rat)
METHYL ETHYL KETONE 15 - 40	78-93-3 200 ppm	2737 mg/kg Oral (Rat)	23500 mg/m3 8 Hours Inhalation (Rat)

SECTION 03: HAZARDS IDENTIFICATION

ROUTE OF ENTRY:-----
SKIN CONTACT-----Can cause moderate skin irritation,
defatting and dermatitis.
SKIN ABSORPTION-----Tetrahydrofuran can be absorbed through
the skin resulting in toxic effects.
INHALATION-----As described below.
INHALATION CHRONIC-----Can cause damage to the respiratory
system. Can cause headache, dizziness and nausea.
INGESTION-----Can cause gastro-intestinal irritation,
nausea, vomiting and diarrhea.
EYE CONTACT-----Causes eye burns. Severe irritation,
redness, watering and blurred vision.
EFFECTS OF ACUTE EXPOSURE-----Refer to "ROUTE ENTRY" section.
EFFECTS OF CHRONIC EXPOSURE-----May cause damage to the central nervous
system, respiratory system, lungs, eyes,
skin, gastro-intestinal tract, liver,
spleen and kidneys. May cause nausea,
headache, dizziness and
drowsiness. Prolonged or repeated skin
contact may cause drying or cracking of the skin.

MATERIAL SAFETY DATA SHEET
IPEX 100T PRIMER (Low VOC)

Page : 2

SECTION 04: FIRST AID MEASURES

EYE CONTACT-----Check for and remove any contact lenses.
Immediately flush with water for a minimum
of 20 minutes and get medical attention.

SKIN CONTACT-----Remove contaminated clothing. Wash
affected area with water and soap. Seek
medical attention if irritation occurs or persists.

INHALATION-----Remove patient to fresh air. If not
breathing, trained personnel should
administer artificial respiration. Get medical attention.

INGESTION-----Do NOT induce vomiting. Get immediate medical attention.

ADDITIONAL INFORMATION-----Contact your local poison control centre.

SECTION 05: FIRE FIGHTING MEASURES

FLAMMABILITY-----Flammable.

UNDER WHAT CONDITIONS-----Extremely flammable liquid. Dangerous fire
hazard when exposed to heat, flame or
temperatures above the flash point. As
vapours are heavier than air, they may
travel to a source of ignition and flash
back.

SPECIAL PROCEDURES-----A self-contained breathing apparatus is
required for fire fighting personnel. Use
water spray to cool fire exposed surfaces
and to protect personnel.

FLASH POINT (METHOD)----- -5°C TAG Closed Cup.

AUTO IGNITION TEMPERATURE-----321°C.

UPPER FLAMMABLE LIMIT (% VOL)-----12.50.

LOWER FLAMMABLE LIMIT (% VOL)-----11.60.

EXTINGUISHING MEDIA-----Alcohol foam, CO2 or dry chemical.

HAZARDOUS COMBUSTION PRODUCTS-----Oxides of Carbon (CO and CO2). Hydrogen
Chloride.

SENSITIVITY TO MECHANICAL-----Unknown.

IMPACT

SENSITIVITY TO STATIC-----May be sensitive.

DISCHARGE

SECTION 06: ACCIDENTAL RELEASE MEASURES

LEAK/SPILL-----Prevent run-off into drains, sewers and
other waterways. Use a non-combustible
absorbent inorganic material. Ventilate.
Eliminate all sources of ignition. Contain
spill with dike to prevent entry into
sewers and waterways. For large quantities
contact the Environmental Authorities.

SECTION 07: HANDLING AND STORAGE

HANDLING PROCEDURES-----Avoid prolonged or repeated skin
contact. Handle away from all sources of
ignition. Ventilate adequately and wear
appropriate breathing apparatus.

STORAGE NEEDS-----Store in a dry, well ventilated area. Store

Ref: 00000318

Preparation Date : June.04.2012

EMERGENCY - CALL CANUTEC (613) 996-6666 (Collect)

MATERIAL SAFETY DATA SHEET
IPEX 100T PRIMER (Low VOC)

Page : 3

in a cool area, away from all sources of heat and ignition. Keep container closed and out of reach from children and pets when not in use.

SECTION 08: EXPOSURE CONTROLS / PERSONAL PROTECTION

PROTECTIVE EQUIPMENT:-----
EYE/TYPE-----Safely goggles.
RESPIRATORY/TYPE-----Wear a NIOSH/MSHA approved air supply respirator.
GLOVES/ TYPE-----Wear impervious gloves (Neoprene or Rubber).
CLOTHING/TYPE-----Not available.
FOOTWEAR/TYPE-----Safety boots as specified in workplace regulations.
OTHER/TYPE-----Eye bath and safety shower.
VENTILATION REQUIREMENTS-----Natural or mechanical (Explosion Proof) ventilation to keep vapour levels well below the TLV.

SECTION 09: PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE-----Liquid.
ODOUR-----Strong solvent odour.
SPECIFIC GRAVITY-----0.84 - 0.88.
ODOUR THRESHOLD (ppm)-----25 ppm.
VAPOUR PRESSURE-----145 mmHg @ 20°C.
VAPOUR DENSITY (AIR=1)-----2.50.
EVAPORATION RATE-----6.00 (NBUAC = 1).
BOILING POINT (deg C)-----65°C.
pH-----Not available.
SOLUBILITY IN WATER (% W/W)-----Slightly.
COEFFICIENT OF WATER\OIL-----Not available.
DISTRIBUTION
FREEZING POINT----- <0°C.
MELTING POINT (deg C)-----Not available.
MOLECULAR WEIGHT-----

SECTION 10: STABILITY AND REACTIVITY

INCOMPATIBILITY-----Ammonia. Do NOT mix with nitrites. Strong acids and strong bases.
REACTIVITY CONDITIONS-----Thermal.
HAZARDOUS PRODUCTS OF DECOMPOSITION-----Hydrogen Chloride. Oxides of Carbon (CO and CO2). Peroxides.

SECTION 11: TOXICOLOGICAL INFORMATION

EXPOSURE LIMIT OF MATERIAL-----50 ppm for Toluene.200 ppm for Methyl Ethyl Ketone.200 ppm for Tetrahydrofuran.
IRRITANCY OF MATERIAL-----Irritant upon prolonged exposure. Eye irritant.
SENSITIZING CAPABILITY OF MATERIAL-----Not available.
CARCINOGENICITY OF MATERIAL-----Not available.
TERATOGENICITY-----No information is available and no adverse teratogenicity effects are anticipated.
MUTAGENICITY-----No information is available and no adverse mutagenicity effects are anticipated.
REPRODUCTIVE EFFECTS-----Not available.
SYNERGISTIC MATERIALS-----Not available.

Ref: 00000318

Preparation Date : June.04.2012

EMERGENCY - CALL CANUTEC (613) 996-6666 (Collect)

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IPEX 100T PRIMER (Low VOC)

SECTION 12: ECOLOGICAL INFORMATION

ENVIRONMENTAL-----Not available. Can be dangerous if allowed to enter drinking water intakes. Product has an unaesthetic appearance and can be a nuisance. Do not contaminate domestic or irrigation water supplies, lakes, streams, ponds and rivers.

BIODEGRADABILITY-----Not available. The solvent portion of this product is biodegradable and vaporizes rapidly.

VOC INFORMATION-----This product emits VOC's (volatile organic compounds in use. Always ensure that the use of this product complies with local VOC Emission Regulations, where they exist. The VOC level is 409 grams/litre (SCAQMD Test Method 316A)

SECTION 13: DISPOSAL CONSIDERATIONS

WASTE DISPOSAL-----To be disposed of in accordance with current Local, Provincial and Federal regulations.

SECTION 14: TRANSPORT INFORMATION

T.D.G. CLASSIFICATION-----

(A)-----(A) In containers up to 1 litre - shipped as CONSUMER COMMODITY. If the shipment exceeds 500 kg in weight, shipped as CONSUMER COMMODITY - FLAMMABLE LIQUIDS N.O.S.(TETRAHYDROFURAN) CLASS 3.

(B)----- (B) In containers over 1 litre - FLAMMABLE LIQUIDS N.O.S. (TETRAHYDROFURAN) CLASS 3 UN1993 P.G. II.

SECTION 15: REGULATORY INFORMATION

WHMIS CLASSIFICATION-----Class B Div.2 Flammable Liquid Class D Div.2B Toxic Material.

SECTION 16: OTHER INFORMATION

IMPORTANT:-----The information on this Material Safety Data Sheet is furnished without warranty, expressed or implied. All the information appearing herein is based upon data obtained from manufacturers and/or recognized technical sources. While the information is believed to be accurate, we make no representations for the accuracy or sufficiency.

IRON**PRODUCT IDENTIFICATION**

Chemical Name and Synonyms: Iron.
Chemical Family: Metal
Chemical Formula: Fe
Product Use: Laboratory reagent
Manufacturers Name and Address: Caledon Laboratories Ltd. 40
Armstrong Avenue Georgetown, Ontario L7G 4R9
Telephone No: (905) 877-0101
Fax No: (905) 877-6666
Emergency Telephone No: CANUTEC (613) 996-6666

HAZARDOUS INGREDIENTS OF MATERIALS

Ingredients, %, TLV Units, CAS No: Iron, > 99, 1 mg/m³, 7439-89-6

PHYSICAL DATA

Physical State: Solid
Odour and Appearance: Fine grey filings, shavings or powder, odourless
Odour Threshold (ppm): Not applicable.
Vapour Pressure (mm Hg): 1 mm Hg at 1787 °C
Vapour Density (Air = 1): Not available.
Evaporation Rate: Not available.
Boiling Point (degrees C): 2750 °C
Melting Point (degrees C): 1535 °C
pH: Not available.
Specific Gravity: 7.87 at 20 °C
Coefficient of Water/Oil distribution: Not available.

SHIPPING DESCRIPTION

UN: Not regulated.
T.D.G. Class: Not regulated.
Pkg. Group: Not regulated.

REACTIVITY DATA

Chemical Stability: Stable to temperature of 700 °C. Stable in dry air; readily oxidizes in moist air, forming rust. Ultrafine (5 microns) powder is very unstable and can ignite spontaneously in air.
Incompatibility with other substances: Avoid acids, moisture, oxygen. Reacts violently with strong oxidizing agents, halogens, phosphorus, polystyrene. Reaction with water can produce flammable/explosive hydrogen gas.
Reactivity: Avoid incompatible materials, moisture, generation of dust, ignition sources.

FIRE AND EXPLOSION DATA

Flammability: Not flammable. Fine dust dispersed in air in the presence of an ignition source may ignite or explode.
Extinguishing Media: Dry chemical powder. DO NOT USE WATER. Firefighters should wear self-contained breathing apparatus and protective clothing sufficient to prevent contact.
Flash Point (Method Used): Not available.
Autoignition Temperature: Not available.
Upper Flammable Limit (% by volume): Not available.
Lower Flammable Limit (% by volume): Not available.
Hazardous Combustion Products: Toxic iron oxide fumes
Sensitivity to Impact: None
Sensitivity to Static discharge: Under certain conditions, dust/air mixtures can explode if in contact with an electrostatic spark or other ignition source.

TOXICOLOGICAL PROPERTIES AND HEALTH DATA

Toxicological Data:
LD50: (oral, rat) 30 g/kg
LC50: Not available.
Effects of Acute Exposure to Product:
Inhaled: Inhalation of dust is irritating and may be harmful. Inhalation of fumes may cause metal fume fever, characterized by flu-like symptoms with metallic taste, fever, chills, cough, weakness, chest pain, muscle pain and increased white blood cell count. May cause lung damage.
In contact with skin: May cause mechanical irritation.
In contact with eyes: May cause mechanical irritation.
Ingested: May be harmful. Severe overdose may have corrosive effect on gastrointestinal system, with necrosis, perforation and stricture. Symptoms of abdominal pain, nausea, vomiting, diarrhea may be delayed several hours. Metabolic acidosis may occur several days after an apparent recovery, and can lead to convulsions and coma.
Effects of Chronic Exposure to Product: Long term inhalation can cause siderosis, a benign pneumoconiosis. Long-term exposure may cause effects to the liver, pancreas, gastrointestinal system, blood and cardiovascular system, and may cause diabetes, and cardiac abnormalities.
Carcinogenicity: Not listed by IARC, ACGIH, NTP.
Teratogenicity: No information available.
Reproductive Effects: No information available.
Mutagenicity: No information available.
Synergistic Products: None known.

PREVENTIVE MEASURES

Engineering Controls: Local exhaust ventilation required.
Respiratory Protection: Dust mask. In high or unknown concentrations, as in fire or spill conditions, NIOSH approved respirator or self-contained breathing apparatus. For emergency or unknown concentrations, positive pressure, full-facepiece self-contained breathing apparatus.
Eye Protection: Chemical safety glasses or goggles. Do not wear contact lenses.
Skin Protection: Rubber gloves. Other protective clothing sufficient to prevent contact.
Other Personal Protective Equipment: Safety shower and eye wash fountain readily available in work area.
Leak and Spill Procedure: Ventilate area and restrict access. Eliminate all sources of ignition. Cleanup personnel must be thoroughly trained in the handling of hazardous materials, and must wear protective equipment and clothing sufficient to prevent any contact or inhalation. Absorb on inert absorbent and collect for disposal. Wash site of spillage thoroughly with detergent and copious amounts of water. Use non-sparking tools.
Waste Disposal: Dispose of in compliance with local, provincial and federal regulations.
Handling Procedures and Equipment: Fine dust dispersed in air in the presence of an ignition source may ignite or explode. Workers using this chemical must be properly trained in its hazards and its safe use. Wear appropriate protective clothing and equipment. Use the smallest amount possible for the purpose in an area with adequate ventilation. Avoid generating dust or vapours. Follow routine safe handling and good housekeeping procedures. Keep away from heat and sources of ignition. Use non-sparking tools.

Caledon Laboratories, Ltd. believes that the information contained herein is reliable and accurate. Caledon makes no warranty thereto, and expressly disclaims all liability for reliance thereon. Such information is solely for your consideration, investigation, and verification.

Storage Requirements: Moisture sensitive. Store in cool, dry, well-ventilated area, out of direct sunlight, and away from heat or ignition sources and incompatible materials. Keep containers tightly closed. Protect from damage.

FIRST AID MEASURES

Specific Measures:

Eyes: Flush eyes thoroughly with gently running water for at least fifteen (15) minutes, holding eyelids open while flushing. Get medical attention if irritation persists.

Skin: Remove contaminated clothing. Wash affected areas with soap and running water for at least fifteen (15) minutes. Get medical attention if irritation persists.

Inhalation: Remove to fresh air. Give oxygen and get medical attention for any breathing difficulty.

Ingestion: If victim is alert and NOT convulsing, rinse mouth, give several glasses of water to drink to dilute. Induce vomiting as directed by medical personnel. Get medical attention.

REFERENCES USED

Budavari: The Merck Index, 12th ed., 1997

CCINFO disc: Cheminfo

Sax: Dangerous Properties of Industrial Materials, 5th ed., 1979

Sax, Lewis: Hawleys Condensed Chemical Dictionary, 11th ed., 1987

Suppliers Material Safety Data Sheets:

ADDITIONAL INFORMATION

Date Issued: 19-Aug-91

Revision: Sep 2014

Proposed WHMIS Designation: B4

Prepared by: Caledon Laboratories Ltd. (905) 877-0101



Date:	1/14/2014	MSDS No.:	CAN-M290
Trade Name:	Jet-LH 78MR		
Sizes:	All		
Supersedes:	1/14/2011		

MATERIAL SAFETY DATA SHEET

For Welding Consumables and Related Products

Conforms to Workplace Hazardous Materials Information System (WHMIS) Rev. November, 1988

Section I & II - Preparation and Product Information

The Lincoln Electric Company of Canada LP 179 Wicksteed Avenue Toronto, Ontario M4G 2B9 CANADA Phone: (416) 421-2600	Product Type:	Cored Electrode
	Representative Classifications:	AWS E7018-H4R, CSA E4918-1
Prepared by The Lincoln Electric Company, Cleveland, Ohio, USA (216) 481-8100, on the date shown above.		

Section III - Hazardous Ingredients (1)

IMPORTANT!

This section covers the materials from which this product is manufactured. The fumes and gases produced during welding with the normal use of this product are covered by Section VII; see it for industrial hygiene information.

CAS Number shown is representative for the ingredients listed. All ingredients listed may not be present in all sizes.

(1) The term "hazardous" in "Hazardous Ingredients" should be interpreted as a term required and defined in the Hazardous Products Act and does not necessarily imply the existence of any hazard.

Ingredients:	CAS No.	Wt. %	TLV mg/m ³	LD ₅₀ (Route/Species)	LC ₅₀ mg/m ³ (Route/Species)
Iron	7439-89-6	10-30	10*	Not Available	Not Available
Limestone and/or calcium carbonate	1317-65-3	5-10	10*	Not Available	Not Available
Fluorides (as F)	7789-75-5	1-5	2.5	4250 mg/kg (oral/rat)	Not Available
Titanium dioxides	13463-67-7	1-5	10	Not Available	Not Available
Silicates and other binders	1344-09-8	1-5	10*	1153 mg/kg (oral/rat)	Not Available
Manganese and/or manganese alloys and compounds (as Mn)	7439-96-5	1-5	0.02	9 g/kg (oral/rat)	2.3 LCLo (inhalation/human)
Silicon and/or silicon alloys and compounds (as Si)	7440-21-3	0.1-1	10*	Not Available	Not Available
Quartz	14808-60-7	0.1-1	#0.025**	200 mg/kg LDLo (intratracheal/rat)	300 LCLo (inhalation/human)
Cellulose and other carbohydrates	65996-61-4	0.1-1	10*	Not Available	Not Available
Aluminum oxide and/or Bauxite	1344-28-1	0.1-1	1.0*	Not Available	Not Available
Iron oxides	65996-74-9	0.1-1	5	Not Available	Not Available
Mineral silicates	1332-58-7	0.1-1	5**	590 g/kg LDLo (oral/rat) reproductive	Not Available
Vanadium alloys (as V)	7440-62-2	0.1-1	.05(@)	10 mg/kg LDLo (oral/rat)	346 mg LCLo (inhalation/human)
Lithium compounds (as Li)	554-13-2	0.1-1	10*	4111 mg/kg LDLo (oral/human)	Not Available
Carbon steel core wire	7439-89-6	30-60	10*	Not Available	Not Available

Notes:

(*) Not listed. The ACGIH guideline for total particulate is 10 milligrams per cubic meter. TLV value for iron oxide is 5 milligrams per cubic meter.

(**) As respirable dust.

(@) As V₀s fume or dust.

(LDLo, LCLo) Lowest published toxic concentration.
(#) Crystalline silica (quartz) is on the IARC (International Agency for Research on Cancer) and NTP (National Toxicology Program) lists as posing a carcinogenic risk to humans.

Section IV - Physical Data

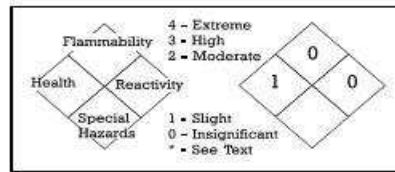
Physical data such as odor, vapor pressure, density, evaporation rate and freezing or boiling points are not listed as they are not applicable to this product and its use.

Section V - Hazard Data

Non Flammable; Welding arc and sparks can ignite combustibles and flammable products. See CSA W117.2 Section 9.7 as referenced in Section VIII. Product is inert, no special handling or spill procedures required.

Product: Jet-LH 78MR

Date: 1/14/2014



Section VI - Health Hazard Data and Toxicological Properties

Acute Lethality Values: LC₅₀ means the concentration of a substance in air that when administered by means of inhalation over a specified length of time in an animal assay, is expected to cause the death of 50% of a defined animal population.

LD₅₀ means the single dose of a substance that, when administered by a defined route in an animal assay, is expected to cause the death of 50% of a defined animal population.

Threshold Limit Value: The ACGIH recommended general limit for Welding Fume NOS - (Not Otherwise Specified) is 5 mg/m³. The TLV-TWA is the time-weighted average concentration for a normal 8-hour workday and a 40 hour workweek, to which nearly all workers may be repeatedly exposed, day after day, without adverse effect. See Section VII for specific fume constituents which may modify this TLV. Threshold Limit Values are figures published by the American Conference of Government Industrial Hygienists.

Effects of Overexposure: Electric arc welding may create one or more of the following health hazards:

Fumes and Gases can be dangerous to your health. Common entry is by inhalation. Other possible routes are skin contact and ingestion.

Short-term (acute) overexposure to welding fumes may result in discomfort such as metal fume fever, dizziness, nausea, or dryness or irritation of nose, throat, or eyes. May aggravate pre-existing respiratory problems (e.g. asthma, emphysema).

Long-term (chronic) overexposure to welding fumes can lead to siderosis (iron deposits in lung) and may affect pulmonary function. Manganese overexposure can affect the central nervous system, resulting in impaired speech and movement. Bronchitis and some lung fibrosis have been reported. Repeated exposure to fluorides may cause excessive calcification of the bone and calcification of ligaments of the ribs, pelvis and spinal column. May cause skin rash. Titanium dioxide is listed on the IARC (International Agency for Research on Cancer) as a Group 2B carcinogen (possibly carcinogenic to humans based on animal studies). Respiratory exposure to the crystalline silica present in this welding electrode is not anticipated during normal use. Respiratory overexposure to airborne crystalline silica is known to cause silicosis, a form of disabling pulmonary fibrosis which can be progressive and may lead to death. Crystalline silica is on the IARC (International Agency for Research on Cancer) and NTP (National Toxicology Program) lists as posing a cancer risk to humans.

Arc Rays can injure eyes and burn skin. *Skin cancer has been reported.*

Electric Shock can kill. If welding must be performed in damp locations or with wet clothing, on metal structures or when in cramped positions such as sitting, kneeling or lying, or if there is a high risk of unavoidable or accidental contact with workpiece, use the following equipment: Semiautomatic DC Welder, DC Manual (Stick) Welder, or AC Welder with Reduced Voltage Control.

Section VII - Reactivity Data

Hazardous Decomposition Products: Welding fumes and gases cannot be classified simply. The composition and quantity of both are dependent upon the metal being welded, the process, procedure and electrodes used.

Other conditions which also influence the composition and quantity of the fumes and gases to which workers may be exposed include: coatings on the metal being welded (such as paint, plating, or galvanizing), the number of welders and the volume of the worker area, the quality and amount of ventilation, the position of the welder's head with respect to the fume plume, as well as the presence of contaminants in the atmosphere (such as chlorinated hydrocarbon vapors from cleaning and degreasing activities.)

When the electrode is consumed, the fume and gas decomposition products generated are different in percent and form from the ingredients listed in Section III. Decomposition products of normal operation include those originating from the volatilization, reaction, or oxidation of the materials shown in Section III, plus those from the base metal and coating, etc., as noted above.

Reasonably expected fume constituents of this product would include: Primarily iron oxide and fluorides; secondarily complex oxides of manganese, potassium, silicon, and sodium .

Maximum fume exposure guideline for this product (based on manganese content) is 0.4 milligrams per cubic meter.

Gaseous reaction products may include carbon monoxide and carbon dioxide. Ozone and nitrogen oxides may be formed by the radiation from the arc.

Determine the composition and quantity of fumes and gases to which workers are exposed by taking an air sample from inside the welder's helmet if worn or in the worker's breathing zone. Improve ventilation if exposures are not below limits. See ANSI/AWS F1.1, F1.2, F1.3 and F1.5, available from the American Welding Society, 8669 Doral Blvd. Doral, FL 33166.

Section VIII - Preventive Measures and Precautions for Safe Handling and Use

Read and understand the manufacturer's instruction and the precautionary label on the product. Request Lincoln Safety Publication E205. See Canadian Standards Association Standard CSA-W117.2 "Safety in Welding, Cutting, and Allied Processes" published by the Canadian Standards Association, 178 Rexdale Blvd., Rexdale, Ontario M9W1R3 for more details on many of the following:

Ventilation: Use enough ventilation, local exhaust at the arc, or both to keep the fumes and gases from the worker's breathing zone and the general area. Train the welder to keep his head out of the fumes. *Keep exposure as low as possible.*

Respiratory Protection: Use respirable fume respirator or air supplied respirator when welding in confined space or general work area when local exhaust or ventilation does not keep exposure below TLV.

Eye Protection: Wear helmet or use face shield with filter lens shade number 12 or darker. Shield others by providing screens and flash goggles.

Protective Clothing: Wear hand, head, and body protection which help to prevent injury from radiation, sparks and electrical shock. See W117.2.

At a minimum this includes welder's gloves and a protective face shield, and may include arm protectors, aprons, hats, shoulder protection, as well as dark substantial clothing. Train the welder not to permit electrically live parts or electrodes to contact skin . . . or clothing or gloves if they are wet. Insulate from work and ground.

Disposal Information: Discard any product, residue, disposable container, or liner as ordinary waste in an environmentally acceptable manner according to Federal, State and Local regulations unless otherwise noted. No applicable ecological information available.

Section IX - Emergency and First Aid Procedures

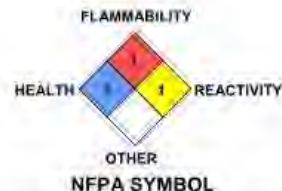
Call for medical aid. Employ first aid techniques recommended by the Canadian Red Cross. IF BREATHING IS DIFFICULT give oxygen. IF NOT BREATHING employ CPR (Cardiopulmonary Resuscitation) techniques. IN CASE OF ELECTRICAL SHOCK, turn off power and follow recommended treatment. In all cases call a physician.

Health	1
Flammability	1
Reactivity	1
PPI	8

HMIS SYMBOL

MATERIAL SAFETY DATA SHEET

Z-50



SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION

Product Name: **Z-50**
 Chemical Family: Mixture
 Use: Tool joint compound,
 Manufacturer/Supplier: **Jet-Lube of Canada Ltd.**
 3820 - 97 Street NW
 Edmonton, Alberta
 Canada T6E 5S8
 Phone: (780) 463-7441 Fax: (780) 463-7454
 CCOHS: 1-800-668-4284

Emergency:
 CANUTEC PH: (613) 996-6666 Cell: *666 TTY/TDD: 1-888-675-6863

SECTION 2 - COMPOSITION/INFORMATION ON INGREDIENTS

Hazardous Components	Non Hazardous Blend	Talc
CAS NO.	7440-66-6, 12001-26-2	14807-96-6
WT %	55 - 65	1 - 5
OSHA PEL	Not Determined	2mg/m ³
ACGIH TLV	Not Determined	2mg/m ³
LD50	Not determined	Not determined
LC50	Not determined	Not determined
OTHER:	Not determined	N/A

SECTION 3 - HAZARDS IDENTIFICATION

Route of Entry: Eyes, Inhalation, Ingestion, Skin
 Eyes: May cause irritation to eyes.
 Inhalation: Viscous nature may block breathing passages if inhaled.
 Ingestion: May cause diarrhea if ingested.
 Skin: May cause irritation after prolonged skin exposure, especially for persons with hyper sensitivity.

SECTION 4 - FIRST AID MEASURES

Eyes: Flush with water until all residual material is gone. If irritation persists, seek medical help.
 Ingestion: Do not induce vomiting. Wash out mouth. Contact a physician immediately.
 Skin: Remove by wiping or with a waterless hand cleaner, followed by washing with soap and water.
 Inhalation: Clear air passage. If breathing difficulty continues seek medical help.

SECTION 5 - FIRE FIGHTING MEASURES

Flammability: Nil at ambient temp
 Extinguishing Media: Use dry chemicals, foam, halon, CO₂ and water mist
 Flash Point (COC): >221°C (430°F)
 Explosive Properties: LEL - 0.9% UEL - 7.0%
 Autoignition Temp: >260°C (500°F)
 Hazardous Combustion Products: Oxides of carbon, smoke and irritating vapors as products of incomplete combustion.
 Protective Equipment: Self-contained breathing apparatus.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Spillage: Scoop up excess, then wipes down the affected area and pick up residue with diatomaceous earth to avoid a walking hazard.
 Environmental Precautions: Do not allow product to enter into drains.

SECTION 7 - HANDLING AND STORAGE

Handling Procedures: No special handling precautions necessary. Do not pressurize, out, heat or weld empty containers.
 Storage Requirements: Store in a cool, well ventilated place.
 Engineering Controls: If user's operation generates vapors or mists, use ventilation to keep exposure to airborne contaminants below the exposure limit. Make up air should always be supplied to balance air removed by exhaust ventilation. Ensure eyewash station and safety shower are close to work station.

SECTION 8 - EXPOSURE CONTROLS/PERSONAL PROTECTION

Personal Protective Equipment (PPE's):
 Respiratory Protection: None required.
 Hand Protection: Protective gloves for hypersensitive persons.
 Eye Protection: Protective glasses if applied to moving parts.
 Body Protection: Protective overalls.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Physical State: Grey Paste
 Odor Threshold: Not Determined
 Vapor Pressure: <0.01 kPa
 Boiling Point: Not determined
 pH: Neutral
 Density (Typical): 1.59 g/cm³
 Evaporation Rate (Butyl Acetate = 1.0): <0.01
 Odor: Light petroleum
 Specific Gravity (Typical): 1.59
 Vapor Density: Not determined
 Melting Point: Not determined
 % VOC: Nil

SECTION 10 - STABILITY AND REACTIVITY

Stability: Chemically stable under normal conditions. No photoreactive agents.
 Conditions to Avoid: Powerful sources of ignition and extreme temperatures.
 Materials to Avoid: Strong acids and oxidizing agents.
 Hazardous Decomposition Products: May release CO₂, smoke and irritating vapors when heated to decomposition.

SECTION 11 - TOXICOLOGICAL INFORMATION

Exposure Limit of Material: See Section 2
 LC50 of Ingredients, Species and Routes: See Section 2
 LD50 of Ingredients, Species and Routes: See Section 2
 Teratogenicity, Embryotoxicity and/or Fetotoxicity: Not Available
 Mutagenicity: Not Available
 Effects of Long-Term (Chronic) Exposure: Long term dermal application may produce possible skin irritation. Elevated temperatures or mechanical action may form vapors or fumes. Inhalation of oil mists or vapors may cause irritation of the upper respiratory tract.
 Carcinogen: No NTP: No IARC: No OSHA: No

SECTION 12 - ECOLOGICAL INFORMATION

Possible Effects: May generate oil fractions that could act as a marine pollutant, but is highly unlikely.
 Behavior: Relatively well behaved. Bioaccumulation potential almost nil.
 Environmental Fate: Highly unlikely to cause notable contamination.

SECTION 13 - DISPOSAL CONSIDERATIONS

Consult federal, provincial and local regulations for disposal of petroleum products. Do not incinerate.

SECTION 14 - TRANSPORT INFORMATION

TDG (Canada): The mixture is not specifically listed in the Canadian Transportation of Dangerous Goods regulations.
 Land & Rail: Not Regulated
 Marine: Not Regulated
 Shipping Name: N/A
 UN No.: N/A
 Packing Group: N/A
 Classification: N/A
 Labeling Requirements: N/A
 Placard Requirements: N/A

SECTION 15 - REGULATORY INFORMATION

WHMIS: D2
 DSL: All components listed
 CPR Compliance: This product has been classified in accordance with the hazard criteria of the Controlled Product Regulations and the MSDS contains all of the information required by those regulations.

SECTION 16 - OTHER INFORMATION

CPR - Controlled Product Regulations
 DSL - Domestic Substance List

As of issue date, the information contained herein is accurate and reliable to the best of Jet-Lube of Canada Ltd.'s knowledge. Jet-Lube of Canada Ltd. does not warrant or guarantee its accuracy or reliability and shall not be liable for any loss or damage arising out of the use thereof. It is the users' responsibility to satisfy themselves that the information offered for their consideration is suitable for their particular use.

Prepared by: **Jet-Lube of Canada Ltd. - Laboratory**
 Last Date of Revision: **January 19, 2012**

Safety Data Sheet

According to OSHA 29 CFR 1910.1200 HCS & Canada WHMIS

Revision Date : 25.02.2014

SECTION 1: Identification

1.1. Product identifier

Product Name : Jiffy Eco-Marker 30,70,90,100 Color : (Black)
 JK-30,JK-30/1B,JK-30/2B, JK-70,JK-70/1B,JK-70/2B
 JK-90,JK-90/1B,JK-90/2B, JK-100,JK-100/1B,JK-100/2B

1.2. Recommended use of the chemical and restrictions on use

Recommended use : Permanent marker ink

1.3. Details of the supplier of the safety data sheet

Supplier	Company Name	: Jiffco International Ltd.
	Address	: 835 - West 3rd Street North Vancouver , BC V7P 3K7 Canada
	Telephone	: 604-980-2685
	Fax	: 604-980-8549
	Contact (e-mail)	: sales@jiffco.net
Manufacturer	Company Name	: Shachihata Inc.
	Address	: 4-69,Amazuka-cho,Nishi-ku,Nagoya City,451-0021,Japan
	Telephone	: +81-52-521-3600
	Fax	: +81-52-521-3899
	Contact (e-mail)	: chem-analysis@ngy.shachihata.co.jp

1.4. Emergency telephone number

Telephone : 604-657-9822

SECTION 2: Hazard(s) identification

United States (US) : According to OSHA 29 CFR 1910.1200 HCS 2012

2.1.1 Classification of the substance or mixture

Flammable liquids, Category 2	H225	: Highly flammable liquid and vapour
Serious eye damage /eye irritation, Category 1	H318	: Causes serious eye damage

2.1.2 Label elements

Hazard pictograms :



Signal word : Danger

Hazard statement	:	Highly flammable liquid and vapour	(H225)
	:	Causes serious eye damage	(H318)

Precautionary statement

【Prevention】

Keep away from heat/sparks/open flames/hot surfaces. - No smoking.	(P210)
Take precautionary measures against static discharge.	(P243)
Wear protective gloves/protective clothing/eye protection/face protection.	(P280)
Use only outdoors or in a well-ventilated area.	(P271)
Wash hands thoroughly after handling.	(P264)

【Response】

In case of fire	: Use dry chemical powder,form or carbon dioxide for extinction.	(P370+P378)
IF INHALED	: Remove victim to fresh air and keep at rest in a position comfortable for breathing.	(P304+P340)
IF IN EYES	: Rinse cautiously with water for several minutes.	(P305+P351+P338)
	Remove contact lenses, if present and easy to do. Continue rinsing.	
If eye irritation persists	: Get medical advice/attention.	(P337+P313)

- IF ON SKIN (or hair) : Remove/Take off immediately all contaminated clothing. (P303+P361+P353)
Rinse skin with water/shower.
- If skin irritation occurs : Get medical advice/attention. (P332+P313)
- IF SWALLOWED : Get medical advice/attention if you feel unwell. Rinse mouth. (P301+P314+P330)

【Storage】

Store in a well-ventilated place. Keep container tightly closed. (P403+P233)

【Disposal】

Dispose of contents/container to waste in accordance with local/regional/ national/international regulation (to be specified). (P501)

2.1.3 Other hazards

Under United States Regulations (29 CFR 1910.1200 - Hazard Communication Standard), this product is considered hazardous.

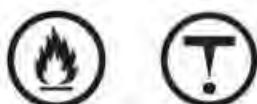
Canada : According to WHMIS

2.2.1 Classification of the substance or mixture

Class B2 : Flammable Liquids

Class D2B : Eye irritation

2.2.2 Label elements



2.2.3 Other hazards

In Canada, the product mentioned above is considered hazardous under the Workplace Hazardous Materials Information System (WHMIS)

2.3 Other information

NFPA

HMIS

SECTION 3: Composition/information on ingredients

Substance/Mixture : Mixture
Ingredients :

Chemical Name / Generic name	Composition weight %	CAS Registry No.	Classification (OSHA HCS 2012)	
			Hazard Class	Hazard statement
Ethanol	50 ~ 60	64-17-5	Flam.Liq. 2	H225
Propan-1-ol	1 ~ 10	71-23-8	Flam.Liq. 2 Eye Irrit. 1 STOT.SE. 3	H225 H318 H336
Ethyl lactate	10 ~ 20	97-64-3	Flam.Liq. 3 Eye Irrit. 1 STOT.SE. 3	H226 H318 H335
Benzyl alcohol	1 ~ 5	100-51-6	Acute Tox.(oral) 4 Acute Tox.(inhal.) 4	H302 H332
Synthetic resin	5 ~ 15	Confidential	none	none
Dyestuff	5 ~ 15	Confidential	none	none
Additive	1 ~ 5	Confidential	none	none
total	100			

SECTION 4: First-aid measures

4.1. Description of first aid measures

- IF INHALED : Remove victim to fresh air and keep at rest in a position comfortable for breathing.
Consult a doctor if symptoms persist.

- IF ON SKIN : Remove/Take off immediately all contaminated clothing.Wash with soap and water. If skin irritation/rash occurs or feel unwell, consult a doctor for medical advice.
- IF IN EYES : Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do.Continue rinsing.If eye irritation persists, get medical advice/attention.
- IF SWALLOWED : After rinse mouth immediately, give about 250 ml of water or milk and thin in the stomach, and do not vomit forcibly.Moreover, do not give anything from the mouth to the patient when not conscious.Receive the doctor's treatment (stomach pump) promptly.

Note to Physicians :

All treatments should be based on observed signs and symptoms of distress in the patient.
 Consideration should be given to the possibility that overexposure to materials other than this product may have occurred.

SECTION 5: Fire-fighting measures

- 5.1. Extinguishing media
 - Suitable extinguishing media : Dry chemical powder, foam or carbon dioxide
 - Unsuitable extinguishing media : Water jet
- 5.2. Special hazards arising from the substance or mixture
 - For initial stage extinction, carbon dioxide or dry chemical powder.
 - When a fire extends, fire is extinguished by a large amount of water spray.
 - Do not discharge extinguishing waters into the aquatic environment.
- 5.3. Advice for firefighters
 - In the extinction work, an appropriate protective equipment (gloves, glasses, and mask) has to be worn.
 - Because during a fire, hazardous gases may be generated, fire-fighters have to wear self-contained breathing apparatus and other protective equipment.

SECTION 6: Accidental release measures

- 6.1. Personal precautions, protective equipment and emergency procedures
 - Evacuate personnel to safe area. Shut off all sources of ignition.
 - No Flares, smoking or flame in area. Put on protective equipment. Ensure adequate ventilation.
- 6.2. Environmental precautions
 - Do not throw the leakage thing directly into environment
- 6.3. Methods and material for containment and cleaning up
 - In case of a small spill, absorb with dry sand, soil, sawdust, cloth, etc., then place in a chemical waste containers.
 - In case of large spills, dike and prevent overflow, cover spills with foam, then place in a chemical container using non-sparking tools.

SECTION 7: Handling and storage

- 7.1. Precautions for safe handling
 - Advice on safe handling : Use with adequate ventilation.
 - Avoid contact with skin, eyes and clothing.
 - Obtain special instructions before use.
 - Do not handle until all safety precautions have been read and understood.
 - Do not eat, drink or smoke when using this product.
- 7.2. Conditions for safe storage, including any incompatibilities
 - Requirements for storage areas and containers : Keep containers tightly closed and store in a cool and dry place.
 - Keep away from heat and flame,ignition source and sunlight.
 - Keep out of the reach of children.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters		
ACGIH (2013)		
Ethanol	STEL	1000ppm
Propan-1-ol	TWA	100ppm
OSHA PEL		
Ethanol	TWA	1000ppm
Propan-1-ol	TWA	200ppm
Canada Ontario Provincial		
Ethanol	STEL	1000ppm
Propan-1-ol	TWA	100ppm

Canada Quebec Provincial

Ethanol	TWA	1000ppm
Propan-1-ol	TWA	200ppm

8.2. Exposure controls

Personal protective equipment

- Respiratory Protection : Use with local exhaust ventilation, when in long use.
Avoid breathing vapours. Wear mask to prevent organic gas, if necessary.
- Hand Protection : Avoid contact with hands. Wear safety gloves, if necessary.
- Eye Protection : Avoid contact with eyes. Wear safety glasses, if necessary.
- Skin Protection : Avoid skin contact. Wear personal protection apron, boots, if necessary.

Environmental exposure controls

- General advice : Prevent product from entering drains.
Prevent further leakage or spillage if safe to do so.
If the product contaminates rivers and lakes or drains inform respective authorities.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance	: black liquid
Odor	: minor solvent odor
pH	: Not applicable
Boiling point	: No data available
Flash point	: 61.7 °F (16.5 °C) (closed cup)
Relative Density (at 77 °F, 25 °C)	: 0.85 ~ 0.95 (g/cm ³)
Solubility in Water	: Insoluble

SECTION 10: Stability and reactivity

10.1. Reactivity

No dangerous reaction known under conditions of normal use.

10.2. Possibility of hazardous reactions

Under normal conditions of storage and use, hazardous reactions will not occur.

10.3. Chemical stability

The product is stable.

10.4. Conditions to Avoid

High temperature, Direct sunlight, Fire

10.5. Incompatible Materials

No data available

10.6. Hazardous decomposition products

CO, CO₂

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity	: LD/LC50 values that are relevant for classification		
	[Ethanol]		
	Oral-rat	LD50	7,060mg/kg
	Inhalation-rat	LC50	20,000ppm/10h
	[Propan-1-ol]		
	Oral-rat	LD50	1,870mg/kg
	Dermal-rabbit	LD50	4,060mg/kg
	Inhalation-rat	LC50	4,000mg/l/4H
	[Ethyl lactate]		
	Oral-rat	LD50	2,500mg/kg
	Inhalation-rat	LC50	>5,400mg/m ³ /8H
	[Benzyl alcohol]		
	Oral-rat	LD50	1,610mg/kg
	Dermal-rabbit	LD50	2,000mg/kg
	Inhalation-rat	LC50	>4,178mg/l/4H

Serious eye damage /eye irritation : Category 1 Causes serious eye damage

Carcinogenicity : This product does not contain any component that is considered a human carcinogen by IARC, ACGIH, OSHA or NTP.

SECTION 12: Ecological information

- 12.1. Ecotoxicity : No data available
 12.2. Persistence and degradability : No data available
 12.3. Bioaccumulative potential : No data available
 12.4. Mobility in soil : No data available
 12.5. Other adverse effects : No known significant effects or critical hazards.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

- Disposal must be made according to official regulations.
 Comply with all Federal, State, and Local regulations regarding disposal.
 Do not allow product to reach ground, any water course or sewage system.

SECTION 14: Transport information

- 14.1. UN number DOT, TDG, IMO / IMDG, IATA / ICAO : UN1210
 14.2. UN proper shipping name DOT, TDG, IMO / IMDG, IATA / ICAO : PRINTING INK, flammable
 14.3. Transport hazard class(es) DOT, TDG, IMO / IMDG, IATA / ICAO :
 · Class 3 (Flammable liquids,)
 · Label 3
 14.4. Packing group DOT, TDG, IMO / IMDG, IATA / ICAO : II
 14.5. Environmental hazards Marine pollutant : No
 14.6. Special precautions for user EMS Number : F-E, S-D
 14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code : Not applicable.



☆☆

Jiffy Eco-Marker (JK-30, JK-70, JK-90) is not a hazardous material by the special provision.
 However, Jiffy Eco-Marker (JK-100) is a hazardous material (UN3175) for more than 10ml.

Jiffy Eco-Marker (JK-30, JK-70, JK-90)		(Amount of ink : less than 10ml)
UN number	: UN3175	
UN proper shipping name	: Solids containing Flammable Liquid. n.o.s.	
IATA	Special Provision A46	
IMDG Code	Special Provision 216	

According to IATA Special Provision A46, and IMDG Code Special Provision 216, small inner packagings consisting of sealed packets and articles containing less than 10 mL of a Class 3 liquid in Packing Group II or III absorbed onto a solid material are not subject to as a hazardous material/dangerous goods provided there is no free liquid in the packet or article.

Jiffy Eco-Marker (JK-100)		(Amount of ink : over 10ml)
UN number	: UN3175	
UN proper shipping name	: Solids containing Flammable Liquid. n.o.s.	
UN Classification	: 4.1	
Packing group	: II	

SECTION 15: Regulatory information

< USA Information >

- OSHA STATUS : This product is hazardous under 29 CFR 1910.1200.
 TSCA inventory : All components of this product are listed in the TSCA Inventory.
 TSCA Hazard Communication Program (40 CFR Part 721) (SNUR) : not Listed
 EPCRA Section 302 Extremely Hazardous Substances (EHS) : not Listed
 EPCRA Section 313 Toxic Chemicals : not Listed
 CERCLA Hazardous Substances : not Listed
 CAA Section 112(r) List of Substances for Accidental Release Prevention : not Listed
 California Proposition 65 : not Listed

< Canada Information >

- This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the SDS contains all the information required by the CPR.
 Canada inventory : All components of this product are listed in the DSL/NDSL Inventory.

SECTION 16: Other information, including date of preparation or last revision

Last Revision Date : 25.02.2014

Preparation Date : 02.04.2007



EU RoHS Directive(2002/95/EC) and ELV Directive(2000/53/EC)
This product does not contain lead, mercury, cadmium, hexavalent chromium,
polybrominated biphenyls (PBB) or polybrominated diphenylethers (PBDE).

This data sheet may not be enough when evaluating danger or hazard. The above information, which is created from currently available documents, information and data, may be revised when new findings are announced. This document has been written on the assumption that when dealing with a large amount of ink on the business case and emergency. When handling as a normal product, please refer to the notes that is described in the produce or packaging. The information contained herein is not intended to provide any kind of warranty other than information, there is no guarantee for the accuracy of the content.

JIG-A-LOO INC.
316-2 KNOWLTON RD
BROME LAKE, QC
J0E 1V0
CANADA

PRODUCT: 10251-01-011 JIG1601 JIG-A-LOO 311G



Section 01: CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

MANUFACTURER MANUFACTURED FOR:
JIG-A-LOO INC.
316-2 Knowlton Rd, Brome Lake, Qc J0E 1V0 (450-243-1500)
For Chemical Emergency
Spill Leak Fire Exposure or Accident
Call Canutec Day or Night
DOMESTIC NORTH AMERICA 613-947-5048
INTERNATIONAL, CALL 613-947-5048 (collect calls accepted)
PRODUCT NAME 10251-01-011 JIG1601 JIG-A-LOO 311G
CHEMICAL FAMILY CHLORINATED HYDROCARBON.
MOLECULAR WEIGHT NOT APPLICABLE.
CHEMICAL FORMULA MIXTURE.
TRADE NAMES & SYNONYMS 10251-01-011 JIG1601 JIG-A-LOO 311G
PRODUCT USES LUBRICANT.
FORMULATION NUMBER 004-1-167-B.
FORMULA/LAB BOOK # 99-1882B.

Section 02: COMPOSITION/INFORMATION INGREDIENTS

Hazardous Ingredients	%	Exposure Limit	C.A.S.#	LD/50, Route,Species	LC/50 Route,Species
METHYLENE CHLORIDE	30-60	50 ppm	75-09-2	2100 mg/kg ORAL - RAT	88,000 mg/m ³ (1/2 hr) INHAL - RAT
PERCHLOROETHYLENE (TETRACHLOROETHYLENE)	10-30	25 ppm	127-18-4	2629 mg/kg ORAL - RAT	5200 ppm (4 Hr) INHAL - MOUSE
SILICONE (Polydimethyl Siloxane)	1-5	NOT AVAILABLE	63148-62-9	NOT AVAILABLE	NOT AVAILABLE
PROPANE	5-10	1000 ppm	74-98-6	>5000 mg/kg DERMAL-RABBITS	NOT AVAILABLE
ISOBUTANE	7-13	1000 ppm	75-28-5	NOT APPLICABLE	142,500 ppm (4h) INHAL - RAT

Section 03: HAZARDS IDENTIFICATION

ROUTE OF ENTRY:
INGESTION MAY CAUSE HEADACHE, NAUSEA, VOMITING AND WEAKNESS.
INHALATION METHYLENE CHLORIDE VAPOURS CAN READILY ACCUMULATE IN POORLY VENTILLATED
AREAS AND CAN CAUSE UNCONSCIOUSNESS. PROPELLANT IS A SIMPLE ASPHYXIANT.
EYE CONTACT MAY CAUSE IRRITATION.
SKIN ABSORPTION REPEATED CONTACT MAY CAUSE DERMATITIS IN SENSITIVE INDIVIDUALS.
SKIN CONTACT METHYLENE CHLORIDE-PROLONGED OR REPEATED EXPOSURE MAY CAUSE SKIN
IRRITATION.
EFFECTS OF ACUTE EXPOSURE METHYLENE CHLORIDE OVEREXPOSURE MAY LEAD TO CENTRAL NERVOUS SYSTEM
DEPRESSION AND CARDIAC SENSITIZATION.
EFFECTS OF CHRONIC EXPOSURE METHYLENE CHLORIDE MAY HAVE CENTRAL NERVOUS SYSTEM EFFECTS.
PERCHLOROETHANE - PROLONGED EXPOSURE MAY CAUSE SKIN CRACKING AND
DERMATITIS. REPEAT EXPOSURE MAY CAUSE LIVER AND KIDNEY DAMAGE, DEPRESSION,
LETHARGY, CARDIAC, ARRYTHMIA, AND REDUCED FERTILITY AT BELOW THE LD50.
EXPOSURE LIMIT OF MATERIAL SEE SECTION 2.

Section 04: FIRST AID MEASURES

EMERGENCY FIRST AID PROCEDURE IN CASE OF EYE CONTACT, FLUSH IMMEDIATELY WITH PLENTY OF WATER FOR AT LEAST 15
MINUTES AND GET MEDICAL ATTENTION. FOR SKIN, WASH THOROUGHLY WITH SOAP AND
WATER. IF AFFECTED BY INHALATION OF VAPOUR OR SPRAY MIST, REMOVE TO FRESH AIR.
IF SWALLOWED; DO NOT INDUCE VOMITING, GET MEDICAL ATTENTION.

Section 05: FIRE FIGHTING MEASURES

AUTO IGNITION TEMPERATURE (°C) NOT AVAILABLE.
SPECIAL PROCEDURES WATER FROM FOGGING NOZZLES MAY BE USED TO COOL CLOSED CONTAINERS TO
PREVENT BUILD-UP IF EXPOSED TO EXTREME TEMPERATURES. FULL PROTECTIVE
EQUIPMENT INCLUDING SELF CONTAINED BREATHING APPARTATUS SHOULD BE WORN IN A
FIRE INVOLVING THIS MATERIAL.
FLAMMABILITY FLAMMABLE.
IF YES, UNDER WHICH CONDITIONS? EXCESSIVE HEAT, SPARKS AND OPEN FLAME.
EXTINGUISHING MEDIA WATER, CARBON DIOXIDE, DRY CHEMICAL, FOAM.
UPPER FLAMMABLE LIMIT 22.
(% BY VOLUME)

PRODUCT: 10251-01-011 JIG1601 JIG-A-LOO 311G**Section 05: FIRE FIGHTING MEASURES**

LOWER FLAMMABLE LIMIT.....	1.9.
(% BY VOLUME)	
EXPLOSION DATA	
SENSITIVITY TO STATIC DISCHARGE.....	NOT APPLICABLE.
SENSITIVITY TO IMPACT.....	NOT APPLICABLE.
HAZARDOUS COMBUSTION PRODUCTS.....	POSSIBLE PHOSGENE OVER 250 DEG C, CHLORINE GAS, HYDROCHLORIC ACID. HYDROCARBON FUMES AND SMOKE. CARBON MONOXIDE WHERE COMBUSTION IS INCOMPLETE.
AEROSOL FLAME PROJECTION	
CLASSIFIED AS:.....	15 - 45cm.
FLASHBACK.....	NONE.
FLASH POINT(°C), TAG CLOSED-CUP	-40F BASED ON PROPANE/ISOBUTANE.
(CONCENTRATE)	

Section 06: ACCIDENTAL RELEASE MEASURES

LEAK/SPILL.....	REMOVE ALL SOURCES OF IGNITION. USE AN INERT ABSORBENT MATERIAL, AND NON-SPARKING TOOLS. VENTILATE AREA. PREVENT FROM ENTERING A WATERCOURSE.
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Section 07: HANDLING AND STORAGE

STORAGE NEEDS.....	KEEP AWAY FROM HEAT, SPARKS, AND OPEN FLAMES.
ENGINEERING CONTROLS.....	VENTILATION - LOCAL (MECHANICAL IF USED INDOORS ON A CONTINUOUS BASIS).
HANDLING PROCEDURES AND EQUIPMENT.....	STORE IN A COOL, WELL VENTILATED AREA NOT TO EXCEED 50 DEG C.
SYNERGISTIC MATERIALS.....	NONE KNOWN.

Section 08: EXPOSURE CONTROLS/PERSONAL PROTECTION

GLOVES/ TYPE.....	WEAR CHEMICAL RESISTANT GLOVES.
RESPIRATORY/TYPE.....	IF USED INDOORS ON A CONTINUOUS BASIS, USE OF A CARTRIDGE TYPE RESPIRATOR (NIOSH/MSHATC 23C OR EQUIVALENT) IS RECOMMENDED.
EYE/TYPE.....	SAFETY GLASSES.
FOOTWEAR/TYPE.....	NOT NORMALLY REQUIRED.
OTHER/TYPE.....	NOT REQUIRED.

Section 09: PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE.....	AEROSOL.
APPEARANCE.....	CLEAR LIQUID.
ODOR.....	CHLORINATED HYDROCARBON.
ODOR THRESHOLD.....	NOT AVAILABLE.
VAPOUR PRESSURE(PSIG)-AEROSOL.....	30 - 40.
@ 20 C	
BOILING POINT (°C)(CONC).....	39.8-121.
EVAPORATION RATE.....	GREATER THAN 1.
n-BUTYL ACETATE = 1	
VAPOUR DENSITY (AIR=1).....	GREATER THAN 1.
(BY WEIGHT)	
SOLUBILITY IN WATER g/L (20°C).....	NOT AVAILABLE.
pH.....	NOT APPLICABLE.
SPECIFIC GRAVITY (LIQUID).....	1.37-1.41.
COEFFICIENT OF WATER/OIL DIST.....	NOT AVAILABLE.
FREEZING POINT: (°C).....	NOT AVAILABLE.
AEROSOL PERCENT VOLATILE.....	97-98.
(BY WEIGHT).	
SPECIFIC GRAVITY (AEROSOL).....	1.03-1.07.
AEROSOL PERCENT VOC (w/w).....	20-21.

Section 10: STABILITY AND REACTIVITY

HAZARDOUS PRODUCTS OF DECOMPOSITION.....	POSSIBLE PHOSGENE OVER 250 DEG C, CHLORINE GAS, HYDROCHLORIC ACID. HYDROCARBON FUMES AND SMOKE. CARBON MONOXIDE WHERE COMBUSTION IS INCOMPLETE.
CHEMICAL STABILITY:	
YES.....	UNDER NORMAL CONDITIONS.
NO, WHICH CONDITIONS?.....	NOT APPLICABLE.
COMPATIBILITY WITH OTHER SUBSTANCES:	
NO, WHICH ONES?.....	STRONG OXIDIZING AGENTS.
REACTIVITY CONDITIONS?.....	NOT APPLICABLE.
HAZARDOUS POLYMERIZATION.....	WILL NOT OCCUR.

Section 11: TOXICOLOGICAL INFORMATION

REPRODUCTIVE EFFECTS.....	NO INFORMATION IS AVAILABLE AND NO ADVERSE REPRODUCTIVE EFFECTS ARE ANTICIPATED.
IRRITANCY OF MATERIAL.....	SKIN/EYE IRRITANT.
SENSITIZING CAPABILITY OF MATERIAL.....	UNKNOWN.
CARCINOGENICITY OF MATERIAL.....	METHYLENE CHLORIDE HAS BEEN LISTED AS A POTENTIAL CARCINOGEN BY IARC. PERCHLOROETHYLENE HAS BEEN LISTED AS A POTENTIAL CARCINOGEN BY IARC.

PRODUCT: 10251-01-011 JIG1601 JIG-A-LOO 311G**Section 11: TOXICOLOGICAL INFORMATION**

TERATOGENICITY..... NO INFORMATION IS AVAILABLE AND NO ADVERSE TERATOGENIC EFFECTS ARE ANTICIPATED.
 MUTAGENICITY..... NO INFORMATION IS AVAILABLE AND NO ADVERSE MUTAGENIC EFFECTS ARE ANTICIPATED.

Section 12: ECOLOGICAL CONSIDERATIONS

ENVIRONMENTAL..... PERCHLOROETHYLENE-THE LC50/96 HOUR VALUES FOR FISH ARE BETWEEN 10 AND 100mg/l. THIS MATERIAL IS EXPECTED TO BE TOXIC O AQUATIC LIFE.

Section 13: DISPOSAL CONSIDERATIONS

WASTE DISPOSAL..... DO NOT PUNCTURE OR INCINERATE CONTAINERS, EVEN WHEN EMPTY. DISPOSE OF IN ACCORDANCE WITH LOCAL, PROVINCIAL AND FEDERAL REGULATIONS.

Section 14: TRANSPORTATION INFORMATION

T.D.G. CLASSIFICATION..... CONSUMER COMMODITY (AEROSOLS, UN1950, CLASS 2.1 (6.1)).
 D.O.T. CLASSIFICATION..... CONSUMER COMMODITY, ORM-D.
 IATA:
 IATA Shipping Description..... UN1950, Aerosols, Flammable 2.1 (6.1).
 IATA Hazard Class..... 2.1 (6.1).
 ID Number..... UN1950.
 IATA Hazard Labels Required..... Flammable Gas.
 IMDG/IMO:
 Classification..... CONSUMER COMMODITY/LIMITED QUANTITY.
 Proper Shipping Name..... AEROSOLS, FLAMMABLE.
 UN Class..... 2.1 (6.1).
 UN Number..... 1950.
 Marine Pollutant..... YES.

Section 15: REGULATORY INFORMATION**CANADIAN REGULATIONS:**

WHMIS CLASSIFICATION..... A,B5,D1B,D2A,D2B.
 CNFC SECTION 3.3.5..... LEVEL 1.
 CEPA (Canadian Environmental Protection Act) ALL SUBSTANCES IN THIS PRODUCT ARE LISTED ON THE CANADIAN DOMESTIC SUBSTANCES LIST (DSL) OR ARE NOT REQUIRED TO BE LISTED.

U.S. REGULATIONS:

HMIS RATING HEALTH..... 2 MODERATE HAZARD.
 HMIS RATING FLAMMABILITY..... 4 SEVERE HAZARD.
 HMIS RATING REACTIVITY..... 0 MINIMAL HAZARD.
 HMIS RATING PERSONAL PROTECTION..... B.
 NFPA CODE 30B..... LEVEL 1.
 SARA 313 INFORMATION: THIS PRODUCT CONTAINS THE FOLLOWING SUBSTANCES SUBJECT TO THE REPORTING REQUIREMENTS OF SECTION 313 OF TITLE III OF THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 AND 40 CFR PART 372:
 CAS #: CHEMICAL NAME:
 *127-18-4 PERCHLOROETHYLENE (TETRACHLOROETHYLENE)
 *75-09-2 METHYLENE CHLORIDE
 (DICHLOROMETHANE)
 CALIFORNIA PROPOSITION 65:..... THE FOLLOWING STATEMENT IS MADE IN ORDER TO COMPLY WITH THE CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT OF 1986:
 WARNING: THIS PRODUCT CONTAINS A CHEMICAL KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER, BIRTH DEFECTS OR OTHER REPRODUCTIVE HARM.
 CAS #: CHEMICAL NAME:
 *127-18-4 TETRACHLOROETHYLENE
 *75-09-2 METHYLENE CHLORIDE (DICHLOROMETHANE)
 TSCA (Toxic Substances Control Act)..... ALL COMPONENT OF THIS PRODUCT ARE LISTED ON THE TSCA INVENTORY. ANY IMPURITIES PRESENT IN THIS PRODUCT ARE EXEMPT FROM LISTING.
 VOC (w/w%)..... 20-21.

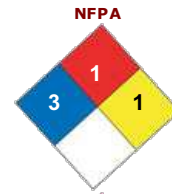
Section 16: OTHER INFORMATION

NOTICE FROM JIG-A-LOO INC..... THE INFORMATION ON THIS MATERIAL SAFETY DATA SHEET IS PROVIDED BY JIG-A-LOO INC. FREE OF CHARGE. WHILE BELIEVED TO BE RELIABLE, IT IS INTENDED FOR USE BY SKILLED PERSONS AT THEIR OWN RISK. JIG-A-LOO INC. ASSUMES NO RESPONSIBILITY FOR EVENTS RESULTING OR DAMAGES INCURRED FROM ITS USE. THE INFORMATION ON THIS MATERIAL SAFETY DATA SHEET RELATES ONLY TO THE SPECIFIC MATERIAL DESIGNATED HEREIN AND DOES NOT RELATE TO USE IN COMBINATION WITH ANY OTHER MATERIAL OR IN ANY PROCESS.
 PREPARED BY..... TECHNICAL SERVICES
 PREPARATION DATE Nov14/12

Personal Protective Equipment				WHMIS Pictograms		DOT Pictograms
Chemical Splash Goggles	Safety Glasses	Protective Gloves	Face shield	D2B Toxic	Corrosive Material	Consumer Commodity

SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION

Product Name: SP30 (2 oz. or 1 lbs. container)
Product Code: SP-30
MSDS Manufacturer Number: SP-30 (2 oz./ 56.6 g. container)
Product Use/Restriction: Flux
Manufacturer Name: Kester
Address: 800 W. Thorndale Avenue
Itasca, IL 60143
General Phone Number: (630)-616-4000
Customer Service Phone Number: (800)-2KESTER (253-7837)
CHEMTREC: For emergencies in the US, call CHEMTREC: 800-424-9300 Outside of the U.S. and Canada: (703) 527-3887
Website: msds@kester.com
MSDS Creation Date: August 15, 2008
MSDS Revision Date: September 30, 2012



HMIS	
Health Hazard	3
Fire Hazard	1
Reactivity	1
Personal Protection	X

SECTION 2 - COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS#	Ingredient Percent	EC Num.
Non Hazardous	N/A	5 - 10 by weight	
Ammonium chloride	12125-02-9	1 - 5 by weight	
Petrolatum	8009-03-8	60 - 100 by weight	
Zinc Chloride	7646-85-7	10 - 30 by weight	

SECTION 3 - HAZARDS IDENTIFICATION

Emergency Overview: DANGER! Corrosive. Irritant.
Route of Exposure: Eyes. Skin. Inhalation. Ingestion.
Potential Health Effects:
Eye: Corrosive. Will cause eye burns, permanent tissue damage, and blindness.
Skin: Contact causes severe skin irritation and possible burns. may cause permanent skin damage.
Inhalation: May cause severe respiratory system irritation.
Ingestion: Harmful if swallowed. Corrosive to the gastrointestinal tract.
Signs/Symptoms: Depending on solution concentration, material may be corrosive to skin, mucous membranes and eyes. Vapors may cause respiratory irritation.
Target Organs: Eyes. Skin. Respiratory system. Digestive system.
Aggravation of Pre-Existing Conditions: May aggravate pre-existing respiratory disorders, allergy, eczema, or skin conditions.

SECTION 4 - FIRST AID MEASURES

Eye Contact: Immediately flush eyes with plenty of water for 15 to 20 minutes. Get medical attention, if irritation or symptoms of overexposure persists.
Skin Contact: Immediately wash skin with plenty of soap and water for 15 to 20 minutes, while removing contaminated clothing and shoes.

Get medical attention if irritation develops or persists.

Inhalation:	If inhaled, remove to fresh air. If not breathing, give artificial respiration or give oxygen by trained personnel. Seek immediate medical attention.
Ingestion:	If swallowed, do NOT induce vomiting. Call a physician or poison control center immediately. Never give anything by mouth to an unconscious person.

SECTION 5 - FIRE FIGHTING MEASURES

Flash Point:	221 °C (430 °F)
Lower Flammable/Explosive Limit:	Not applicable.
Upper Flammable/Explosive Limit:	Not applicable.
Extinguishing Media:	Use alcohol resistant foam, carbon dioxide, dry chemical, or water fog or spray when fighting fires involving this material.
Unsuitable Media:	Do not use a solid water stream as it may scatter and spread fire.
Protective Equipment:	As in any fire, wear Self-Contained Breathing Apparatus (SCBA), MSHA/NIOSH (approved or equivalent) and full protective gear.
Hazardous Combustion Byproducts:	Oxides of carbon, oxides of nitrogen, aliphatic aldehydes, and other organic substances may be formed during combustion.. Zinc chloride hydrogen chloride
NFPA Ratings:	
NFPA Health:	3
NFPA Flammability:	1
NFPA Reactivity:	1
NFPA Other:	


SECTION 6 - ACCIDENTAL RELEASE MEASURES

Personnel Precautions:	Evacuate area and keep unnecessary and unprotected personnel from entering the spill area. Avoid breathing vapor, aerosol or mist. Avoid contact with skin, eyes and clothing.
Environmental Precautions:	Avoid runoff into storm sewers, ditches, and waterways.
Methods for containment:	Contain spills with an inert absorbent material such as soil, sand or oil dry.
Methods for cleanup:	Absorb spill with inert material (e.g., dry sand or earth), then place in a chemical waste container. Provide ventilation. Clean up spills immediately observing precautions in the protective equipment section.

SECTION 7 - HANDLING and STORAGE

Handling:	Use with adequate ventilation. Avoid breathing vapor and fumes. Use only in accordance with directions.
Storage:	No special storage conditions required.
Hygiene Practices:	Wash thoroughly after handling. Avoid inhaling vapors, mists, or fumes.

SECTION 8 - EXPOSURE CONTROLS, PERSONAL PROTECTION - EXPOSURE GUIDELINES

Engineering Controls:	Use appropriate engineering control such as process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits. Where such systems are not effective wear suitable personal protective equipment, which performs satisfactorily and meets OSHA or other recognized standards. Consult with local procedures for selection, training, inspection and maintenance of the personal protective equipment.
Eye/Face Protection:	Safety glasses with side-shields.
Hand Protection Description:	Wear appropriate protective gloves. Consult glove manufacturer's data for permeability data. Nitrile rubber or natural rubber gloves are recommended.
Respiratory Protection:	When ventilation is not sufficient to remove fumes from the breathing zone, a safety approved respirator or self- contained breathing apparatus should be worn.
PPE Pictograms:	

EXPOSURE GUIDELINES

Ammonium chloride :

Guideline ACGIH: TLV-TWA: 10 mg/m³
TLV-STEL: 20 mg/m³

Zinc Chloride :

Guideline ACGIH: TLV-TWA: 1 mg/m³
TLV-STEL: 2 mg/m³
Guideline OSHA: PEL-TWA: 1 mg/m³

SECTION 9 - PHYSICAL and CHEMICAL PROPERTIES

Physical State Appearance: Paste.
Color: Amber.
Odor: Mild chemical.
Boiling Point: Not determined.
Melting Point: 49 °C (120 deg F)
Density: 1.05 g/cm³ (at 20 °C (68 °F))
Vapor Pressure: 1.0 hPa (1 mm Hg) (at 20 °C (68 °F))
Flash Point: 221 °C (430 °F)

SECTION 10 - STABILITY and REACTIVITY

Chemical Stability: Stable under normal temperatures and pressures.
Hazardous Polymerization: Not reported.
Conditions to Avoid: No thermal decomposition if used according to specifications.
Incompatible Materials: Oxidizing agents. Strong acids and alkalis.
Special Decomposition Products: Carbon monoxide and carbon dioxide Hydrogen chloride (HCl) Zinc oxide

SECTION 11 - TOXICOLOGICAL INFORMATION

Non Hazardous :

RTECS Number: ZC0110000

Ingestion: Oral - Rat LD50 : >90 mL/kg [Details of toxic effects not reported other than lethal dose value] (RTECS)

Ammonium chloride :

RTECS Number: BP4570000

Petrolatum :

RTECS Number: SE6780000

Zinc Chloride :

RTECS Number: ZH1400000

Ingestion: Oral - Rat LD50: 350 mg/kg [Details of toxic effects not reported other than lethal dose value]
Oral - Mouse LD50: 329 mg/kg [Details of toxic effects not reported other than lethal dose value] (RTECS)

SECTION 12 - ECOLOGICAL INFORMATION


Ecotoxicity: No ecotoxicity data was found for the product.
Environmental Fate: No environmental information found for this product.

SECTION 13 - DISPOSAL CONSIDERATIONS

Waste Disposal: Consult with the US EPA Guidelines listed in 40 CFR Part 261.3 for the classifications of hazardous waste prior to disposal. Furthermore, consult with your state and local waste requirements or guidelines, if applicable, to ensure compliance. Arrange disposal in accordance to the EPA and/or state and local guidelines.

SECTION 14 - TRANSPORT INFORMATION

DOT Shipping Name: Non regulated.

DOT Exemption: ORM-D Small quantity exemption
 IATA Shipping Name: Non regulated.
 DOT Pictograms: 
 Canadian Shipping Name: Non regulated.
 Canadian Hazard Class: Non regulated.
 Canadian Packing Group: Non regulated.
 Canadian Shipping Label: Non regulated.
 IMDG Shipping Name : Non regulated.
 ADR Shipping Name : Non regulated.
 RID Shipping Name : Non regulated.
 ICAO Shipping Name: Non regulated.

SECTION 15 - REGULATORY INFORMATION

Canada Reg. Status: This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by the Controlled Products Regulations.

Canada WHMIS: Controlled - Class: D2B Toxic

Non Hazardous :

TSCA Inventory Status: Listed

Canada DSL: Listed

Ammonium chloride :

TSCA Inventory Status: Listed

Canada DSL: Listed

Petrolatum :

TSCA Inventory Status: Listed

Canada DSL: Listed

Zinc Chloride :

TSCA Inventory Status: Listed

Canada DSL: Listed

GHS Pictograms:



SECTION 16 - ADDITIONAL INFORMATION

General Use: Flux

HMIS Health Hazard: 3

HMIS Fire Hazard: 1

HMIS Reactivity: 1

HMIS Personal Protection: X

MSDS Creation Date: August 15, 2008

MSDS Revision Date: September 30, 2012

Disclaimer: The information contained herein is based on data considered accurate and is offered solely for information, consideration and investigation. Kester extends no warranties, makes no representations and assumes no responsibility as to the accuracy, completeness or suitability of this data for any purchaser's use. The data on this Material Safety Data Sheet relates only to this product and does not relate to use with any other material or in any process. All chemical products should be used only by, or under the direction of, technically qualified personnel who are aware of the hazards involved and the necessity for reasonable care in handling. Hazard communication regulations require that employees must be trained on how to use a Material Safety Data Sheet as a source for hazard information.

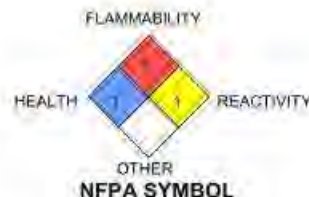
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Health	1
Flammability	1
Reactivity	1
PPI	B

HMIS SYMBOL

MATERIAL SAFETY DATA SHEET

KOPR-KOTE THERMAL GRADE



SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION

Product Name: **KOPR-KOTE THERMAL GRADE**
 Chemical Family: Mixture
 Use: Lubricating grease anti-seize
 Manufacturer/Supplier: **Jet-Lube of Canada Ltd.**
 3820 - 97 Street
 Edmonton, Alberta
 Canada T6E 5S8
 Phone: (780) 463-7441 Fax: (780) 463-7454
 CCOHS: 1-800-668-4284

Emergency:

CANUTEC PH: (613) 996-6666 Cell: *666 TTY/TDD: 1-888-675-6663

SECTION 2 - COMPOSITION/INFORMATION ON INGREDIENTS

Hazardous Components	Talc	Graphite	Copper	Molybdenum Disulphide
CAS NO.	14807-96-6	7782-42-5	7440-50-8	1317-33-5
WT %	3-7	7-13	5-10	1-5
OSHA PEL	2 mg/m ³ (dust)	2.5 mg/m ³	1 mg/m ³ (dust)	15 mg/m ³
ACGIH TLV	2 mg/m ³ (dust)	2 mg/m ³	1 mg/m ³ (dust)	10 mg/m ³
LD50	Not Available	10000 mg/kg	Not Available	>2000 mg/kg (oral, rat)
LC50	Not Available	64400 mg/m ³	Not Available	>2820 mg/m ³ (rat)
OTHER:	Not Applicable	Not Applicable	Not Applicable	Not Applicable

SECTION 3 - HAZARDS IDENTIFICATION

Route of Entry: Eyes, Inhalation, Ingestion, Skin
 Eyes: May cause irritation to eyes as a foreign object.
 Inhalation: Viscous nature may block breathing passages if inhaled.
 Ingestion: May cause diarrhea if ingested.
 Skin: May cause irritation after prolonged skin exposure, especially for persons with hyper sensitivity.

SECTION 4 - FIRST AID MEASURES

Eyes: Flush with water until all residual material is gone. If irritation persists, seek medical help.
 Ingestion: Do not induce vomiting. Wash out mouth. Contact a physician immediately.
 Skin: Remove by wiping or with a waterless hand cleaner, followed by washing with soap and water.
 Inhalation: Clear air passage. If breathing difficulty continues seek medical help.

SECTION 5 - FIRE FIGHTING MEASURES

Flammability: Nil at ambient temp
 Extinguishing Media: Use dry chemicals, foam, halon, CO₂
 Flash Point (OC): >293°C (560°F)
 Flammable Limits: Upper (Not Available) Lower (Not Available)
 Explosive Properties: Sensitivity to Static Discharge (Not Available)
 Sensitivity to Impact (Not Available)
 LEL - 0.9% UEL - 7%
 Auto-ignition Temp: >360°C (680°F)
 Hazardous Combustion Products: Oxides of carbon, smoke and irritating vapors as products of incomplete combustion.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Spillage: Scoop up excess, then wipe down the affected area and pick up residue with diatomaceous earth to avoid a walking hazard.
 Environmental Precautions: Do not allow product to enter into drains.

SECTION 7 - HANDLING AND STORAGE

Handling Procedures: No special handling precautions are necessary. Do not pressurize, cut, heat or weld empty containers.
 Storage Requirements: Store in a cool, well ventilated place.

SECTION 8 - EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure Limits: **Talc** **Graphite** **Copper** **Molybdenum Disulphide**
OSHA PEL 2mg/m³ 2.5mg/m³ 1mg/m³ 15mg/m³
ACGIH TLV 2mg/m³ 2mg/m³ 1mg/m³ 10mg/m³
 Engineering Controls: If user's operation generates vapors or mists, use ventilation to keep exposure to airborne contaminants below the exposure limit. Make up air should always be supplied to balance air removed by exhaust ventilation. Ensure eyewash station and safety shower are close to work station.
 Personal Protective Equipment (PPE's):
 Respiratory Protection: None required.
 Hand Protection: Protective gloves for hypersensitive persons.
 Eye Protection: Protective glasses if applied to moving parts.
 Body Protection: Protective Overalls.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Paste	Odor & Appearance:	Light Petroleum & Dark Brown
Odor Threshold:	Not Available	Specific Gravity:	1.10, Typical
Vapor Pressure:	<0.01 kPa	Vapor Density:	Not Available
Boiling Point:	>370°C (698°F)	Freezing Point:	Not Available
pH:	Neutral		
Density:	1.10 g/cm ³		
Coefficient of Water/Oil Distribution:	Not Available		
Evaporation Rate (Butyl Acetate = 1.0):	<0.01		

SECTION 10 - STABILITY AND REACTIVITY

Stability:	Chemically stable under normal conditions. No photoreactive agents.
Conditions to Avoid:	Powerful sources of ignition and extreme temperatures.
Materials to Avoid:	Strong acids and oxidizing agents.
Hazardous Decomposition Products:	May release CO _x , smoke and irritating vapors when heated to decomposition.

SECTION 11 - TOXICOLOGICAL INFORMATION

Effects of Short-Term (Acute) Exposure:	No adverse effects known.
Effects of Long-Term (Chronic) Exposure:	Long term dermal application may produce possible skin irritation. Elevated temperatures or mechanical action may form vapors or fumes. Inhalation of oil mists or vapors may cause irritation of the upper respiratory tract.
Irritancy of Product:	Product is not known to be an irritant.
Skin Sensitization:	Product is not known to produce skin sensitization.
Respiratory Sensitization:	Product is not known to produce respiratory sensitization.
Teratogenicity, Embryotoxicity & Reproductive Toxicity:	Not Available
Mutagenicity:	Product is not a known mutagen.
Carcinogen:	Not classifiable as a human carcinogen IARC: Group 3 ACGIH: A4
Name of Synergistic Products/Effects:	Not Available.

SECTION 12 - ECOLOGICAL INFORMATION

Possible Effects:	May generate oil fractions that could act as a marine pollutant, but is highly unlikely.
Behavior:	Product is non-reactive under ambient conditions. Bioaccumulation potential almost nil.
Environmental Fate:	Highly unlikely to cause widespread contamination. May be toxic to marine and land organisms. Non-toxic to land and marine organisms.

SECTION 13 - DISPOSAL CONSIDERATIONS

Consult federal, provincial and local regulations for disposal of petroleum products.
Do not incinerate.

SECTION 14 - TRANSPORT INFORMATION

TDG (Canada):	The mixture is not specifically listed in the Canadian Transportation of Dangerous Goods regulations. The mixture is not regulated.
Land & Rail:	Not Regulated
Marine:	Regulated
Shipping Name:	Environmentally Hazardous Substance, N.O.S (copper)
UN No.:	UN3077
Packing Group:	III
Classification:	Class 9
Labeling Requirements:	Class 9 and Marine Pollutant Labels
Placard Requirements:	None
Labeling Requirements:	Limited Quantities Label for containment less than LQI of 5L net Contents per containment. Class 9 & Marine Pollutant label if >5L net contents per containment or large containment.
Placard Requirements:	Limited Quantities - Non Required Large Containment - Class 9 & Marine Pollutant

SECTION 15 - REGULATORY INFORMATION

WHMIS:	Not Classified
DSL:	All components listed
CPR Compliance:	This product has been classified in accordance with the hazard criteria of the Controlled Product Regulations and the MSDS contains all of the information required by those regulations.

SECTION 16 - OTHER INFORMATION

CPR - Controlled Product Regulations
DSL - Domestic Substance List

As of issue date, the information contained herein is accurate and reliable to the best of Jet-Lube of Canada Ltd.'s knowledge. Jet-Lube of Canada Ltd. does not warrant or guarantee its accuracy or reliability and shall not be liable for any loss or damage arising out of the use thereof. It is the users' responsibility to satisfy themselves that the information offered for their consideration is suitable for their particular use.

Prepared by: **Jet-Lube of Canada Ltd. - Laboratory**
Last Date of Revision: **November 16, 2012**

MATERIAL SAFETY DATA SHEET FOR LEAD
SECTION I – MATERIAL IDENTIFICATION

Material Name: Lead
Description: Bluish-Grey metal, apparently odorless
Other Designations: Soft lead, Hard Lead, Calcium lead.



Manufacturer:

Mars Metal Company,
4140 Morris Drive,
Burlington, Ontario
L7L 5L6

Emergency Phone Number: (905) 637-3862

SECTION II – HAZARDOUS INGREDIENTS EXPOSURE GUIDELINES

Base Metal: Lead – C.A.S. #7439-9201/Exposure Limits: 1.05 Mg/M3 ACGIH TWA
Alloys: Sb, Sn, As, Cu, Ca – Antimony C.A.S. #7440-36-0/
Exposure Limits: 0.50 Mg/M3 ALGIH TWA

SECTION III – PHYSICAL DATA:

Boiling Point: 3164 degrees Fahrenheit
Melting Point: 622 degrees Fahrenheit
Specific Gravity: (H o = 1) Approximately 10.3
Vapour Pressure: (MM HG) N.A.
Solubility in Water: Negligible

SECTION IV – FIRE AND EXPLOSION DATA

Hazards: Toxic fumes and vapours are produced by molten lead. Dust explosion potential exists.
Extinguishing Media: Dry chemical or carbon dioxide should be used on surrounding area.
Firefighting Procedures: Full body protective clothing should be worn and positive pressure breathing apparatus used.
Flammability: Metal is not flammable, powders or dust may be flammable.

SECTION V – REACTIVITY DATA

Chemical Stability: Metal is stable.
Incompatibility: Strong oxidizers, Hydrogen Peroxide, Active metals.
Hazardous Decomposition Products: High temperature may produce hazardous fumes.

SECTION VI – HEALTH HAZARD DATA AND FIRST AID

Threshold Limit Value: Time weighed average exposure 0.15 MG/M3. Short-term Exposure 0.30 MG/M3.
Routes of Exposure: Ingestion, Inhalation, and Eyes.

EFFECTS OF EXPOSURE:

Acute Overexposure: May cause weakness, vomiting, loss of appetite and Constipation.

Chronic Exposure: May cause weakness, Insomnia, Hypertension, Anemia, Neuromuscular dysfunction's and joint paint.

EMERGENCY AND FIRST AID PROCEDURES:

Ingestion: Rinse mouth, give plenty of water, get medical attention.

Inhalation: Remove from exposure to fresh air, get medical attention.

Eyes: Rinse thoroughly with water, get medical attention.

Skin: Remove contaminated clothing and wash effected area with water and soap.

SECTION VII – SPILL AND LEAK PROCEDURES:

Released or Spilled: Sweep up carefully using water (or other suitable wetting agent) to prevent emissions, place waste in sealable containers which are to be disposed of in accordance with local legislation.

Waste Disposal Method: Contact local authorities for instructions on proper disposal procedures in your area.

SECTION VIII – SPECIAL PROTECTION INFORMATION:

Respiratory: Use respirators as per the regulations respecting Lead.

Eye Protection: Face shield/approved safety glasses.

Hands: Protective gloves should be worn when handling Lead.

Other Protective Equipment: Clean overalls, safety boots, and helmets.

Local Exhaust: Adequate local and general ventilation must be provided.

SECTION IX – SPECIAL PRECAUTIONS:

Handling and Storage: Lead dust should be handled in sealed containers. Every effort should be made to prevent dusts from becoming airborne.

Other Precautions: Use wet methods for dust control whenever possible. Ensure that there is sufficient ventilation in areas of lead use.

January 2013

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LEAD METAL MATERIAL SAFETY DATA SHEET

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product Identity: Lead Metal

Manufacturer:

Teck Metals Ltd.
Trail Operations
Trail, British Columbia
V1R 4L8
Emergency Telephone: 250-364-4214

Supplier:

Teck Metals Ltd.
#1700 – 11 King Street West
Toronto, Ontario
M5H 4C7

MSDS Preparer:

Teck Metals Ltd.
Suite 3300 – 550 Burrard Street
Vancouver, British Columbia
V6C 0B3

Date of Last MSDS Review: February 1, 2013.

Date of Last Edit: February 1, 2013.

Product Use: Used as a construction material for tank linings, piping, and equipment used in the manufacture of sulfuric acid and the refining and processing of petroleum; used in x-ray and atomic radiation shielding; used in the manufacture of tetraethyl lead, paint pigments, organic and inorganic lead compounds, lead shot, lead wire for bullets, ballast, and lead solders; used as a bearing metal or alloy; used in the manufacture of storage batteries, ceramics, plastics, and electronic devices; used in the metallurgy of steel and other metals; and used in the form of lead oxide for batteries.

SECTION 2. COMPOSITION / INFORMATION ON INGREDIENTS

Hazardous Ingredient	Approximate Percent by Weight	CAS Number	Occupational Exposure Limits (OELs)	LD 50 / LC 50 Species and Route
Lead	99+%	7439-92-1	OSHA PEL 0.05 mg/m ³ ACGIH TLV 0.05 mg/m ³ NIOSH REL 0.05 mg/m ³	No Data

NOTE: OELs for individual jurisdictions may differ from OSHA PELs. Check with local authorities for the applicable OELs in your jurisdiction. OSHA - Occupational Safety and Health Administration; ACGIH - American Conference of Governmental Industrial Hygienists; NIOSH - National Institute for Occupational Safety and Health. OEL – Occupational Exposure Limit, PEL – Permissible Exposure Limit, TLV – Threshold Limit Value, REL – Recommended Exposure Limit.

Trade Names and Synonyms: Lead; Pb; Plumbum; Metallic Lead; Inorganic Lead; ASTM B29; TADANAC Lead, Low-Alpha Lead.

SECTION 3. HAZARDS IDENTIFICATION

Emergency Overview: A bluish-white to silvery-grey, heavy, soft metal that does not burn in bulk. Finely-divided lead dust clouds are a moderate fire and explosion hazard, however. When heated strongly in air, highly toxic lead oxide fumes can be generated. Inhalation or ingestion of lead may produce both acute and chronic health effects. Possible cancer and reproductive hazard. SCBA and full protective clothing are required for fire emergency response personnel.

Potential Health Effects: Inhalation or ingestion of lead may result in headache, nausea, vomiting, abdominal spasms, fatigue, sleep disturbances, weight loss, anemia and leg, arm, and joint pain. Prolonged exposure may also cause central nervous system damage, hypertension, gastrointestinal disturbances, anemia, kidney dysfunction and possible reproductive effects. Pregnant women should be protected from excessive exposure in order to prevent lead crossing the placental barrier and causing infant neurological disorders. Lead and inorganic lead compounds are listed as an *A3 Carcinogen (Confirmed Animal Carcinogen with Unknown Relevance to Humans)* by the ACGIH. IARC has listed lead compounds as *Group 2A Carcinogens (Probably Carcinogenic to Humans)* while lead metal is listed as *Group 2B (Possibly Carcinogenic to Humans)*. The NTP has recently listed lead and lead compounds as *Reasonably Anticipated to be a Human Carcinogen*. OSHA and the EU does not currently list lead as a human carcinogen. (See Toxicological Information, Section 11)

Potential Environmental Effects: Lead metal has relatively low bioavailability; however, compounds which it forms with other elements can be toxic to both aquatic and terrestrial organisms at low concentrations. These compounds can be particularly toxic in the aquatic environment. Lead bioaccumulates in plants and animals in both aquatic and terrestrial environments (see Ecological Information, Section 12).

EU Risk Phrase(s): R61 - May cause harm to unborn child; R62 – Risk of impaired fertility; R20/22 - Harmful by inhalation and if swallowed; R33 - Danger of cumulative effects.

SECTION 4. FIRST AID MEASURES

Eye Contact: Do not allow victim to rub eye(s). Let the eye(s) water naturally for a few minutes. If particle/dust does not dislodge, flush with lukewarm, gently flowing water for 5 minutes or until particle/dust is removed, while holding eyelid(s) open. If irritation persists, immediately obtain medical attention. DO NOT attempt to manually remove anything stuck to the eye.

Skin Contact: *Dust:* Remove contaminated clothing, shoes and leather goods (e.g., watchbands, belts). Quickly and gently blot or brush away excess chemical. Wash gently and thoroughly with lukewarm gently flowing water and non-abrasive soap for 5 minutes. If irritation persists, repeat flushing. Obtain medical advice. Completely decontaminate clothing, shoes and leather goods before reuse or else discard. *Molten Metal:* Flush contact area to solidify and cool but do not attempt to remove encrusted material or clothing. Cover burns and seek medical attention immediately.

Inhalation: Remove source of contamination or move victim from exposure area to fresh air. Obtain medical advice. If breathing has stopped, trained personnel should begin artificial respiration. Medical oxygen may be administered by trained personnel, where breathing is difficult. If the heart has stopped, immediately start cardiopulmonary resuscitation (CPR), or automated external defibrillation (AED). If either of the above adverse circumstances occur, quickly transport victim to an emergency care facility.

Ingestion: Never give anything by mouth if victim is rapidly losing consciousness, or is unconscious or convulsing. Have victim rinse mouth thoroughly with water. DO NOT INDUCE VOMITING. Have victim drink 2 – 8 oz. (60 – 240 ml) of water. If vomiting occurs naturally, have victim rinse mouth with water again. Obtain medical advice and bring a copy of this MSDS.

SECTION 5. FIRE FIGHTING MEASURES

Fire and Explosion Hazards: Massive metal is not flammable or combustible. Finely-divided lead dust or powder is a moderate fire hazard and moderate explosion hazard when dispersed in the air at high concentrations and exposed to heat, flame, or other ignition sources. Explosions may also occur upon contact with certain incompatible materials (see Stability and Reactivity, Section 10).

Extinguishing Media: Use any means of extinction appropriate for surrounding fire conditions such as water spray, carbon dioxide, dry chemical, or foam.

Fire Fighting: Do not use direct water streams on fires where molten metal is present, due to the risk of a steam explosion that could potentially eject molten metal uncontrollably. Use a fine water mist on the front-running edge of the spill and on the top of the molten metal to cool and solidify it. If possible, move solid material from fire area or cool material exposed to flame. Highly toxic lead oxide fumes may evolve in fires. Fire fighters must be fully trained and wear full protective clothing including an approved, self-contained breathing apparatus which supplies a positive air pressure within a full face-piece mask.

Flashpoint and Method: Not Applicable.

Upper and Lower Flammable Limit: Not Applicable.

Autoignition Temperature: Not Applicable.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Procedures for Cleanup: Control source of spillage if possible to do so safely. Restrict access to the area until completion of clean-up. Clean up spilled material immediately, observing precautions outlined below. Molten metal should be allowed to solidify before cleanup. If solid metal, wear gloves, pick up and return to process. If dust, wear recommended personal protective equipment (see below) and use methods which will minimize dust generation (e.g., vacuum solids). Return uncontaminated spilled material to the process if possible. Place contaminated material in suitable labelled containers for later recovery or disposal. Treat or dispose of waste material in accordance with all local, regional, and national requirements.

Personal Precautions: Persons responding to an accidental release should wear protective clothing, gloves and a respirator (see also Section 8). Close-fitting safety goggles may be necessary in some circumstances to prevent eye contact with dust

and fume. Where molten metal is involved, wear heat-resistant gloves and suitable clothing for protection from hot-metal splash as well as a respirator to protect against inhalation of lead fume. Workers should wash and change clothing following cleanup of a lead spill to prevent personal contamination with lead dust.

Environmental Precautions: Lead metal has low bioavailability; however, compounds which it forms with other elements can be toxic to aquatic and terrestrial organisms. Releases of the product to water and soil should be prevented.

SECTION 7. HANDLING AND STORAGE

Store in a DRY, covered area, separate from strong acids, other incompatible materials, active metals and food or feedstuffs. Solid metal suspected of containing moisture should be THOROUGHLY DRIED before being added to a molten bath. Otherwise, entrained moisture could expand explosively and spatter molten metal out of the bath. Always practice good personal hygiene. Refrain from eating, drinking, or smoking in work areas. Thoroughly wash hands before eating, drinking, or smoking in appropriate, designated areas as well as at the end of the workday. No special packaging materials are required.

EU Safety Phrase(s): S53 - Avoid exposure - obtain special instructions before use; S45 – In case of accident, or if you feel unwell, seek medical advice immediately (show label where possible).

SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Protective Clothing: Gloves and coveralls or other work clothing are recommended to prevent prolonged or repeated direct skin contact when lead is processed. Appropriate eye protection should be worn where fume or dust is generated. Where hot or molten metal is handled, heat resistant gloves, goggles or face shield, and clothing to protect from radiant heat and hot metal splash should be worn. Safety type boots are recommended.

Do not eat, drink or smoke in work areas. Thoroughly wash hands before eating, drinking, or smoking in appropriate, designated areas as well as at the end of the workday. A double locker-shower system with separate clean and dirty sides is usually required for lead handling operations to avoid cross-contamination of street clothes. Contaminated clothing should be changed frequently and laundered before each reuse. Inform laundry personnel of contaminants' hazards. Workers should not take dirty work clothes home and launder them with other personal clothing.

Ventilation: Use adequate local or general ventilation to maintain the concentration of lead fumes in the working environment well below recommended occupational exposure limits. Supply sufficient replacement air to make up for air removed by the exhaust system. Local exhaust is recommended for melting, casting, welding, grinding, flame cutting or burning, and use of lead powders.

Respirators: Where lead dust or fumes are generated and cannot be controlled to within acceptable levels by engineering means, use appropriate NIOSH-approved respiratory protection equipment (a 42CFR84 Class N, R or P-100 particulate filter cartridge). When exposure levels are obviously high but the actual concentration is unknown, a self-contained breathing apparatus which supplies a positive air pressure within a full face-piece mask should be worn.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Malleable, bluish-white to silvery-grey metal	Odour: None	Physical State: Solid	pH: Not Applicable
Vapour Pressure: 1.3 mm Hg at 970°C (negligible @ 20°C)	Vapour Density: Not Applicable	Boiling Point/Range: 1,740°C	Melting Point/Range: 328°C
Specific Gravity: 11.34	Evaporation Rate: Not Applicable	Coefficient of Water/Oil Distribution: Not Applicable	Odour Threshold: None
Solubility: Insoluble in water			

SECTION 10. STABILITY AND REACTIVITY

Stability & Reactivity: Massive metal is stable and not considered reactive under normal temperatures and pressures. Hazardous polymerization or runaway reactions will not occur. Freshly cut or cast lead surfaces tarnish rapidly due to the formation of an insoluble protective layer of basic lead carbonate.

Incompatibilities: Lead reacts vigorously with strong acids (e.g. hot concentrated nitric acid, boiling concentrated hydrochloric acid, etc.), strong oxidizers such as peroxides, chlorates, nitrates and halogen or interhalogen compounds such as chlorine trifluoride. Powdered lead metal in contact with disodium acetylde, chlorine trifluoride, sodium carbide or fused ammonium nitrate poses a risk of explosion. Solutions of sodium azide in contact with lead metal can form lead azide, which is a detonating compound. Vigorous reactions can also occur between molten lead and active metals, such as sodium, potassium, lithium and calcium. A lead-zirconium alloy (10-70% Zr) will ignite when struck with a hammer.

Hazardous Decomposition Products: High temperature operations such as oxy-acetylene cutting or burning, electric arc welding or overheating a molten bath will generate highly toxic lead oxide fume. Lead oxide is highly soluble in body fluids and the particle size of the metal fumes is largely within the respirable size range, which increases the likelihood of inhalation and deposition of the fume within the body.

SECTION 11. TOXICOLOGICAL INFORMATION

General: Lead accumulates in bone and body organs once it enters the body. Elimination from the body is slow. Initial and periodic medical examinations are advised for persons repeatedly exposed to levels above the exposure limits of lead dust or fumes. Once lead enters the body, it can affect a variety of organ systems, including the nervous system, kidneys, reproductive system, blood formation, and gastrointestinal system. The primary routes of exposure to lead are inhalation or ingestion of dust and fumes.

Acute:

Skin/Eye: Contact with dust or fume may cause local irritation but would not cause tissue damage.

Inhalation: Exposure to lead dust or fume may cause headache, nausea, vomiting, abdominal spasms, fatigue, sleep disturbances, weight loss, anemia, and pain in legs, arms, and joints. An intense, short-term exposure to lead could cause acute encephalopathy with seizures, coma, and death. However, short-term exposures of this magnitude are unlikely in industry today. Kidney damage, as well as anemia, can occur from acute exposure.

Ingestion: Symptoms due to ingestion of lead dust or fume would be similar to those from inhalation. Other health effects such as metallic taste in the mouth and constipation or bloody diarrhea might also occur.

Chronic:

Prolonged exposure to lead dust and fume may produce many of the symptoms of short-term exposure and may also cause central nervous system damage, gastrointestinal disturbances, anemia, and, rarely, wrist drop. Reduced hemoglobin production has been associated with low lead exposures. Symptoms of central nervous system damage due to moderate lead exposure include fatigue, headaches, tremors and hypertension. Very high lead exposure can result in lead encephalopathy with symptoms of hallucinations, convulsions, and delirium. Kidney dysfunction and possible injury has also been associated with chronic lead poisoning. Chronic over-exposure to lead has been implicated as a causative agent for the impairment of male and female reproductive capacity. Pregnant women should be protected from excessive exposure as lead can cross the placental barrier and unborn children may suffer neurological damage or developmental problems due to excessive lead exposure. Teratogenic and mutagenic effects from exposure to lead have been reported in some studies but not in others. The literature is inconsistent and no firm conclusions can be drawn at this time. Lead and lead compounds are listed as an *A3 Carcinogen (Confirmed Animal Carcinogen with Unknown Relevance to Humans)* by the ACGIH. IARC has listed lead compounds as *Group 2A Carcinogens (Probably Carcinogenic to Humans)* while lead metal is listed as *Group 2B (Possibly Carcinogenic to Humans)*. The NTP has recently listed lead and lead compounds as *Reasonably Anticipated to be a Human Carcinogen*. OSHA and the EU do not currently list lead as a human carcinogen.

SECTION 12. ECOLOGICAL INFORMATION

While lead metal is relatively insoluble, its processing or extended exposure in aquatic and terrestrial environments may lead to the release of lead compounds in more bioavailable forms. While lead compounds are not particularly mobile in the aquatic environment, they can be toxic to aquatic organisms, especially fish, at low concentrations. Water hardness, pH and dissolved organic carbon content are three major factors which regulate the degree of lead toxicity. Lead in soil is generally neither very mobile nor bioavailable, as it can become strongly sorbed onto soil particles, increasingly so over time, to a degree related to physical properties of the soil. Lead bioaccumulates in plants and animals in both aquatic and terrestrial environments.

SECTION 13. DISPOSAL CONSIDERATIONS

If material cannot be returned to process or salvage, dispose of in accordance with applicable regulations.

SECTION 14. TRANSPORT INFORMATION

PROPER SHIPPING NAME Not a regulated product in ingot form.

TRANSPORT CANADA AND U.S. DOT CLASSIFICATION Not Applicable
TRANSPORT CANADA AND U.S. DOT PIN..... Not Applicable
MARINE POLLUTANT..... No
IMO CLASSIFICATION..... Not Regulated

SECTION 15. REGULATORY INFORMATION

U.S.

Ingredient Listed on TSCA Inventory Yes
Hazardous Under Hazard Communication Standard..... Yes
CERCLA Section 103 Hazardous Substances Lead RQ: 10 lbs. (4.54 kg.)*
*reporting not required when diameter of the pieces of solid metal released is equal to or exceeds 100 micrometers (0.004 inches).
EPCRA Section 302 Extremely Hazardous Substance No
EPCRA Section 311/312 Hazard Categories..... Delayed (chronic) health hazard - Carcinogen
Delayed (chronic) health hazard – Reproductive toxin
EPCRA Section 313 Toxic Release Inventory Lead CAS No. 7439-92-1
Percent by Weight - At least 99%

CANADIAN:

Ingredient Listed on Domestic Substances List Yes
WHMIS CLASSIFICATION..... D2A, Materials Causing Other Toxic Effects – Very
Toxic

EUROPEAN UNION:

Ingredients Listed on the European Inventory
of Existing Commercial Chemical Substances (EINECS)..... Yes
EU Classification..... Toxic; Repr. Cat. 1 – Reproductive Toxin
(Developmental Toxin); Repr. Cat. 3 – Reproductive
Toxin (Fertility)

SECTION 16. OTHER INFORMATION

The information in this Material Safety Data Sheet is based on the following references:

- American Conference of Governmental Industrial Hygienists, 2004, Documentation of the Threshold Limit Values and Biological Exposure Indices, Seventh Edition plus updates.
- American Conference of Governmental Industrial Hygienists, 2012, Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices.
- American Conference of Governmental Industrial Hygienists, Guide to Occupational Exposure Values – 2012.
- Bretherick's Handbook of Reactive Chemical Hazards, 20th Anniversary Edition. (P. G. Urban, Ed), 1995.
- Canadian Centre for Occupational Health and Safety, Hamilton, ON, CHEMINFO Record No. 608 - Lead (Rev. 2009-05).
- European Economic Community, Commission Directives 91/155/EEC and 67/548/EEC.
- Industry Canada, SOR/88-66, Controlled Products Regulations, as amended.
- International Agency for Research on Cancer (IARC), Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, 1972 – present, (multi-volume work), World Health Organization, Geneva.
- International Chemical Safety Cards (WHO/IPCS/ILO), ICSC:0052 - Lead.
- Merck & Co., Inc., 2001, The Merck Index, An Encyclopedia of Chemicals, Drugs, and Biologicals, Thirteenth Edition.
- National Library of Medicine, National Toxicology Information Program, Hazardous Substance Data Bank (online version).
- Patty's Toxicology, Fifth Edition, 2001: E. Bingham, B. Cohrssen & C.H. Powell, Ed.
- U.S. Dept. of Health and Human Services, National Institute of Environmental Health Sciences, National Toxicology Program (NTP), 12th Report on Carcinogens, June 2011.
- U.S. Dept. of Health and Human Services, National Institute for Occupational Safety and Health, NIOSH Pocket Guide to Chemical Hazards, on-line edition.
- U.S. Dept. of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry, Toxicological Profile for Lead, September 2005.
- U.S. Occupational Safety and Health Administration, 1989, Code of Federal Regulations, Title 29, Part 1910.

Notice to Reader

Although reasonable precautions have been taken in the preparation of the data contained herein, it is offered solely for your information, consideration and investigation. Teck Metals Ltd. extends no warranty and assumes no responsibility for the accuracy of the content and expressly disclaims all liability for reliance thereon. This material safety data sheet provides guidelines for the safe handling and processing of this product; it does not and cannot advise on all possible situations. Therefore, your specific use of this product should be evaluated to determine if additional precautions are required. Individuals exposed to this product should read and understand this information and be provided pertinent training prior to working with this product.



**TW100AFAS
MATERIAL SAFETY DATA SHEET**

COMPANY IDENTITY: Magic Safety Products
PRODUCT IDENTITY: MAGIC PURE SIGHT LENS CLEANING ANTI-STAT,
ANTI-FOG FLUID

DATE: 11/14/11
PAGE: 1 OF 7

PRODUCT NUMBERS: TW100B (TW100AFAS)
MANUFACTURED FOR: CONDOR, EDMONTON, AB T5M 3Z2

SAFETY DATA SHEET

This Safety Data Sheet conforms to ANSI Z400.5, and to the format requirements and the International Chemical Safety Cards of the Global Harmonizing System. THIS SDS COMPLIES WITH 29 CFR 1910.1200 (HAZARD COMMUNICATION STANDARD) IMPORTANT: Read this SDS before handling & disposing of this product. Pass this information on to employees, customers, & users of this product.

SECTION 1. IDENTIFICATION OF THE SUBSTANCE OR MIXTURE AND OF THE SUPPLIER

PRODUCT IDENTITY: MAGIC PURE SIGHT LENS CLEANING ANTI-STAT,
ANTI-FOG FLUID
NEW MSDS DATE: 11/14/2011
COMPANY IDENTITY: Magic Safety Products
COMPANY ADDRESS: 4301 B New Brunswick Ave.
COMPANY CITY: South Plainfield, NJ 07080
COMPANY PHONE: 1-732-968-0008
EMERGENCY PHONES: CHEMTREC: 1-800-424-9300 (USA)
CANUTEC: 1-613-996-6666 (CANADA)

SECTION 2. HAZARDS IDENTIFICATION

DANGER!!

RISK STATEMENTS:

R36/37/38 Irritating to eyes, respiratory system and skin.
R11 Highly Flammable.
R41 Risk of serious damage to eyes.
R67 Vapors may cause drowsiness and dizziness.

SAFETY STATEMENTS:

S24/25 Avoid contact with skin and eyes.
S7 Keep container tightly closed.
S16 Keep away from sources of ignition. No smoking.
S26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

SEE SECTION 11 FOR OTHER TOXICOLOGICAL INFORMATION (ACUTE & CHRONIC HAZARDS)

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

MATERIAL	CAS#	EINECS#	WT%	TWA (OSHA)	TLV (ACGIH)
Water	7732-18-5	231-791-2	75-85	None Known	None Known
Isopropanol	67-63-0	200-661-7	5-15	400 ppm	200 ppm A4
Nonvolatile		-	0- 5	None Known	None Known
Propylene Glycol					
n-Butyl Ether	5131-66-8	225-878-4	0- 5	None Known	50 ppm



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ANTI-FOG FLUID

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SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS (CONTINUED)

MATERIAL	CAS#	EINECS#	CEILING	STEL(OSHA/ACGIH)	HAP
Isopropanol	67-63-0	200-661-7	None Known	400 ppm	No

This product contains no EPA Hazardous Air Pollutants (HAP) in amounts > 0.1%.

SECTION 4. FIRST AID MEASURES

EYE CONTACT:

For eyes, flush with plenty of water for 15 minutes & get medical attention.

SKIN CONTACT:

In case of contact with skin immediately remove contaminated clothing.
Wash thoroughly with soap & water. Wash contaminated clothing before reuse.

INHALATION:

After high vapor exposure, remove to fresh air. If breathing is difficult, give oxygen. If breathing has stopped, trained personnel should immediately begin artificial respiration. If the heart has stopped, trained personnel should immediately begin cardiopulmonary resuscitation (CPR).

SWALLOWING:

Rinse mouth. Do NOT induce vomiting. GET MEDICAL ATTENTION IMMEDIATELY.
Do NOT give liquids to an unconscious or convulsing person.

SECTION 5. FIRE FIGHTING MEASURES

FIRE & EXPLOSION PREVENTIVE MEASURES

NO open flames, NO sparks, & NO smoking. Above flash point, use a closed system, ventilation, explosion-proof electrical equipment, lighting.

EXTINGUISHING MEDIA

Use dry powder, alcohol-resistant foam, water in large amounts, carbon dioxide.

SPECIAL FIRE FIGHTING PROCEDURES

Water spray may be ineffective on fire but can protect fire-fighters & cool closed containers. Use fog nozzles if water is used.
Do not enter confined fire-space without full bunker gear.
(Helmet with face shield, bunker coats, gloves & rubber boots).
Use NIOSH approved positive-pressure self-contained breathing apparatus.

UNUSUAL EXPLOSION AND FIRE PROCEDURES

HIGHLY FLAMMABLE!! VAPORS CAN CAUSE FLASH FIRE
Isolate from oxidizers, heat, sparks, electric equipment & open flame.
Closed containers may explode if exposed to extreme heat.
Applying to hot surfaces requires special precautions.
Empty container very hazardous! Continue all label precautions!



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SECTION 6. ACCIDENTAL RELEASE MEASURES

PERSONAL PROTECTIVE MEASURES:

Vapors may ignite explosively & spread long distances. Prevent vapor buildup.
Keep unprotected personnel away. Remove all ignition sources.
Filter respirator for organic vapors.

ENVIRONMENTAL PRECAUTIONS:

Keep from entering storm sewers and ditches which lead to waterways.

CONTAINMENT AND CLEAN-UP MEASURES:

Stop spill at source. Dike and contain. Collect leaking liquid in sealable containers.
Absorb remaining liquid in sand or inert absorbent. Remove to safe place.

SECTION 7. HANDLING AND STORAGE

HANDLING

Isolate from oxidizers, heat, sparks, electric equipment & open flame.
Use only with adequate ventilation. Avoid breathing of vapor or spray mist.
Do not get in eyes, on skin or clothing.
Wear OSHA Standard goggles or face shield. Consult Safety Equipment Supplier. Wear gloves, apron & footwear impervious to this material. Wash clothing before reuse.
Avoid free fall of liquid. Ground containers when transferring. Do not flame cut, saw, drill, braze, or weld. Empty container very hazardous! Continue all label precautions!
To minimize static discharge when transferring, ensure electrical continuity by bonding and grounding all equipment. Use an inlet line diameter of at least 3.5 inches (8.9 centimeters) with a maximum flow rate of 1 meter/second.

STORAGE

Keep in fireproof surroundings. Keep separated from strong oxidants. Keep cool.
Do not store above 49 C/120 F. Keep container tightly closed & upright when not in use to prevent leakage.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

RESPIRATORY EXPOSURE CONTROLS

A respiratory protection program that meets OSHA 29 CFR 1910.134 and ANSI Z86.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant a respirator's use.

VENTILATION

LOCAL EXHAUST:	Necessary	MECHANICAL (GENERAL):	Acceptable
SPECIAL:	None	OTHER:	None

Please refer to ACGIH document, "Industrial Ventilation, A Manual of Recommended Practices", most recent edition, for details.

PERSONAL PROTECTIONS:

Wear OSHA Standard goggles or face shield. Consult Safety Equipment Supplier. Wear gloves, apron & footwear impervious to this material. Wash clothing before reuse.



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ANTI-FOG FLUID

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SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION (CONTINUED)

WORK & HYGIENIC PRACTICES:

Provide readily accessible eye wash stations & safety showers.
Wash at end of each workshift & before eating, smoking or using the toilet.
Promptly remove clothing that becomes contaminated. Destroy contaminated
leather articles. Launder or discard contaminated clothing.

SECTION 9. PHYSICAL & CHEMICAL PROPERTIES

APPEARANCE:	Liquid, Water-White
ODOR:	Alcohol
ODOR THRESHOLD:	Not Available
pH (Neutrality):	Not Applicable
MELTING POINT/FREEZING POINT:	Not Available
BOILING RANGE (IBP, 50%, Dry Point):	80 97 171°C/177 208 340°F(*=End Point)
FLASH POINT (TEST METHOD):	39 C / 102 F (TCC) (Lowest Component)
EVAPORATION RATE (n-BUTYL ACETATE=1):	Not Applicable
FLAMMABILITY CLASSIFICATION:	Class I B
LOWER FLAMMABLE LIMIT IN AIR (% by vol):	1.2 (Lowest Component)
UPPER FLAMMABLE LIMIT IN AIR (% by vol):	Not Available
VAPOR PRESSURE (mm of Hg)@20 C	18.1
VAPOR DENSITY (air=1):	0.750
GRAVITY @ 68/68 F / 20/20 C:	
SPECIFIC GRAVITY (Water=1):	0.965
POUNDS/GALLON:	8.037
WATER SOLUBILITY:	Appreciable
PARTITION COEFFICIENT (n-Octane/Water):	Not Available
AUTO IGNITION TEMPERATURE:	398 C / 750 F
DECOMPOSITION TEMPERATURE:	Not Available
REFRACTIVE INDEX:	1.339
VOC'S (>0.44 Lbs/Sq In) :	12.0 Vol% / 115.6 g/L / 0.9 Lbs/Gal
TOTAL VOC'S (TVOC):	18.0 Vol% / 144.5 g/L / 1.2 Lbs/Gal
NONEXEMPT VOC'S (CVOC):	18.0 Vol% / 144.5 g/L / 1.2 Lbs/Gal
HAZARDOUS AIR POLLUTANTS (HAPS):	0.0 Wt% / 0.0 g/L / 0.000 Lbs/Gal
NONEXEMPT VOC PARTIAL PRESSURE (mm of Hg @ 20 C)	1.4

SECTION 10. STABILITY & REACTIVITY

STABILITY

Stable under normal conditions.

CONDITIONS TO AVOID

Isolate from oxidizers, heat, sparks, electric equipment & open flame.

MATERIALS TO AVOID

Reacts with strong oxidants, causing fire & explosion hazard. Attacks

HAZARDOUS DECOMPOSITION PRODUCTS

Carbon Monoxide, Carbon Dioxide from burning.

HAZARDOUS POLYMERIZATION

Will not occur.



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SECTION 11. TOXICOLOGICAL INFORMATION

ACUTE HAZARDS

EYE & SKIN CONTACT:

Primary irritation to skin, defatting, dermatitis.
Absorption thru skin increases exposure.
Primary irritation to eyes, redness, tearing, blurred vision.
Liquid can cause eye irritation. Wash thoroughly after handling.

INHALATION:

Anesthetic. Irritates respiratory tract. Acute overexposure
can cause serious nervous system depression. Vapor harmful.
Breathing vapor can cause irritation.
Acute overexposure can cause harm to kidneys, blood, nerves, liver, lungs.

SWALLOWING:

Swallowing can cause abdominal irritation, nausea, vomiting & diarrhea.

SUBCHRONIC HAZARDS/CONDITIONS AGGRAVATED

CONDITIONS AGGRAVATED

Chronic overexposure can cause harm to kidneys, blood, nerves, liver, lungs.
Persons with severe skin, liver or kidney problems should avoid use.

CHRONIC HAZARDS

CANCER, REPRODUCTIVE & OTHER CHRONIC HAZARDS:

This product has no carcinogens listed by IARC, NTP, NIOSH,
OSHA or ACGIH, as of this date, greater or equal to 0.1%.

MAMMALIAN TOXICITY INFORMATION

MATERIAL	CAS#	EINECS#	LOWEST KNOWN LETHAL DOSE DATA
Isopropanol	67-63-0	200-661-7	LOWEST KNOWN LD50 (ORAL) 5840.0 mg/kg(Rats)
Isopropanol	67-63-0	200-661-7	LOWEST KNOWN LC50 (VAPORS) 1600 ppm (Rats)
Isopropanol	67-63-0	200-661-7	LOWEST KNOWN LD50 (SKIN) 16400.0 mg/kg (Rabbits)



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ANTI-FOG FLUID

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SECTION 12. ECOLOGICAL INFORMATION

AQUATIC ANIMAL INFORMATION:

The most sensitive known aquatic group to any component of this product is:
Chub 1000 ppm or mg/L (24 hour exposure).
Keep out of sewers and natural water supplies.

MOBILITY IN SOIL

This material is a mobile liquid.

DEGRADABILITY

This product is completely biodegradable.

ACCUMULATION

Bioaccumulation of this product has not been determined.

SECTION 13. DISPOSAL CONSIDERATIONS

Processing, use or contamination may change the waste management options.
Recycle / dispose of observing national, regional, state, provincial and local
health, safety & pollution laws. If in doubt, contact appropriate agencies.

SECTION 14. TRANSPORT INFORMATION

DOT SHIPPING NAME: UN1993, Flammable Liquids, n.o.s.
(Contains: Isopropyl Alcohol, Glycol Ether PnB), 3, PG-II
DRUM LABEL: (FLAMMABLE LIQUID)
IATA / ICAO: UN1993, Flammable Liquids, n.o.s.
(Contains: Isopropyl Alcohol, Glycol Ether PnB), 3, PG-II
IMO / IMDG: UN1993, Flammable Liquids, n.o.s.
(Contains: Isopropyl Alcohol, Glycol Ether PnB), 3, PG-II
EMERGENCY RESPONSE GUIDEBOOK NUMBER: 128

SECTION 15. REGULATORY INFORMATION

EPA REGULATION:

SARA SECTION 311/312 HAZARDS: Acute Health, Fire

All components of this product are on the TSCA list.
This material contains no known products restricted under SARA Title III,
Section 313 in amounts greater or equal to 1%.



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ANTI-FOG FLUID

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SECTION 15. REGULATORY INFORMATION (CONTINUED)

INTERNATIONAL REGULATIONS

The components of this product are listed on the chemical inventories of the following countries:
Australia, Canada, China, Europe (EINECS), Japan, Korea, United Kingdom.

CANADA: WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS)

B2: Flammable Liquid.
D2B: Irritating to skin / eyes.

SECTION 16. OTHER INFORMATION

HAZARD RATINGS:

HEALTH (NFPA): 0, HEALTH (HMIS): 0, FLAMMABILITY: 2, REACTIVITY: 0
(Personal Protection Rating to be supplied by user based on use conditions.)
This information is intended solely for the use of individuals trained in the NFPA & HMIS hazard rating systems.

EMPLOYEE TRAINING

See Section 2 for Risk & Safety Statements. Employees should be made aware of all hazards of this material (as stated in this SDS) before handling it.

NOTICE

The supplier disclaims all expressed or implied warranties of merchantability or fitness for a specific use, with respect to the product or the information provided herein, except for conformation to contracted specifications. All information appearing herein is based upon data obtained from manufacturers and/or recognized technical sources. While the information is believed to be accurate, we make no representations as to its accuracy or sufficiency. Conditions of use are beyond our control, and therefore users are responsible for verifying the data under their own operating conditions to determine whether the product is suitable for their particular purposes and they assume all risks of their handling, and disposal of the product. Users also assume all risks in regards to the publication or use of, or reliance upon information contained herein. This information relates only to the product designated herein, and does not relate to its use in combination with any other material or process.

Unless updated, the Safety Data Sheet is valid until 11/14/2014.

Material Name: **Low Sulphur Diesel-S15**

MSDS ID: NOVA-0034

Section 1 - Product and Company Identification**Synonyms:** Ultra-low sulphur diesel, diesel oil, fuel distillate, hydrodesulphurized kerosene**Chemical Name:** Kerosine, petroleum, hydrodesulfurized**Chemical Family:** Kerosene**Material Use:** Fuel for on- and off-road diesel engines; also fuel for home heating and marine industry**Chemical Formula:** Not available; complex mixtureNOVA Chemicals
P.O. Box 2518, Station M
Calgary, Alberta, Canada T2P 5C6**EMERGENCY Telephone Numbers:**

1-800-561-6682, 1-403-314-8767 (NOVA Chemicals) (24 hours)

1-800-424-9300 (CHEMTREC-USA) (24 hours)

1-613-996-6666 (Canutec-Canada) (24 hours)

Product Information: 1-412-490-4063**MSDS Information Email:** msdsemail@novachem.com**General Comments**

This product has been assigned a CAS # of 64742-81-0.

Section 2 - Hazards Identification**HMIS Ratings:** Health: 1 Fire: 2 Physical Hazard: 0 Personal Protection: chemical goggles, gloves, respirator, coveralls*Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe * = Chronic hazard***NFPA Ratings:** Health: 1 Fire: 2 Reactivity: 0*Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe***Emergency Overview**

WARNING! COMBUSTIBLE. Product is an amber oily liquid with a kerosene-like odour. This product burns readily when heated to high temperatures, giving off combustible and toxic vapours. This product is harmful and possibly fatal if swallowed. Small amounts of this product, if aspirated into the lungs, may cause mild to severe injury. This product is irritating to the eyes and skin. Ingestion or excessive inhalation of this product may result in headache, sleepiness, dizziness, nausea, loss of coordination, and in extreme conditions coma and possibly death. Contains trace components that may cause cancer. Avoid contact. Pre-existing medical conditions may be aggravated by exposure. Prevent entry into drains, ditches, sewers, and waterways.

Potential Health Effects: Eyes

This product is irritating to the eyes. Pre-existing medical conditions may be aggravated by exposure.

Potential Health Effects: Skin

Prolonged and/or repeated skin contact with this product may cause irritation, blistering and severe dermatitis. Product may be absorbed through intact skin. Prolonged or repeated contact with this product may cause allergic-like skin reactions and over time may possibly cause skin cancer. Pre-existing medical conditions may be aggravated by exposure.

Potential Health Effects: Ingestion

This product is harmful or fatal if swallowed. Ingestion may cause gastrointestinal irritation, nausea, vomiting, diarrhoea, and cramping. May also cause central nervous system effects including headache, sleepiness, dizziness, nausea, loss of coordination, and in extreme conditions coma and possibly death. Ingestion may cause kidney and liver damage and blood disorders. Small amounts of this product, if aspirated into the lungs, may cause mild to severe pulmonary injury.

Potential Health Effects: Inhalation

This product may be harmful by inhalation. Pre-existing medical conditions may be aggravated by exposure. Excessive inhalation of this product may result in heartbeat irregularities and central nervous system effects including headache, sleepiness, dizziness, nausea, loss of coordination, and in extreme conditions respiratory failure, coma and possibly death. Small amounts of this product, if aspirated into the lungs, may cause mild to severe pulmonary injury.

Material Safety Data Sheet

Material Name: **Low Sulphur Diesel-S15**

MSDS ID: NOVA-0034

Section 3 - Composition/Information on Ingredients

CAS #	Component	Percent by Wt.
64742-81-0	Kerosine, petroleum, hydrodesulfurized	≥99.5
7704-34-9	Sulphur	0-0.0015

Additional Information

This product is a complex mixture of aliphatic, olefinic, naphthenic and aromatic hydrocarbons having a variable boiling range of 161°C to 355°C (322°F to 671°F).

This product may or may not contain dye. Dye is added prior to sale to indicate product is for use in off-road applications only.

This product is hazardous under 29 CFR 1910.1200 (Hazard Communication).

This material is a controlled product under Canadian WHMIS regulations.

This material is transported within North America as a hazardous material / dangerous goods.

See Section 8 for applicable exposure limits. See Section 11 for applicable toxicity data.

Section 4 - First Aid Measures

First Aid: Eyes

Remove contact lenses, if it can be done safely. Immediately flush eyes with water for at least 15 minutes, while holding eyelids open. Seek medical attention if symptoms develop or persist.

First Aid: Skin

Remove contaminated clothing and shoes. Wash immediately with soap and water for at least 15 minutes. Seek medical attention if symptoms develop or persist. Completely decontaminate clothing, shoes and other protective equipment before reuse or discard.

First Aid: Inhalation

Move affected individual to non-contaminated air. Loosen tight clothing such as a collar, tie, belt or waistband to facilitate breathing. Seek immediate medical attention if the individual is not breathing, unconscious or if any other symptoms persist. **WARNING:** Contact through mouth-to-mouth resuscitation may pose a secondary risk to the rescuer. Avoid mouth-to-mouth contact by using a mouth shield or guard to perform artificial respiration.

First Aid: Ingestion

DO NOT INDUCE VOMITING. Loosen tight clothing such as a collar, tie, belt or waistband. Seek immediate medical attention. Small amounts which accidentally enter the mouth should be rinsed out until taste is gone.

First Aid: Notes to Physician

For more detailed medical emergency support information call 1-800-561-6682 or 1-403-314-8767 (24 hours, NOVA Chemicals Emergency Response). Ensure thorough eye and skin decontamination. Treat unconsciousness, nausea, hypotension, seizures and cardiac arrhythmias in the conventional manner. Aspiration of this material during induced emesis can result in lung injury. If evacuation of stomach contents is considered necessary, use the method least likely to cause aspiration, such as gastric lavage after protecting the airway. Observe hospitalized patients for delayed chemical pneumonia, acute tubular necrosis, encephalopathy and dysrhythmias. Monitor for urinary phenol within 72 hours of acute exposure.

Section 5 - Fire Fighting Measures

See Section 9: Physical Properties for flammability limits, flash point and auto-ignition information.

General Fire Hazards

Fire and container explosion hazards are serious when this product is exposed to heat, flame or oxidizing materials. Empty containers when heated may pose a fire risk. Vapours are heavier than air and may travel along the ground to some distant source of ignition and flash back. Consider need for immediate emergency isolation and evacuation.

Explosion Hazards

Vapours may form explosive mixture with air. Keep containers away from source of heat, fire or oxidizing materials. Containers may explode if exposed to heat.

Hazardous Combustion Products

Upon combustion, this material emits carbon monoxide, carbon dioxide, low molecular weight hydrocarbons, acidic gases, nitrogen oxides, sulphur oxides, and other toxic contaminants.

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Extinguishing Media

Dry chemical, foam, carbon dioxide, and water spray or fog. Use water to cool fire-exposed containers and to protect personnel. Water spray may be an ineffective extinguishing medium and may actually spread flames. Monitor water run-off for flammability, and prevent from entering sewers, drains, ditches or other confined or underground spaces.

Fire Fighting Equipment/Instructions

Reference 2012 Emergency Response Guidebook, Guide No. 128 for additional details and instructions. Position upwind. Keep unnecessary personnel away. Move containers from fire area if you can do so without risk. Fight fire from maximum distance or use unmanned holders or monitor nozzles. Immediately withdraw in case of fire and tank venting or heat discoloration of a tank. Fire fighters should wear full-face, self-contained breathing apparatus and thermal protective clothing. Avoid inhaling any smoke and combustion materials. Remove and clean or destroy any contaminated clothing. Cool containers with water until well after the fire is out. Control runoff waters to prevent entry into sewers, drains, ditches, underground or confined spaces and waterways.

Section 6 - Accidental Release Measures

Evacuation Procedures

Isolate area. Keep unnecessary personnel away. Alert stand-by emergency and fire fighting personnel. Monitor surrounding area for buildup of flammable concentrations in air.

Small Spills

Spill or leak area should be isolated immediately for at least 50 metres (164 feet) in all directions. Eliminate ignition sources. Keep upwind and out of low areas. Stop discharge if safe to do so. Contain discharge by booming on water or diking on ground. Remove liquid material with non-sparking approved pumps, skimmers or vacuum equipment. Absorb with DRY earth, sand or other non-combustible material and clean up with non-sparking tools. Prevent entry into sewers, drains, ditches, underground or confined spaces, water intakes and waterways. Shovel material with non-sparking tools into appropriate container for disposal.

Large Spills

Consider downwind evacuation for 300 metres (984 feet). Eliminate ignition sources. Keep upwind and out of low areas. Stop discharge if safe to do so. Contain discharge by booming on water or diking on ground. Remove liquid material with approved non-sparking pumps, skimmers or vacuum equipment. Absorb with DRY earth, sand or other non-combustible material. Soil remediation may be required. Prevent entry into sewers, drains, ditches, underground or confined spaces, water intakes and waterways.

Special Procedures

Contact local police/emergency services and appropriate emergency telephone numbers provided in Section 1. Ensure that statutory and regulatory reporting requirements in the applicable jurisdiction are met. Wear appropriate protective equipment and clothing during cleanup. Individuals without appropriate protective equipment should be excluded from area of spill until cleanup has been completed.

See Section 8 for recommended Personal Protective Equipment and see Section 13 for waste disposal considerations.

Section 7 - Handling and Storage

Handling Procedures

Keep locked up or secured. Handle in fully grounded, properly designed and approved equipment systems that are suitable for flammable liquids. Use with adequate ventilation. Do not ingest or inhale. Keep away from heat and ignition sources. No smoking or open flames permitted in storage, use or handling areas. Dissipate static electricity during transfer by grounding and bonding containers and equipment. An anti-static agent may be added to storage tanks to reduce static charge buildup during loading. Take special precautions when cold cutting or breaking into lines, or when cleaning and disposing of empty containers. Do not breathe gas, fumes, vapour or spray. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately. Avoid contact with skin and eyes. Keep away from incompatible materials such as oxidizing agents. Oil-contaminated clothing must be removed and cleaned prior to reuse. After handling, always wash hands thoroughly with soap and water.

Storage Procedures

Storage area should be clearly identified, well-illuminated, clear of obstruction and accessible only to trained and authorized personnel. Adequate security must be provided so that unauthorized personnel do not have access to

Material Safety Data Sheet

Material Name: **Low Sulphur Diesel-S15**

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product. Store in grounded, properly designed and approved vessels and away from incompatible materials. Store and use away from heat, sparks, open flame, or any other ignition source. An anti-static agent may be added to storage tanks to reduce static charge buildup during loading. Store according to applicable regulations for combustible materials for storage tanks, containers, piping, buildings, rooms, cabinets, allowable quantities and minimum storage distances. Use non-sparking ventilation systems, approved explosion-proof equipment, and intrinsically safe electrical systems. Have appropriate extinguishing capability in storage area (e.g. portable fire extinguishers (dry chemical, foam or carbon dioxide)) and flammable gas detectors. Water spray is ineffective for extinguishing fires. Prevent soil contamination. Keep absorbents for leaks and spills readily available. Equip storage tank vents with a flame arrestor. Inspect vents during winter conditions for vapour ice buildup. Storage tanks should be above ground and diked to hold entire contents. Do not store at temperatures at or above product's flashpoint.

See Section 8: Exposure Controls/Personal Protection for appropriate Personal Protective Equipment. See Section 10 for information on Incompatibilities.

Section 8 - Exposure Controls / Personal Protection

Exposure Guidelines

A: General Product Information

Refer to published exposure limits - use effective control measures and PPE to maintain worker exposure to concentrations that are below these limits. Ensure that eyewash stations and safety showers are in close proximity to work locations.

B: Component Exposure Limits

ACGIH, OSHA, NIOSH, EPA, Alberta, and Ontario exposure limit lists have been checked for major components listed with CAS registry numbers. Other exposure limits may apply, check with proper authorities.

Kerosine, petroleum, hydrodesulfurized (64742-81-0)

- ACGIH: 200 mg/m³ TWA (as total hydrocarbon vapor) (application restricted to conditions in which there are negligible aerosol exposures)
Skin - potential significant contribution to overall exposure by the cutaneous route.
- Alberta: 200 mg/m³ TWA (as total hydrocarbon vapour)
Substance may be readily absorbed through intact skin
- Ontario: 200 mg/m³ TWA (as total hydrocarbon vapour) (application restricted to conditions in which there are negligible aerosol exposures)
Skin - Danger of cutaneous absorption

Sulphur (7704-34-9)

- Alberta: 10 mg/m³ TWA

ENGINEERING CONTROLS

Engineering methods to reduce hazardous exposure are preferred controls. Methods include mechanical ventilation (dilution and local exhaust) process or personal enclosure, remote and automated operation, control of process conditions, leak detection and repair systems, and other process modifications. Ensure all exhaust ventilation systems are discharged to outdoors, away from air intakes and ignition sources. Supply sufficient replacement air to make up for air removed by exhaust systems. Administrative (procedure) controls and use of personal protective equipment may also be required.

PERSONAL PROTECTIVE EQUIPMENT

Personal Protective Equipment: Eyes/Face

Wear safety glasses; chemical goggles are recommended if splashing is possible to prevent eye irritation from vapours.

Personal Protective Equipment: Skin/Hands/Feet

Use chemically resistant gloves when handling product. Wear chemical-resistant safety footwear with good traction to prevent slipping. Work clothing that sufficiently prevents skin contact should be worn, such as coveralls and/or long sleeves and pants. Fire resistant (i.e., Nomex) or natural fibre clothing (i.e., cotton or wool) is recommended. Synthetic clothing can generate static electricity and is not recommended where flammable vapour releases may occur. Static Dissipative (SD) rated footwear is recommended.

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Personal Protective Equipment: Respiratory

If engineering controls and ventilation are not sufficient to prevent buildup of aerosols or vapours, appropriate NIOSH approved air-purifying respirators or self-contained breathing apparatus (SCBA) appropriate for exposure potential should be used. Air supplied breathing apparatus must be used when oxygen concentrations are low or if airborne concentrations exceed the limits of the air-purifying respirators.

Personal Protective Equipment: General

Personal protective equipment (PPE) should not be considered a long-term solution to exposure control. Employer programs to properly select, fit, maintain, and train employees to use equipment must accompany PPE. Consult a competent industrial hygiene resource, the PPE manufacturer's recommendation, and/or applicable regulations to determine hazard potential and ensure adequate protection.

Section 9 - Physical & Chemical Properties

Physical State and Appearance:	Oily liquid	Colour:	Amber
Odour:	Kerosene-like	Odour Threshold:	Not available
pH:	Not available	Vapour Pressure:	0.20 kPa at 20°C (68°F)
Relative Vapour Density (Air=1):	8	Boiling Point:	Range: 161°C to 355°C (322°F to 671 °F)
Melting Point:	Range: -36°C to 0°C (-33°F to 32 °F)	Solubility (H2O):	Insoluble
Specific Gravity (Water=1):	Range: 0.840 to 0.855	Evaporation Rate (Ethyl Ether):	600
Viscosity (Kinematic):	Range: 2.6 to 2.9 cst	Percent Volatile:	100%
Octanol/H2O Coeff.:	Not available	Auto Ignition:	257°C (495°F)
Flash Point:	Range: 60°C to 75°C (140°F to 167°F)	Flash Point Method:	Pensky-Martens, closed cup
Upper Flammable Limit (UFL):	5%	Lower Flammable Limit (LFL):	0.7%
Flammability Classification:	Combustible		

Section 10 - Stability & Reactivity Information

Chemical Stability

This product is stable under normal use conditions for shock, vibration, pressure, or temperature.

Chemical Stability: Conditions to Avoid

Keep away from heat, sparks, or open flame.

Incompatibility

May react with oxidizing agents. Slightly reactive with metals. Heated vapours or mists may form explosive mixture with air.

Possibility of Hazardous Reactions or Hazardous Polymerization

Hazardous polymerization not likely to occur.

Corrosivity

Not corrosive to the common metals.

Hazardous Decomposition

Upon decomposition, this product emits carbon monoxide, carbon dioxide low molecular weight hydrocarbons, acidic gases, nitrogen oxides, sulphur oxides, and other toxic contaminants.

Section 11 - Toxicological Information

A: Acute Toxicity – General Product Information

Similar fuel oil mixtures have been tested under the EPA's High Production Volume (HPV) Chemical Challenge Program for the Kerosenes/Jet Fuel Category. Kerosene is not considered acutely toxic. Animal tests have produced moderate to severe skin irritation and eye irritation. Eye irritation is generally resolved within one to 7 days. Kerosenes did not produce sensitization when tested in guinea pigs.

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B: Acute Toxicity - LD50/LC50

Kerosine, petroleum, hydrodesulfurized (64742-81-0)

Inhalation LC50 Rat: >5.2 mg/L/4H; Oral LD50 Rat: >5000 mg/kg; Dermal LD50 Rabbit: >2000 mg/kg

Sulphur (7704-34-9)

Inhalation LC50 Rat: >6.23 mg/L/4H; Oral LD50 Rat: >8437 mg/kg; Dermal LD50 Rabbit: >2000 mg/kg

C: Chronic Toxicity - General Product Information

Similar fuel oil mixtures have been tested under the EPA's High Production Volume (HPV) Chemical Challenge Program for the Kerosenes/Jet Fuel Category. Chronic skin exposure causes dermatitis and slight to moderate skin irritation in rabbits. Application of hydrodesulphurized kerosene to mouse skin, twice a week for 12 months, resulted in an increased incidence of skin tumours. Hydrodesulphurized kerosene applied to the skin of female rats at 494, 330, or 165 mg/kg daily for 7 consecutive weeks (pre-mating, mating, and gestation), or for 8 consecutive weeks in males did not result in systemic, reproductive, or developmental toxicity. Some animal studies have indicated damage to the heart and spleen. No tests have shown evidence of mutagenicity or teratogenicity.

D: Chronic Toxicity - Carcinogenic Effects

ACGIH, EPA, IARC, OSHA, and NTP carcinogen lists have been checked for selected similar materials or those components with CAS registry numbers.

Kerosine, petroleum, hydrodesulfurized (64742-81-0)

ACGIH: A3 - Confirmed animal carcinogen with unknown relevance to humans (as total hydrocarbon vapor)

IARC: Monograph 45 [1989] (related to Jet Fuel) (Group 3 (not classifiable))

Section 12 - Ecological Information

Ecotoxicity

A: General Product Information

Similar fuel oil mixtures have been tested under the EPA's High Production Volume (HPV) Chemical Challenge Program for the Kerosenes/Jet Fuel Category. Product is largely insoluble in water. Under ambient conditions, this product absorbs quickly in soil. Kerosene shows moderate toxicity to aquatic organisms.

B: Component Analysis - Ecotoxicity - Aquatic/Terrestrial Toxicity

Kerosine, petroleum, hydrodesulfurized (64742-81-0)

96 Hr LC50 Pimephales promelas: 45 mg/L [flow-through]; 96 Hr LC50 Lepomis macrochirus: 1740 mg/L [static]; 96 Hr LC50 Dendronereides heteropoda: 4720 mg/L

Sulphur (7704-34-9)

96 Hr LC50 Brachydanio rerio: 866 mg/L [static]

Environmental Fate/Mobility

Kerosene is not subject to hydrolysis. Partitioning to water is <10% at equilibrium, while partitioning to sediment is 2% and to biota (fish) is 0.1%

Persistence/Degradability

This material is considered biodegradable. Some components biodegrade quickly while other higher molecular weight components will degrade more slowly. Atmospheric half-lives of 0.2 to 1.5 days have been calculated for representative C9 and C16 hydrocarbon components of kerosenes.

Bioaccumulation/Accumulation

Lower molecular-weight, normal hydrocarbons are most readily biodegraded but tend to partition to air rather than water, while more complex, higher molecular weight polynuclear aromatics and substituted aromatics tend to sorb to soil or sediment; both processes limit bioavailability and can slow biodegradation. The hydrocarbons in kerosenes are generally not inhibitory to microbial activity though changes in microbial community composition may occur in spill or impacted areas due to the proliferation of species that can biodegrade the compounds.

Section 13 - Disposal Considerations

U.S./Canadian Waste Information

A: General Product Information

This product may be known to be a hazardous waste according to US and Canadian regulations. The use, mixing or processing of this product may alter its properties or hazards. Contact federal, provincial/state and local authorities in order to generate or ship a waste material associated with this product to ensure materials are handled appropriately and meet all criteria for disposal of hazardous waste. **DO NOT ATTEMPT TO DISPOSE**

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OF BY UNCONTROLLED IGNITION. Since emptied containers retain product residue, follow safe handling/label warnings even after container is emptied.

See Section 7: Handling and Storage and Section 8: Exposure Controls/Personal Protection for additional handling information that may be applicable for safe handling and the protection of employees.

Waste generator is advised to carefully consider hazardous properties and control measures needed for other materials that may be found in the waste.

B: Component Waste Numbers

No EPA Waste Numbers are applicable for this product's components.

Section 14 - Transportation Information

US DOT Information

Shipping Name: DIESEL FUEL

UN#: UN1202 Hazard Class: 3 Packing Group: III

Required Label(s): FLAMMABLE LIQUID

Additional Information: 2012 Emergency Response Guidebook: Guide #128

Canadian TDG Information

Shipping Name: DIESEL FUEL

UN#: UN1202 Hazard Class: 3 Packing Group: III

Required Label(s): FLAMMABLE LIQUID

Additional Information: 2012 Emergency Response Guidebook: Guide #128

International Air Transport Association (IATA) and International Civil Aviation Organization (ICAO) Information

Shipping Name: DIESEL FUEL

UN#: UN1202 Hazard Class: 3 Packing Group: III

Required Label(s): FLAMMABLE LIQUID

International Maritime Dangerous Goods (IMDG) Code

Shipping Name: DIESEL FUEL

UN#: UN1202 Hazard Class: 3 Packing Group: III

Required Label(s): FLAMMABLE LIQUID

Additional Info.: EmS Code: F-E

Marine Pollutant: No

Section 15 - Regulatory Information

A. International Regulations

Component Analysis - International Inventory Status

Component	CAS #	US - TSCA	CANADA - DSL
Kerosine, petroleum, hydrodesulfurized	64742-81-0	Yes	Yes
Sulphur	7704-34-9	Yes	Yes

B: USA Federal & State Regulations

Ongoing occupational hygiene, medical surveillance programs, site emission or spill reporting may be required by Federal or State regulations. Check for applicable regulations.

USA OSHA Hazard Communication Class

This product/material is hazardous under 29 CFR 1910.1200 (Hazard Communication). HCS Classes:

HCS CLASS: Combustible liquid having a flash point between 37.8°C (100°F) and 93.3°C (200°F).

HCS CLASS: Irritating substance.

HCS CLASS: Target organ effects.

USA Right-to-Know - Federal

None of this product's components are listed under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65), or CERCLA (40 CFR 302.4).

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USA Right-to-Know - State

The following components appear on one or more of the following state hazardous substances lists. Some components (including those present only in trace quantities, and therefore not listed in this document) may be included on the Right-To-Know lists of other U.S. states. The reader is therefore cautioned to contact his or her NOVA Chemicals' representative or NOVA Chemicals' Product Integrity group for further U.S. State Right-To-Know information.

Component	CAS #	NJ	PA
Kerosine, petroleum, hydrodesulfurized	64742-81-0	Yes	Yes
Sulphur	7704-34-9	Yes	Yes

C: Canadian Regulations - Federal and Provincial

Canadian Environmental Protection Act (CEPA): All components of this product are on the Domestic Substances List (DSL), and are acceptable for use under the provisions of CEPA.

WHMIS Ingredient Disclosure List (IDL)

No components are listed in the Canadian Hazardous Products Act - Ingredient Disclosure List (IDL).

WHMIS Classification

Workplace Hazardous Materials Information System (WHMIS): This material has been classified in accordance with the hazard criteria of the CPR (Controlled Products Regulations), and the MSDS contains all the information required by the CPR.

WHMIS CLASS B3: Combustible liquid with a flash point between 37.8°C (100°F) and 93.3°C (200°F).

WHMIS CLASS D2A: Very Toxic (Kerosine, petroleum, hydrodesulfurized)

WHMIS CLASS D2B: Toxic (skin/eye irritant)

Other Regulations

Ongoing occupational hygiene, medical surveillance programs, site emission or spill reporting may be required by Federal or Provincial regulations. Check for applicable regulations.

Section 16 - Other Information

Label Information

WARNING! COMBUSTIBLE. Product is an amber oily liquid with a kerosene-like odour. This product burns readily when heated to high temperatures, giving off combustible and toxic vapours. This product is harmful and possibly fatal if swallowed. Small amounts of this product, if aspirated into the lungs, may cause mild to severe injury. This product is irritating to the eyes and skin. Ingestion or excessive inhalation of this product may result in headache, sleepiness, dizziness, nausea, loss of coordination, and in extreme conditions coma and possibly death. Contains trace components that may cause cancer. Avoid contact. Pre-existing medical conditions are aggravated by exposure. Prevent entry into drains, ditches, sewers, and waterways.

FIRST AID:

SKIN: Remove contaminated clothing and shoes. Wash immediately with soap and water for at least 15 minutes. Seek medical attention if symptoms develop or persist. Completely decontaminate clothing, shoes and other protective equipment before reuse or discard.

EYES: Remove contact lenses, if it can be done safely. Immediately flush eyes with water for at least 15 minutes, while holding eyelids open. Seek medical attention if symptoms develop or persist.

INHALATION: Move affected individual to non-contaminated air. Loosen tight clothing such as a collar, tie, belt or waistband to facilitate breathing. Seek immediate medical attention if the individual is not breathing, is unconscious or if any other symptoms persist. **WARNING:** Contact through mouth-to-mouth resuscitation may pose a secondary risk to the rescuer. Avoid mouth-to-mouth contact by using a mouth shield or guard to perform artificial respiration.

INGESTION: DO NOT INDUCE VOMITING. Loosen tight clothing such as a collar, tie, belt or waistband. Seek immediate medical attention. Small amounts which accidentally enter the mouth should be rinsed out until taste is gone.

IN CASE OF A LARGE SPILL: Consider downwind evacuation for 300 metres (984 feet). Eliminate ignition sources. Keep upwind and out of low areas. Stop discharge if safe to do so. Contain discharge by booming on water or diking on ground. Remove liquid material with approved non-sparking pumps, skimmers or vacuum equipment. Absorb with DRY earth, sand or other non-combustible material. Soil remediation may be required. Prevent entry into sewers, drains, ditches, underground or confined spaces, water intakes and waterways.

References

Available on request.

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Special Considerations

The International Agency for Research on Cancer (IARC) has categorized diesel exhaust as carcinogenic to humans (Group 1).

Diesel exhaust particulates

NTP: Reasonably Anticipated to be a Human Carcinogen (related to Diesel exhaust particulates)

IARC: Monograph 105 [in prep] (related to Diesel engine exhaust) (Group 1 (carcinogenic to humans))

For additional information on equipment bonding and grounding, refer to the American Petroleum Institute (API) Recommended Practice 2003, "Protection Against Ignitions Arising out of Static, Lightning, and Stray Currents" or National Fire Protection Association (NFPA) 77, "Recommended Practice on Static Electricity".

Key/Legend

ACGIH = American Conference of Governmental Industrial Hygienists; ADR = Transport of Dangerous Goods by Road; ADR/RID = European Agreement of Dangerous Goods by Road/Rail; BOD = Biochemical Oxygen Demand; CAS = Chemical Abstracts Service; CEPA = Canadian Environmental Protection Act; CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act; CFR = Code of Federal Regulations; CPR = Controlled Products Regulations; DFG = Deutsche Forschungsgemeinschaft; DOT = Department of Transportation; DSL = Domestic Substances List; EC50 = Effective Concentration 50%; EEC = European Economic Community; EINECS = European Inventory of Existing Commercial Chemical Substances; ELINCS = European List of Notified Chemical Substances; EPA = Environmental Protection Agency; EU = European Union; FDA = Food and Drug Administration; GHS = Globally Harmonized System for the Classification and Labelling of Chemicals; HCS = Hazard Communication Standard; HMIS = Hazardous Materials Identification System; IARC = International Agency for Research on Cancer; IATA = International Air Transport Association; ICAO = International Civil Aviation Organization; IDL = Ingredient Disclosure List; IDLH = Immediately Dangerous to Life or Health; IMDG = International Maritime Dangerous Goods; IMO = International Maritime Organization; ISHL = Industrial Safety and Health Law; Kow = Octanol/water partition coefficient; LC50 = Lethal Concentration 50%; LD50 = Lethal Dose 50%; LEL = Lower Explosive Limit; LFL = Lower Flammable Limit; LLV = Level Limit Ceiling Limit (Sweden dust); MAK = Maximum Concentration Value in the Workplace; MITI = Ministry of International Trade and Industry; MSDS = Material Safety Data Sheet; NAB = Threshold Values (Indonesia); NCEC = National Chemical Emergency Centre; NDSL = Non-Domestic Substances List; NFPA = National Fire Protection Association; NIOSH = National Institute for Occupational Safety and Health; NJTSR = New Jersey Trade Secret Registry; NTP = National Toxicology Program; OEL = Occupational Exposure Limit; OSHA = Occupational Safety and Health Administration; PEL = Permissible Exposure Limit; PNOC = Particulates Not Otherwise Classified; PPE = Personal Protective Equipment; PRTR = Designated Chemical Substance Law (Japan); PSD = Short Term Exposure Limit (Indonesia); RCRA = Resource Conservation and Recovery Act; REACH = Registration, Evaluation, Authorisation and Restriction of Chemical Substances; REL = Recommended Exposure Limit; RID = Transport of Dangerous Goods by Rail; SARA = Superfund Amendments and Reauthorization Act; SCBA = Self Contained Breathing Apparatus; SDS = Safety Data Sheet; SEPA = State Environmental Protection Administration; STEL = Short Term Exposure Limit; TDG = Transportation of Dangerous Goods; TLV = Threshold Limit Value; TSCA = Toxic Substances Control Act; TWA = Time Weighted Average; UEL = Upper Explosive Limit; UFL = Upper Flammable Limit; VLA-ED = Valor límite Ambiental de Exposición Diaria (Environmental Exposure Daily Limit Value); VME = valeur limite d'exposition (Occupational Exposure Limits); WHMIS = Workplace Hazardous Materials Information Systems

MSDS Prepared by: NOVA Chemicals

MSDS Information Phone Number: 1-412-490-4063

Other Information

Notice to Reader:

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This is the end of MSDS # NOVA-0034.

MATERIAL SAFETY DATA SHEET

SECTION 1 IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

LUBRIPLATE® Lubricants Co.
129 Lockwood St.
Newark, NJ 07105

Emergency Telephone Number:
1-800-255-3924-CHEM-TEL (24 hour)
Telephone Number for information:
1-973-589-9150

SUBSTANCE: LUBRIPLATE No. 105

MSDS No. - 0892150034001

TRADE NAMES/SYNONYMS:

PRODUCT USE: Petroleum lubricating grease

CREATION DATE: 04/12/2007

REVISION DATE: 08/07/2012

SECTION 2 COMPOSITION/INFORMATION ON INGREDIENTS

COMPONENT: Heavy hydrotreated naphthenic distillates (petroleum)

CAS NUMBER: 64742-52-5

EC NUMBER (EINECS): 265-155-0

PERCENTAGE: 85-90

COMPONENT: Fatty acid

CAS NUMBER: 8016-28-2

EC NUMBER (EINECS): 232-405-5

PERCENTAGE: 5-10

COMPONENT: Zinc oxide

CAS NUMBER: 1314-13-2

EC NUMBER (EINECS): 215-222-5

PERCENTAGE: 0-5

COMPONENT: Calcium hydroxide

CAS NUMBER: 1305-62-0

EC NUMBER (EINECS): 215-137-3

PERCENTAGE: 0-1

COMPONENT: Proprietary additive package

CAS NUMBER: NA

EC NUMBER (EINECS): NA

PERCENTAGE: 0-1

COMPONENT: Sodium hydroxide
CAS NUMBER: 1310-73-2
EC NUMBER (EINECS): 215-185-5
PERCENTAGE: 0-1

NOTE: The IP 346 value of the mineral oil is less than 3%

SECTION 3 HAZARDS IDENTIFICATION

POTENTIAL HEALTH EFFECTS:

INHALATION:

SHORT TERM EXPOSURE: Irritation

LONG TERM EXPOSURE: Lung damage

SKIN CONTACT:

SHORT TERM EXPOSURE: Irritation

LONG TERM EXPOSURE: Irritation, skin disorders

EYE CONTACT:

SHORT TERM EXPOSURE: Irritation

LONG TERM EXPOSURE: No information available

INGESTION:

SHORT TERM EXPOSURE: Diarrhea, difficulty breathing

LONG TERM EXPOSURE: no information on significant adverse effects

HAZARDOUS MATERIAL IDENTIFICATION SYSTEM (HMIS):

Health – 1

Flammability – 1

Reactivity – 0

Not a Controlled Product under (WHMIS) – Canada

Special Protection: See Section 8

SECTION 4 FIRST AID MEASURES

INHALATION: Vapor pressure is very low and inhalation at room temperature is not a problem. If overcome by vapor from hot product, immediately remove from exposure and call a physician.

SKIN CONTACT: Remove any contaminated clothing and wash with soap and warm water. If injected by high pressure under skin, regardless of the appearance or its size, contact a physician IMMEDIATELY. Delay may cause loss of affected part of the body.

EYE CONTACT: Flush with clear water for 15 minutes or until irritation subsides. If irritation persists, consult a physician.

INGESTION: If ingested, call a physician immediately. Do not induce vomiting.

SECTION 5 FIRE FIGHTING MEASURES

FIRE AND EXPLOSION HAZARDS: Slight fire hazard

EXTINGUISHING MEDIA: Foam, Dry Chemical, Carbon Dioxide or Water Spray (Fog)

SPECIAL FIRE FIGHTING PROCEDURES: Cool exposed containers with water. Use air-supplied breathing equipment for enclosed or confined spaces.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Do not store or mix with strong oxidants. Empty containers retain residue. Do not cut, drill, grind, or weld, as they may explode.

SECTION 6 ACCIDENTAL RELEASE MEASURES

OCCUPATIONAL RELEASE: Scrape up grease, wash remainder with suitable petroleum solvent or add absorbent. Keep petroleum products out of sewers and water courses. Advise authorities if product has entered or may enter sewers and water courses.

SECTION 7 HANDLING AND STORAGE

STORAGE: Keep containers closed when not in use. Do not handle or store near heat, sparks, flame, or strong oxidants.

SECTION 8 EXPOSURE CONTROLS/PERSONAL PROTECTION

EXPOSURE LIMITS:

OIL MIST IN AIR (Not Encountered in Normal Usage):

5 mg/m³ UK OES TWA

10mg/m³ UK OES STEL

VENTILATION: Provide local exhaust ventilation system. Ensure compliance with applicable exposure limits.

EYE PROTECTION: Wear splash resistant safety goggles. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

CLOTHING: Wear appropriate chemical resistant clothing.

GLOVES: Wear appropriate chemical resistant (nitrile) gloves.

RESPIRATOR: Consider the need for appropriate protective equipment, such as self-contained breathing apparatus, adequate masks and filters.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: solid

APPEARANCE: smooth

COLOUR: off-white

PHYSICAL FORM: grease

ODOR: mineral oil odor

BOILING POINT: >288°C

FREEZING POINT: Not available

FLASH POINT: 182°C (COC)

LOWER FLAMMABLE LIMIT: 0.9% by volume

UPPER FLAMMABLE LIMIT: 7.0% by volume
AUTO IGNITION: not available
VAPOUR PRESSURE: not available
VAPOR DENSITY (air=1): not available
SPECIFIC GRAVITY (water=1): 0.89
DENSITY: not available
WATER SOLUBILITY: negligible
pH: not available
VOLATILITY: not available
ODOR THRESHOLD: not available
EVAPORATION RATE (Butyl acetate = 1): <0.01
VISCOSITY: not available
COEFFICIENT OF WATER/OIL DISTRIBUTION: not available

SECTION 10 STABILITY AND REACTIVITY

REACTIVITY: Stable at normal temperatures and pressures

CONDITIONS TO AVOID: Avoid heat, flames, sparks and other sources of ignition. Avoid contact with incompatible materials.

INCOMPATIBLES: Oxidising materials, chlorine

HAZARDOUS DECOMPOSITION:

Thermal decomposition products or combustion: oxides of carbon, oxides of sulphur

POLYMERISATION: Will not polymerise.

SECTION 11 TOXICOLOGICAL INFORMATION

Heavy hydrotreated naphthenic distillates (petroleum):

TOXICITY DATA:

Low order of dermal and oral toxicity

Fatty acid:

TOXICITY DATA:

No data available

Zinc oxide:

TOXICITY DATA:

No data available

Calcium hydroxide:

TOXICITY DATA:

No data available

Proprietary additive package:

TOXICITY DATA:

No data available

Inedible animal grease:

TOXICITY DATA:

No data available

Sodium hydroxide:

TOXICITY DATA:

No data available

SECTION 12 ECOLOGICAL INFORMATION

Not available

SECTION 13 DISPOSAL CONSIDERATIONS

Dispose in accordance with all applicable regulations

SECTION 14 TRANSPORT INFORMATION

LAND TRANSPORT ADR: No classification assigned.

LAND TRANSPORT RID: No classification assigned.

AIR TRANSPORT IATA: No classification assigned.

AIR TRANSPORT ICAO: No classification assigned.

MARITIME TRANSPORT IMDG: No classification assigned.

SECTION 15 REGULATORY INFORMATION

EUROPEAN REGULATIONS:

EC CLASSIFICATION (CALCULATED): N

Risk Phrases: R51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

SECTION 16 OTHER INFORMATION

The above information is furnished without warranty, expressed or implied, except that it is accurate to the best knowledge of LUBRIPLATE Lubricants Company. The data on these sheets relates only to the specific material designated herein. LUBRIPLATE Lubricants Company assumes no legal responsibility for use or reliance upon this data.

Safety Data Sheet

Magnesium Metal, Ribbon

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: Magnesium Metal, Ribbon

Synonyms/Generic Names: Magnesium turnings; Magnesium sticks

Product Number: 3245

Product Use: Industrial, Manufacturing or Laboratory use

Manufacturer: Columbus Chemical Industries, Inc.
N4335 Temkin Rd.
Columbus, WI. 53925

For More Information Call: 920-623-2140 (Monday-Friday 8:00-4:30)

In Case of Emergency Call: CHEMTREC - 800-424-9300 or 703-527-3887 (24 Hours/Day, 7 Days/Week)

2. HAZARDS IDENTIFICATION

OSHA Hazards: Flammable solid

Target Organs: None

Signal Words: Warning

Pictograms:



GHS Classification:

Flammable solids	Category 2
------------------	------------

GHS Label Elements, including precautionary statements:

Hazard Statements:

H228	Flammable solid
------	-----------------

Precautionary Statements:

P210	Keep away from heat/sparks/open flames/hot surfaces. –No smoking.
------	---

Potential Health Effects

Eyes	May cause eye irritation.
Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Ingestion	May be harmful if swallowed.

NFPA Ratings

Health	0
Flammability	1
Reactivity	2
Specific hazard	Not Available

HMIS Ratings

Health	1
Fire	3
Reactivity	2
Personal	E

3. COMPOSITION/INFORMATION ON INGREDIENTS

Component	Weight %	CAS #	EINECS# / ELINCS#	Formula	Molecular Weight
Magnesium	100	74-39-95-4	231-104-6	Mg	24.31 g/mol

4. FIRST-AID MEASURES

Eyes	Rinse with plenty of water for at least 15 minutes and seek medical attention if necessary.
Inhalation	Move casualty to fresh air and keep at rest. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Get medical attention if necessary.
Skin	Wash off with soap and plenty of water. Get medical attention if necessary.
Ingestion	Do Not Induce Vomiting! Never give anything by mouth to an unconscious person. If conscious, wash out mouth with water. Get medical attention if necessary.

5. FIREFIGHTING MEASURES

Suitable (and unsuitable) extinguishing media	Use alcohol-resistant foam, dry chemical, or carbon dioxide. Use water spray to cool unopened containers.
Special protective equipment and precautions for firefighters	Wear self-contained breathing apparatus for firefighting if necessary.
Specific hazards arising from the chemical	Emits toxic fumes (magnesium oxide) under fire conditions. (See also Stability and Reactivity section).

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	See section 8 for recommendations on the use of personal protective equipment. Avoid dust formation. Avoid breathing vapors, mist, or gas. Ensure adequate ventilation. Remove all sources of ignition.
Environmental precautions	Prevent spillage from entering drains. Any release to the environment may be subject to a federal/national or local reporting requirements.
Methods and materials for containment and cleaning up	Pick up/sweep up and keep in suitable, closed containers for disposal. Clean surfaces thoroughly with water to remove residual contamination. Dispose of all waste or cleanup materials in accordance with local regulations.

7. HANDLING AND STORAGE**Precautions for safe handling**

See section 8 for recommendations on the use of personal protective equipment. Provide appropriate exhaust ventilation at places where dust is formed. Keep away from sources of ignition – No smoking. Take measures to prevent build up of electrostatic charge.

Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well ventilated place.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Occupational exposure controls: Contains no substances with occupational exposure limit values.

Personal Protection

Eyes	Wear chemical safety glasses or goggles.
Inhalation	Provide local exhaust, preferably mechanical. If exposure levels are excessive, use an approved respirator.
Skin	Flame retardant antistatic protective clothing. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.
Other	Not Available

Other Recommendations

Provide eyewash stations, quick-drench showers and washing facilities accessible to areas of use and handling. Have supplies and equipment for neutralization and running water available.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance (physical state, color, etc.)	Silver to white chips, ribbon, or turnings.
Odor	Odorless
Odor threshold	Not applicable
pH	Not Available
Melting point/freezing point	648°C (1198°F) – lit.
Initial boiling point and boiling range	1090°C (1994°F) – lit.
Flash point	Not Applicable
Evaporation rate	Not Available
Flammability (solid, gas)	Flammable solid.
Upper/lower flammability or explosive limit	Not Available
Vapor pressure	Not Available
Vapor density	Not Available
Relative density	Not Available
Solubility (ies)	Decomposes in contact with water.
Partition coefficient: n-octanol/water	Not Available
Auto-ignition temperature	Not Available
Decomposition temperature	Not Available

10. STABILITY AND REACTIVITY

Chemical Stability	Stable
Possibility of Hazardous Reactions	Will not occur.
Conditions to Avoid	Heat, flame, sparks. Extremes of temperature and sunlight.
Incompatible Materials	Strong oxidizing agents, water, acids, methanol, hydrogen peroxide, sulfur compounds, metal oxides, tellurium, ethylene oxide, alkali carbonates, silver nitrate, soluble carbonates and phosphates, carbides.
Hazardous Decomposition Products	Magnesium oxide.

11. TOXICOLOGICAL INFORMATION

Acute Toxicity

Skin	Not Available
Eyes	Not Available
Respiratory	Not Available
Ingestion	Not Available

Carcinogenicity

IARC	No components of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
ACGIH	No components of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
NTP	No components of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA	No components of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Signs & Symptoms of Exposure

Eyes	May cause eye irritation.
Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Ingestion	May be harmful if swallowed.

Chronic Toxicity	Not Available
Teratogenicity	Not Available
Mutagenicity	Not Available
Embryotoxicity	Not Available
Specific Target Organ Toxicity	Not Available

12. ECOLOGICAL INFORMATION

Ecotoxicity

Aquatic Vertebrate	Not Available
Aquatic Invertebrate	Not Available
Terrestrial	Not Available

Persistence and Degradability	Not Available
Bioaccumulative Potential	Not Available
Mobility in Soil	Not Available
PBT and vPvB Assessment	Not Available
Other Adverse Effects	Not Available
Reproductive Toxicity	Not Available
Respiratory/Skin Sensitization	Not Available

13. DISPOSAL CONSIDERATIONS

Waste Residues	Users should review their operations in terms of the applicable federal/national or local regulations and consult with appropriate regulatory agencies if necessary before disposing of waste product container or residue.
Product Containers	Users should review their operations in terms of the applicable federal/national or local regulations and consult with appropriate regulatory agencies if necessary before disposing of waste product container.

The information offered in section 13 is for the product as shipped. Use and/or alterations to the product may significantly change the characteristics of the material and alter the waste classification and proper disposal methods.

14. TRANSPORTATION INFORMATION

US DOT	UN1869, Magnesium, 4.1, pg III
TDG	UN1869, MAGNESIUM, 4.1, pg III
IMDG	UN1869, MAGNESIUM, 4.1, pg III
Marine Pollutant	No
IATA/ICAO	UN1869, Magnesium, 4.1, pg III

15. REGULATORY INFORMATION

TSCA Inventory Status	All ingredients are listed on the TSCA inventory.
DSCL (EEC)	All ingredients are listed on the DSCL inventory.
California Proposition 65	Not Listed
SARA 302	Not Listed
SARA 304	Not Listed
SARA 311	Fire Hazard
SARA 312	Fire Hazard
SARA 313	Not Listed
WHMIS Canada	Class B-4: Flammable solid.

16. OTHER INFORMATION

Revision	Date
Revision 1	08-05-2011
Revision 2	10/23/2013

Disclaimer: Columbus Chemical Industries, Inc. ("Columbus") believes that the information herein is factual but is not intended to be all inclusive. The information relates only to the specific material designated and does not relate to its use in combination with other materials or its use as to any particular process. Because safety standards and regulations are subject to change and because Columbus has no continuing control over the material, those handling, storing or using the material should satisfy themselves that they have current information regarding the particular way the material is handled, stored or used and that the same is done in accordance with federal, state and local law. COLUMBUS MAKES NO WARRANTY, EXPRESS OR IMPLIED, INCLUDING (WITHOUT LIMITATION) WARRANTIES WITH RESPECT TO THE COMPLETENESS OR CONTINUING ACCURACY OF THE INFORMATION CONTAINED HEREIN OR WITH RESPECT TO FITNESS FOR ANY PARTICULAR USE.

MATERIAL SAFETY DATA SHEET

SECTION I - PRODUCT IDENTIFICATION

Product Name: MASTERS AQUAPROOF

Material uses: Pool liner, containment liner, vapour barrier, automotive heel pad, and book stock applications.

Supplier Name and Address:

G.F. THOMPSON CO. LTD.
620 Steven Court, Unit #11
Newmarket, Ontario
L3Y 6Z2

Manufacturer name and address:

Refer to supplier

Emergency Tel:

Mon – Fri, 7:30 am to 5:00 pm EST

905-898-2557

800-499-3673 (toll free)

24 hr Emergency Tel:

905-252-4793

WHMIS CLASS: Not Controlled by WHMIS

SECTION II – HAZARDOUS COMPONENTS OF MIXTURES

NOT APPLICABLE

SECTION III – PHYSICAL DATA

Appearance and Odour: Clear or coloured film.

Boiling Point: N/A

Vapour Pressure: N/A

Vapour Density (Air =1): N/A

Solubility in Water: N/A

Melting Point: N/A

Specific Gravity (Water = 1): 1.2 – 1.8

Percent Volatile (by weight): N/A

Evaporation Rate (Butyl Acetate=1): < 1

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flash Point: N/A

Fire Extinguishing Media: Water fog, CO₂

Special Fire-Fighting Procedures:

Vinyl film will burn if exposed to flame. Use protective breathing equipment.

Unusual Fire and Explosion Hazards:

Burning in an open flame may field toxic hydrogen chloride gas and metal oxides.

Flammable Limits: L – n/a, U – n/a

SECTION V – HEALTH HAZARD DATA

=====
Threshold Limit Value: N/A

Effects of Overexposure: Material does not pose a toxic hazard under normal use. Hazardous fumes are produced by combustion or high temperature decomposition.

Emergency and First Aid Procedures:

Inhalation: In case of exposure to fumes during hot processing, remove victim to fresh air and give CPR or oxygen if needed. Call a physician

Contact: In case of contact, flush eyes with plenty of water for 15 minutes. Flush skin with plenty of water. Call physician.

=====
SECTION VI – REACTIVITY DATA

=====
Stability: Stable

Conditions to Avoid: Exposure to high temperatures for prolonged periods.

Incompatibility (Materials to Avoid): Strong acids, bases, solvents

Hazardous Decomposition Products: Metal Oxides, HC1, CO, CO₂

Hazardous Polymerization: Will not occur.

=====
SECTION VII – SPILL OR LEAK PROCEDURES

=====
Steps to be taken in case material is released or spilled

Collect material and remove to disposal container. Observe all relevant Local, Provincial and Federal laws.

Waste Disposal Method

Obey all relevant Local, Provincial and Federal laws. Do not contaminate any lakes, streams, ponds or underground water supply.

=====
SECTION VIII - SPECIAL PROTECTION INFORMATION

=====
Respiratory Protection: Use NIOSH- approved respiratory protective equipment if exposed to flame.

Ventilation: Ventilate in areas of hot processing.

Protective Gloves: N/A

Eye Protection: Safety Glasses

Other Protective Equipment: N/A

=====
SECTION IX - SPECIAL PRECAUTIONS

=====
Precautions To Be Taken In Handling and Storing:

Protect from flame or excessive heat.

HMIS Ratings: Health -0 Flammability – 1 Reactivity - 0

=====
Additional notes or references: n/av - no additional remark

Preparation date: December 1, 2012

MATERIAL SAFETY DATA SHEET

SECTION I - PRODUCT IDENTIFICATION

Product name: MASTERS LEAK DETECTOR

Product use: Leak detector

Chemical family: Mixture

Supplier name and address :

G.F. THOMPSON CO. LTD.
620 Steven Court, Unit 11
Newmarket, Ontario
L3Y 6Z2

Manufacturer name and address :

Refer to supplier

Emergency Phone #: (905) 898-2557

WHMIS CLASS: D2B

SECTION II - HAZARDOUS INGREDIENTS

<u>Ingredients</u>	<u>CAS #</u>	<u>% (wt/wt)</u>	<u>LC50 ppm (Rat, ihl.)</u>	<u>LD50 mg/kg (Rat, oral)</u>
1,2-Propanediol	57-55-6	40-60	n/av	2000
Hydroxyethyl cellulose	9004-62-0	0.1-1	n/av	n/av
Nonyl phenol ethoxylate	n/av	1-2	n/av	n/av
Dipotassium phosphate	7758-11-4	1-3	n/av	n/av

SECTION III - PHYSICAL DATA

Physical State: Liquid

Odour and appearance: Colorless liquid, odourless.

Odour threshold: n/av

Specific gravity: n/av

Coefficient of water/oil distribution: n/av

Vapour pressure (mm Hg): n/av

Boiling point: n/av

Freezing point: n/av

pH: n/av

Vapour density (Air = 1): n/av

Evaporation rate (BuAc = 1) : n/av

Volatiles, %: n/av

Solubility in water: Complete

VOC: 499.6g/l, 47.9%

=====

SECTION IV - FIRE AND EXPLOSION DATA

=====

Conditions of flammability: Will not burn.

Means of extinction: As appropriate for surrounding materials.

Sensitivity to mechanical impact/static discharge: Not susceptible to mechanical impact or static discharge.

Flash point (Method): n/ap

Upper flammable limit %: n/ap

Lower flammable limit %: n/ap

Auto-ignition temperature: n/ap

Special fire fighting procedures: Standard firemen' body protection and self-contained breathing apparatus are recommended.

Hazardous combustion products: Refer to "Hazardous Decomposition Products"

=====

SECTION V - REACTIVITY DATA

=====

Stability: Stable. Hazardous polymerization will not occur.

Incompatible materials: Can react with oxidizing agents such as peroxides, nitrates, chlorine, perchlorates.

Conditions of reactivity: Stable under normal conditions of pressure and temperature. Avoid excessive heat.

Hazardous decomposition products: Burning may release toxic or suffocating gases, such as carbon monoxide and carbon dioxide.

=====

SECTION VI - TOXICOLOGICAL PROPERTIES

=====

***** Routes of exposure and acute/chronic effects *****

Exposure limit (ACGIH-TWA): Not established.

Inhalation : Inhalation exposure is not likely to cause adverse effects.

Skin : Skin exposure is not likely to result in absorption of harmful amounts. Repeated exposure may cause slight flaking, tenderness and softening of skin.

Eyes : Product can irritate the eyes and cause a slight burning sensation or discharge.

Ingestion : Specific information not available. Probably can cause abdominal pain, nausea, vomiting, diarrhoea, and depression of nervous system.

Chronic effects : None known.

Carcinogenicity: None of the ingredients of this product is listed by IARC or ACGIH as carcinogen.

Reproductive effects, Teratogenicity, Mutagenicity: None known.

Name of Toxicologically Synergistic Products: n/av

=====

SECTION VII FIRST AID

=====

Inhalation : Remove source of contamination or move victim to fresh air. If breathing has stopped, properly trained personnel should begin artificial respiration or cardio-pulmonary resuscitation (CPR) immediately. Obtain medical attention immediately.

Eyes : Immediately flush eyes with lukewarm water, gently flowing water for 20 minutes, by the clock, holding the eyelid(s) open. Obtain medical attention immediately.

Skin : Flush contaminated area with lukewarm, gently running water. If irritation persists, repeat flushing. Obtain medical attention immediately.

Ingestion : DO NOT INDUCE VOMITING. Rinse mouth thoroughly with water. Have victim drink water. Consult a physician or the nearest Poison Control Centre for all exposures except minor instances of inhalation or skin contact.

SECTION VIII - PREVENTIVE MEASURES

Spill, leak or release : Stop release and recover liquid or soak up with absorbent material.
Waste disposal : Dispose of in accordance with federal, provincial and local regulations.

***** PROTECTIVE EQUIPMENT *****

Respiratory protection : None required for normal use.
Ventilation : General ventilation.
Protective gloves : If prolonged skin contact is likely, use impervious gloves.
Eye protection : None required for normal use.
Other protective equipment : None.

***** STORAGE & HANDLING *****

Storage and handling conditions : **Handling:** Avoid eye contact. Avoid prolonged or repeated skin contact. Wash thoroughly after handling. Keep away from incompatibles.
Storage: Store in a cool, well-ventilated area. Keep away from incompatibles.
Special Shipping Information: TDG - Not regulated

Additional notes or references :

Abbreviations :

n/av : not available
n/ap : not applicable
IARC : International Agency for Research on Cancer
ACGIH : American Conference of Governmental Industrial Hygienists
TLV : Threshold Limit Values
NIOSH: National Institute of Occupational Safety and Health
TDG : Transportation of Dangerous Goods Act

References :

1. ACGIH, Threshold Limit Values and Biological Exposure Indices for 1995-96.
2. International Agency for Research on Cancer Monographs, Supplement 7, 1988.
3. N. Irving Sax. Dangerous Properties of Industrial Materials, Seventh Edition.
4. Canadian Centre for Occupational Health and Safety. Cheminfo Database.
5. N. Irving Sax, Richard J. Lewis, Sr. Hawley's Condensed Chemical Dictionary, Eleventh Edition.

SECTION IX PREPARATION INFORMATION

Prepared by : G.F. THOMPSON CO., LTD.
Telephone # : 905-898-2557
Preparation date : December 01, 2009

MATERIAL SAFETY DATA SHEET

SECTION I - PRODUCT IDENTIFICATION

Product name: MASTERS METALLIC COMPOUND

Product use: Pipe thread and gasket sealant.

Supplier name and address:

G.F. THOMPSON CO. LTD.
620 Steven Court
Newmarket, Ontario
L3Y 6Z2

Manufacturer name and address:

Refer to supplier.

Emergency Tel.#:

Mon – Fri, 7:30 am to 5:00 pm EST
905-898-2557
800-499-3673 (toll free)

24 hr Emergency Tel:

905-252-4793

WHMIS CLASS: B3, D2A, D2B

HMIS Rating:

* - Chronic hazard 0 - Minimal 1 – Slight 2 - Moderate 3 - Serious 4 – Severe

Health: *2 Flammability: 2 Reactivity: 0

SECTION II - INGREDIENTS

Ingredients	CAS#	wt. %	LC50 / 4 Hrs (Rat, ihl.)	LD50 mg/kg (Rat, oral) (Rabbit, dermal)	
Lead powder	7439-92-1	15 – 40	N/Av	N/Av	N/Av
Polymerized castor oil	68187-84-8	10 - 30	N/Av	N/Av	N/Av
Castor oil	8001-79-4	10 – 30	N/Av	N/Av	N/Av
n-Butyl alcohol	71-36-3	5 – 10	>8000 ppm	2510 (adult)	4200 790 (young, male)

SECTION III - PHYSICAL DATA

Physical state, odour and appearance:	Medium grey, paste. Odour of alcohol.
Freezing / melting point:	65.6 – 187.8 °C / 150 - 370 °F (emulsion range)
Evaporation rate (n-Butyl acetate = 1):	N/Av
Volatile, % by volume:	>99 (pure n-Butyl alcohol)
Odour threshold:	N/Av
Solubility in water:	Insoluble
Specific gravity:	N/Av
pH:	N/Av.
Boiling point:	N/Av
Vapour density (Air = 1):	N/Av
Viscosity:	N/Av
Vapour pressure (mmHg):	N/Av
Coefficient of water/oil distribution:	N/Av
VOC:	54.4 g/l, 1.6%

SECTION IV - FIRE AND EXPLOSION DATA

Conditions of flammability: Combustible. Product may be ignited by heat, sparks and flame.

Flash point (Method): 63°C / 145.4 °F (Closed Cup)

Auto-ignition temperature: N/Av

Upper flammable limit %: N/Av

Lower flammable limit %: N/Av

Means of extinction: Dry chemical is preferred. Additional types include alcohol foam, carbon dioxide and water fog. Do not use water jet, as this may spread burning material.

Sensitivity to mechanical impact/static discharge: N/Av.

Special fire fighting procedures: Firefighters should wear proper full protective equipment and self-contained breathing apparatus. Move containers from fire area if it can be done without risk. Water spray may only be useful in cooling equipment and containers exposed to heat and flame.

Unusual fire and explosion hazards: Closed containers may rupture if exposed to excess heat or flame due to a build-up of internal pressure.

Hazardous combustion products: Toxic lead oxides, carbon oxides and other irritating fumes and smoke.

SECTION V - REACTIVITY DATA

Stability: Stable under the recommended storage and handling conditions prescribed. Hazardous polymerization will not occur.

Incompatible materials: Strong oxidizers (e.g. Chlorine, Peroxides, etc.), acids, bases.

Conditions of reactivity: Stable under ambient pressure and temperature. Avoid heat, sparks and flames.

Hazardous decomposition products: None known. Refer to Section IV for 'Hazardous combustion products'.

SECTION VI - TOXICOLOGICAL PROPERTIES

******Routes of exposure and acute effects******

Exposure limit: ACGIH-TLV: Lead – 0.05 mg/m³; n-Butyl alcohol – 20 ppm.

OSHA-PEL: Lead – 50 µg/m³ (Final rule limit); n-Butyl alcohol – 100 ppm.

Routes of exposure: Skin contact, eye contact, inhalation and ingestion.

Irritancy of product: Mild skin irritant, severe eye irritant.

Inhalation: Harmful if inhaled. Inhalation may cause nose, throat and respiratory tract irritation. Symptoms may include headache, nausea, vomiting, dizziness and other central nervous system effects. This product contains lead. Inhalation of lead fumes, mists or vapours may cause cumulative effects, which develop slowly over time and resemble chronic overexposure. Symptoms of overexposure to lead may include nausea, headache, fatigue, cramps, vomiting, diarrhea, constipation, confusion, convulsions, anemia and muscular weakness.

Skin: May cause mild irritation. Can be absorbed through open wounds or cuts, causing lead poisoning (effects similar to those listed for Inhalation).

Eyes: May cause severe irritation.

Ingestion: Harmful if ingested. May cause irritation to the mouth, throat and stomach. Symptoms may include joint pain, a metallic taste in the mouth and other symptoms similar to those listed for inhalation.

Chronic effects: Prolonged or repeated skin contact may cause severe drying and cracking of the skin (dermatitis). Chronic overexposure to lead may cause long-term toxicity or plumbism. Plumbism may include central nervous system effects, peripheral nervous system effects, digestive system effects (e.g. inflammation of stomach, blue 'lead line' on the gums), kidney damage, blood system effects and reproductive system effects.

Carcinogenicity: Contains Lead. Lead is classified as carcinogenic by IARC (Group 2B) and ACGIH (Group A3).

Reproductive effects, Teratogenicity, Mutagenicity: Contains Lead. Lead may cause reproductive, teratogenic and mutagenic (reproductive and non-reproductive cells) effects.

Sensitization to material: None known.

Synergistic materials: N/Av.

Conditions aggravated by exposure: Pre-existing skin, eye and respiratory disorders.

SECTION VII - FIRST AID

Inhalation:	Immediately remove victim to fresh air. Obtain medical attention.
Skin contact:	Immediately wash skin with soap and plenty of water, while removing contaminated clothing. Obtain medical attention if irritation persists.
Eye contact:	Immediately flush eyes thoroughly with water for at least fifteen minutes. Do not rub eyes. Obtain medical attention.
Ingestion:	Do not induce vomiting. Call physician or Poison Control Centre immediately (e.g. Hospital for Sick Children, Poison Control Centre. Toronto, Ontario. Telephone: 416-598-5900).

SECTION VIII - PREVENTIVE MEASURES

Spill, leak or release:	Restrict access to area until completion of clean-up. Ensure clean-up is conducted by trained personnel only. All persons dealing with clean-up should wear the appropriate chemically resistant equipment. Eliminate all sources of heat and flame. Ventilate area of release. Stop leak if you can do so without risk. Absorb or wipe up with non-combustible, inert absorbent material. Place contaminated absorbent material into suitable containers for later disposal (see below). Clean spill area. Keep out of waterways. Notify the appropriate authorities as required.
Waste disposal:	Handle according to recommendations listed below. Dispose in accordance with all applicable government regulations.

*****PROTECTIVE EQUIPMENT*****

Respiratory protection:	None required under normal use. For prolonged exposure or if the TLV is exceeded, wear NIOSH-approved respirators.
Ventilation:	Use in well ventilated area. General ventilation should be sufficient under normal use. Local exhaust ventilation may be necessary for prolonged exposures or if the product is being heated.
Protective gloves:	Gloves impervious to the material, must be worn. Advice should be sought from glove suppliers.
Eye protection:	Safety goggles, to prevent product from entering the eyes.
Other protective equipment:	An eyewash station and safety shower should be made available in the immediate working area. Other equipment, including resistant apron, may be required according to workplace standards.

***** STORAGE & HANDLING *******Storage and handling conditions:**

<i>Handling:</i>	Wear appropriate chemically protective equipment. Use in a well ventilated area. Avoid inhalation and ingestion of product, and activities that generate dust or fume. Avoid contact with skin, eyes, and clothing. Do not eat, drink or smoke in work areas. Keep away from heat, sparks and flame. Keep away from acids and incompatible materials. Keep container tightly closed when not in use. Wash thoroughly after handling.
<i>Storage:</i>	Store in a cool, dry, well-ventilated area away from incompatibles (refer to Section V), heat and flame. Practice good housekeeping procedures to prevent accumulation of dust or refuse.

Special Shipping Information - Transportation of Dangerous Goods Regulations (TDGR): This material, as supplied, is not regulated for transport by ground within Canada.

SECTION IX - PREPARATION INFORMATION

Prepared by: G.F. THOMPSON CO. LTD.

Preparation date: December 1, 2012

Additional notes or references:

Legend: ACGIH: American Conference of Governmental Industrial Hygienists

CAS: Chemical Abstract Service

HMIS: Hazardous Materials Identification System

IARC: International Agency for Research on Cancer

N/Ap: Not Applicable

N/Av: Not Available

NIOSH: National Institute of Occupational Safety and Health

OSHA: Occupational Safety and Health Administration

PEL: Permissible Exposure Limit

RTECs: Registry of Toxic Effects of Chemical Substances

TLV: Threshold Limit Values

WHMIS: Workplace Hazardous Materials Information System

- References:
1. ACGIH, Threshold Limit Values and Biological Exposure Indices for 2005.
 2. International Agency for Research on Cancer Monographs, searched 2006.
 3. Canadian Centre for Occupational Health and Safety, CCInfoWeb databases, 2006 (Chempendium and RTECs).
 4. Material Safety Data Sheet from manufacturer.

MATERIAL SAFETY DATA SHEET

SECTION I - PRODUCT IDENTIFICATION

Product name: MASTERS PRO-DOPE

Product use: Thread sealing compound.

Supplier name and address:

G.F. THOMPSON CO. LTD.

620 Steven Court

Newmarket, Ontario

L3Y 6Z2

Manufacturer name and address:

Refer to supplier.

Emergency Tel:

Mon – Fri, 7:30 am to 5:00 pm EST

905-898-2557

800-499-3673 (toll free)

24 hr Emergency Tel:

905-252-4793

WHMIS CLASS: B4, D1A, D2A, D2B

HMIS Rating:

* - Chronic hazard 0 - Minimal 1 – Slight 2 - Moderate 3 - Serious 4 – Severe

Health: *2 Flammability: 3 Reactivity: 0

SECTION II - INGREDIENTS

<u>Ingredients</u>	<u>CAS#</u>	<u>wt. %</u>	<u>LC₅₀ / 4 Hrs (Rat, ihl.)</u>	<u>LD₅₀ mg/kg</u>	
				<u>(Rat, oral)</u>	<u>(Rabbit, dermal)</u>
Castor oil	8001-79-4	15 - 40	N/Av	N/Av	N/Av
Ethylene glycol n-butyl ether	111-76-2	10 - 30	450 ppm	320 (rabbit)	400
Isopropyl alcohol	67-63-0	10 - 30	17,000 ppm	4720	12,890

SECTION III - PHYSICAL DATA

Physical state, odour and appearance: Solid paste. Slight alcohol odour.

Evaporation rate (n-Butyl acetate = 1): N/Av

Volatile, % by volume: 10

Solubility in water: Slightly soluble

pH: N/Av.

Vapour pressure (mmHg): N/Av

Coefficient of water/oil distribution: N/Av

VOC: 345.6 g/l, 25.4%

Freezing / melting point: N/Av

Odour threshold: N/Av

Specific gravity: 1.41

Boiling point: N/Av

Vapour density (Air = 1): N/Av

Viscosity: N/Av

SECTION IV - FIRE AND EXPLOSION DATA

Conditions of flammability: Flammable solid, due to organic solvent content. Product may be ignited by heat, sparks and flame.

Flash point (Method): 25°C / 77°F (Method not known)

Auto-ignition temperature: N/Av

Upper flammable limit %: N/Av

Lower flammable limit %: N/Av

Means of extinction: Dry chemical, foam, carbon dioxide and water fog. Do not use water jet, as this may spread burning material.

Sensitivity to mechanical impact/static discharge: N/Av.

Special fire fighting procedures: Firefighters should wear proper full protective equipment and self-contained breathing apparatus. Move containers from fire area if it can be done without risk. Water spray may only be useful in cooling equipment and containers exposed to heat and flame.

Unusual fire and explosion hazards: Closed containers may rupture if exposed to excess heat or flame due to a build-up of internal pressure.

Hazardous combustion products: Carbon oxides and other irritating fumes and smoke.

SECTION V - REACTIVITY DATA

Stability: Stable under the recommended storage and handling conditions prescribed. Hazardous polymerization will not occur.

Incompatible materials: Strong oxidizers (e.g. Chlorine, Peroxides, etc.).

Conditions of reactivity: Stable under ambient pressure and temperature. Avoid heat, sparks and flames.

Hazardous decomposition products: None known. Refer to Section IV for 'Hazardous combustion products'.

SECTION VI - TOXICOLOGICAL PROPERTIES

******Routes of exposure and acute effects******

Exposure limit: ACGIH-TLV: Ethylene glycol n-butyl ether – 20 ppm; Isopropyl alcohol – 200 ppm.

OSHA-PEL: Ethylene glycol n-butyl ether – 50 ppm (skin); Isopropyl alcohol – 400 ppm.

Routes of exposure: Skin contact, skin absorption, eye contact, inhalation and ingestion.

Irritancy of product: Moderate to severe.

Inhalation: Harmful if inhaled. Inhalation may cause nose, throat and respiratory tract irritation. Symptoms may include headache, nausea, vomiting, other central nervous system effects and blood system effects (red blood cell fragility and hemoglobinuria).

Skin: May cause moderate to severe irritation. Product could be absorbed if left on the skin and cause headache, nausea, vomiting, other central nervous system effects and blood system effects (red blood cell fragility and hemoglobinuria).

Eyes: May cause severe irritation.

Ingestion: Harmful if ingested. May cause irritation to the mouth, throat and stomach. Symptoms may include headache, nausea, vomiting, diarrhea, other central nervous system effects and possibly blood system effects (red blood cell fragility and hemoglobinuria).

Chronic effects: Prolonged or repeated skin contact may cause severe drying and cracking of the skin (dermatitis). Prolonged or repeated inhalation may cause severe toxicity to the blood system. At higher concentrations, prolonged inhalation may cause liver damage.

Carcinogenicity: Contains Ethylene glycol n-butyl ether. Ethylene glycol n-butyl ether is classified as a confirmed animal carcinogen with unknown relevance to humans by ACGIH (Group A3). None of the listed ingredients are classified as carcinogenic by IARC.

Reproductive effects, Teratogenicity, Mutagenicity: Contains Isopropyl alcohol. Isopropyl alcohol may cause fetotoxic effects, based on animal data.

Sensitization to material: None known.

Synergistic materials: N/Av.

Conditions aggravated by exposure: Pre-existing skin, eye and respiratory disorders.

SECTION VII - FIRST AID

Inhalation: Immediately remove victim to fresh air. Obtain medical attention.

Skin contact: Immediately wash skin with mild soap and plenty of water, while removing contaminated clothing. Obtain medical attention immediately.

Eye contact: Immediately flush eyes thoroughly with water for at least fifteen minutes. Do not rub eyes. Obtain medical attention immediately.

Ingestion: Do not induce vomiting. Obtain medical attention immediately. Never give anything by mouth to an unconscious or convulsing person.

SECTION VIII - PREVENTIVE MEASURES

Spill, leak or release: Restrict access to area until completion of clean-up. Ensure clean-up is conducted by trained personnel only. All persons dealing with clean-up should wear the appropriate chemically resistant equipment. Eliminate all sources of heat and flame. Ventilate area of release. Stop leak if you can do so without risk. Scrape up into suitable containers, using method that does not generate sparks. Place any recovered material in closed, labelled containers for recycling or disposal (see below). Clean spill area. Keep out of waterways. Notify the appropriate authorities as required.

Waste disposal: Handle according to recommendations listed below. Dispose in accordance with all applicable government regulations.

SECTION VIII - PREVENTIVE MEASURES Continued

PROTECTIVE EQUIPMENT

Respiratory protection: None required under normal use. For prolonged exposure or if the TLV is exceeded, wear NIOSH-approved respirators.

Ventilation: Use in well ventilated area. General ventilation should be sufficient under normal use. Local exhaust ventilation may be necessary for prolonged exposures or if the product is being heated.

Protective gloves: Gloves impervious to the material, must be worn. Advice should be sought from glove suppliers.

Eye protection: Safety goggles, to prevent product from entering the eyes.

Other protective equipment: An eyewash station and safety shower should be made available in the immediate working area. Other equipment may be required according to workplace standards.

*** STORAGE & HANDLING ***

Storage and handling conditions:

Handling: Wear appropriate chemically protective equipment. Use in a well ventilated area. Avoid inhaling vapours or fumes. Avoid contact with skin, eyes, and clothing. Avoid and control operations that create dusty atmospheres. Keep away from heat, sparks and flame. Ground all equipment during handling. Keep away from incompatible materials. Keep container tightly closed when not in use. Wash thoroughly after handling.

Storage: Store in a cool, dry, well-ventilated area away from incompatibles (refer to Section V), heat and flame. No smoking in the area. Inspect periodically for damage or leaks.

Special Shipping Information - Transportation of Dangerous Goods Regulations (TDGR): Refer to the supplier for shipping information.

SECTION IX - PREPARATION INFORMATION

Prepared by: G. F. Thompson Co. Ltd

Telephone No.: 905-898-2557

Preparation date: December 1, 2012

Additional notes or references:

Legend: ACGIH: American Conference of Governmental Industrial Hygienists

CAS: Chemical Abstract Service

HMIS: Hazardous Materials Identification System

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PEL: Permissible Exposure Limit

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TLV: Threshold Limit Values

WHMIS: Workplace Hazardous Materials Information System

- References:
1. ACGIH, Threshold Limit Values and Biological Exposure Indices for 2005.
 2. International Agency for Research on Cancer Monographs, searched 2006.
 3. Canadian Centre for Occupational Health and Safety, CCIInfoWeb databases, 2006 (Chempendium and RTECs).
 4. Material Safety Data Sheet from manufacturer.

ITW Permatex Canada
 35 Brownridge Road, Unit 1
 Halton Hills, ON Canada L7G 0C6
 Telephone: (800) 924-6994
 Urgence: 800-255-3924 (ChemTel)

**Canadian Workplace Hazardous Materials Information System
 Material Safety Data Sheet**

I. PRODUCT IDENTIFICATION

Product Name: MEDIUM STRENGTH THREADLOCKER BLUE 6ML
 Item No: 24200
 Product Type: Anaerobic

II. COMPOSITION/INFORMATION ON INGREDIENTS

Component	Weight%	LD50/oral/rat	LC50/inhalation/rat	ACGIH; TLV-TWA
POLYGLYCOL DIMETHACRYLATE 25852-47-5	60-80	not available	not available	
POLYGLYCOL OLEATE 9004-96-0	20-40	>25 g/kg	not available	
DIMETHYLBENZYL HYDROPEROXIDE 80-15-9	<3	382 mg/kg	200 ppm/4H	
TITANIUM DIOXIDE 13463-67-7	0.1-1.0	>10000 mg/kg	not available	10 mg/m ³

III. PHYSICAL DATA

Physical State/Appearance: Blue liquid
 Odour & Odour Threshold: Sharp, irritating
 Specific Gravity: 1.00-1.15
 Evaporation Rate: Not determined
 Vapour Pressure: Not determined
 Vapour Density: Heavier than air
 Freezing Point: Not determined
 pH: Does not apply
 Octanol/Water Coefficient: Not determined
 Boiling Point: >150°C/302°F

IV. FIRE AND EXPLOSIVE DATA

Recommended Extinguishing Media: Carbon dioxide, Dry chemical, Foam
 Hazardous Combustion Products: Oxides of carbon
 Sensitivity to Static Discharge: Sensitivity to static discharge is not expected.
 Conditions of Flammability: None anticipated.
 Flash Point/Range: >95°C COC
 Autoignition Temperature: Not determined
 Upper Explosive Limit: Not determined
 Lower Explosive Limit: Not determined

V. REACTIVITY DATA

Conditions Causing Chemical Instability: None
 Materials to avoid: Strong oxidizers, Peroxides, Reducing agents
 Conditions of Reactivity: High temperatures.
 Hazardous Decomposition Products: Carbon oxides

VI. HAZARDS IDENTIFICATION

Primary Routes of Exposure: Eye and skin contact, ingestion, inhalation
 Existing Conditions Aggravated by Exposure: May aggravate preexisting dermatitis
 Toxicity Information: (See Effects of Acute Exposure to Product)

VI. HAZARDS IDENTIFICATION

Effects of Acute Exposure:	At elevated temperatures, may cause irritation of the eyes and respiratory tract. May cause eye and skin irritation. May cause skin irritation in sensitive individuals. May cause pain, redness or swelling of the eyes and excessive blinking and tear production. Swallowing large amounts may cause gastrointestinal tract irritation, central nervous system depression, low blood pressure, rapid heartbeat.
Effects of Chronic Exposure:	May cause an allergic skin reaction.
Irritancy of Product:	May cause dermatitis on prolonged contact in sensitive individuals.
Sensitization to Product:	(See Effects of Acute Exposure to Product)
Carcinogenicity:	(See Effects of Chronic Exposure to Product)
Reproductive Toxicity:	(See Effects of Chronic Exposure to Product)
Teratogenicity:	(See Effects of Chronic Exposure to Product)
Mutagenicity:	(See Effects of Chronic Exposure to Product)
Toxicologically Synergistic Products:	None known
WHMIS Hazard Class:	D2B TOXIC MATERIALS

VII. PREVENTATIVE MEASURES

Personal Protection

Eyes:	Safety glasses.
Skin:	Neoprene or nitrile gloves recommended.
Ventilation:	General; local exhaust ventilation as necessary to control any air contaminants to within their exposure limits (or to the lowest feasible levels when limits have not been established) during the use of this product. In case of insufficient ventilation, wear an organic vapor respirator.
Engineering Controls:	In case of insufficient ventilation, wear an organic vapor respirator.
Spill Procedures:	Maintain good ventilation. Take up with an inert absorbent. Store in a closed waste container until disposal.
Protection of Man and Environment:	Follow Canadian and local regulations for disposal.
Handling Procedures and Equipment:	Store in a dry area below 35°C.
Special Handling Information:	Avoid prolonged breathing of vapor. Keep away from eyes. Avoid prolonged contact with skin. Do not smoke while using. Wash hands after use.

VIII. FIRST AID MEASURES

Ingestion:	If swallowed, do not induce vomiting - seek medical advice. Never give anything by mouth to an unconscious person.
Inhalation:	Move to fresh air in case of accidental inhalation of vapours. Obtain medical attention.
Skin Contact:	Wash off immediately with soap and plenty of water removing all contaminated clothes and shoes. If skin irritation persists, call a physician.
Eye Contact:	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Obtain medical attention.

IX. SHIPPING INFORMATION

Canadian Transportation of Dangerous Goods

Proper Shipping Name:	Not regulated
Hazard Class:	None
UN/ID No:	None

IATA (Air)

Proper Shipping Name:	Not regulated
Class or Division:	None
UN/ID Number:	None

IMDG (Vessel)

Proper Shipping Name:	Not regulated
Hazard Class:	None
UN Number:	None

X. PREPARATION INFORMATION

Estimated HMIS Classification: HEALTH 1, FLAMMABILITY 1, PHYSICAL HAZARD 0
(HMIS is a registered trademark of the National Paint and Coatings Association)

Estimated NFPA Rating: HEALTH 1, FLAMMABILITY 1, REACTIVITY 0
(NFPA is a registered trademark of the National Fire Protection Association)

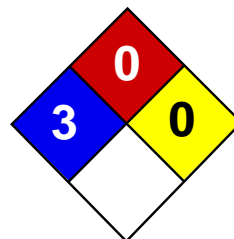
Prepared By: Denise Boyd, Manager-Environmental, Health & Safety

Revision Date: January 10, 2013

Company: ITW Permatex Canada, 35 Brownridge Rd. Unit 1, Halton Hills, ON L76 0C6

Revision Number: 7

Telephone No.: 1-800-924-6994



Health	3
Fire	0
Reactivity	0
Personal Protection	

Material Safety Data Sheet Mercury MSDS

Section 1: Chemical Product and Company Identification

Product Name: Mercury

Catalog Codes: SLM3505, SLM1363

CAS#: 7439-97-6

RTECS: OV4550000

TSCA: TSCA 8(b) inventory: Mercury

CI#: Not applicable.

Synonym: Quick Silver; Colloidal Mercury; Metallic Mercury; Liquid Silver; Hydragryum

Chemical Name: Mercury

Chemical Formula: Hg

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Mercury	7439-97-6	100

Toxicological Data on Ingredients: Mercury LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects:

Very hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Hazardous in case of skin contact (corrosive, permeator). Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Severe over-exposure can result in death. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:

Hazardous in case of skin contact (permeator). **CARCINOGENIC EFFECTS:** Classified A5 (Not suspected for human.) by ACGIH. 3 (Not classifiable for human.) by IARC. **MUTAGENIC EFFECTS:** Not available. **TERATOGENIC EFFECTS:** Not available. **DEVELOPMENTAL TOXICITY:** Not available. The substance may be toxic to blood, kidneys, liver, brain, peripheral nervous system, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage. Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation.

Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. WARM water MUST be used. Get medical attention immediately.

Skin Contact:

In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. **WARNING:** It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards:

When thrown into mercury vapor, boron phosphodiiodide ignites at once. Flame forms with chlorine jet over mercury surface at 200 deg to 300 deg C. Mercury undergoes hazardous reactions in the presence of heat and sparks or ignition.

Special Remarks on Explosion Hazards:

A violent exothermic reaction or possible explosion occurs when mercury comes in contact with lithium and rubidium. CHLORINE DIOXIDE & LIQUID HG, WHEN MIXED, EXPLODE VIOLENTLY. Mercury and Ammonia can produce an

explosive compound. A mixture of the dry carbonyl and oxygen will explode on vigorous shaking with mercury. Methyl azide in the presence of mercury was shown to be potentially explosive.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:

Corrosive liquid. Poisonous liquid. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Use water spray curtain to divert vapor drift. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep locked up.. Keep container dry. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Never add water to this product. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, metals.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area. Do not store above 25°C (77°F).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:

Face shield. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves. Boots.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 0.025 from ACGIH (TLV) [United States] SKIN TWA: 0.05 CEIL: 0.1 (mg/m³) from OSHA (PEL) [United States] Inhalation TWA: 0.025 (mg/m³) [United Kingdom (UK)] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid. (Heavy liquid)

Odor: Odorless.

Taste: Not available.

Molecular Weight: 200.59 g/mole

Color: Silver-white

pH (1% soln/water): Not available.

Boiling Point: 356.73°C (674.1°F)

Melting Point: -38.87°C (-38°F)

Critical Temperature: 1462°C (2663.6°F)

Specific Gravity: 13.55 (Water = 1)

Vapor Pressure: Not available.

Vapor Density: 6.93 (Air = 1)

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Very slightly soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents, metals.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:

Ground mixtures of sodium carbide and mercury, aluminum, lead, or iron can react vigorously. A violent exothermic reaction or possible explosion occurs when mercury comes in contact with lithium and rubidium. Incompatible with boron diiodophosphide; ethylene oxide; metal oxides, metals(aluminum, potassium, lithium, sodium, rubidium); methyl azide; methylsilane, oxygen; oxidants(bromine, peroxyformic acid, chlorine dioxide, nitric acid, tetracarbonylnickel, nitromethane, silver perchlorate, chlorates, sulfuric acid, nitrates,); tetracarbonylnickel, oxygen, acetylinic compounds, ammonia, ethylene oxide, methylsilane, calcium,

Special Remarks on Corrosivity:

The high mobility and tendency to dispersion exhibited by mercury, and the ease with which it forms alloys (amalgam) with many laboratory and electrical contact metals, can cause severe corrosion problems in laboratories. Special precautions: Mercury can attack copper and copper alloy materials.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:

LD50: Not available. LC50: Not available.

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: Classified A5 (Not suspected for human.) by ACGIH. 3 (Not classifiable for human.) by IARC. May cause damage to the following organs: blood, kidneys, liver, brain, peripheral nervous system, central nervous system (CNS).

Other Toxic Effects on Humans:

Very hazardous in case of skin contact (irritant), of ingestion, of inhalation. Hazardous in case of skin contact (corrosive, permeator).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:

May affect genetic material. May cause cancer based on animal data. Passes through the placental barrier in animal. May cause adverse reproductive effects(paternal effects- spermatogenesis; effects on fertility - fetotoxicity, post-implantation mortality), and birth defects.

Special Remarks on other Toxic Effects on Humans:

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Class 8: Corrosive material

Identification: : Mercury UNNA: 2809 PG: III

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Mercury California prop. 65: This product contains the following ingredients for which the State of California has found to cause birth defects which would require a warning under the statute: Mercury Connecticut hazardous material survey.: Mercury Illinois toxic substances disclosure to employee act: Mercury Illinois chemical safety act: Mercury New York acutely hazardous substances: Mercury Rhode Island RTK hazardous substances: Mercury Pennsylvania RTK: Mercury Minnesota: Mercury Massachusetts RTK: Mercury New Jersey: Mercury New Jersey spill list: Mercury Louisiana spill reporting: Mercury California Director's List of Hazardous Substances.: Mercury TSCA 8(b) inventory: Mercury SARA 313 toxic chemical notification and release reporting: Mercury CERCLA: Hazardous substances.: Mercury: 1 lbs. (0.4536 kg)

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):

CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC). CLASS D-2A: Material causing other toxic effects (VERY TOXIC). CLASS E: Corrosive liquid.

DSCL (EEC):

R23- Toxic by inhalation. R33- Danger of cumulative effects. R38- Irritating to skin. R41- Risk of serious damage to eyes. R50/53- Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. S2- Keep out of the

reach of children. S7- Keep container tightly closed. S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S39- Wear eye/face protection. S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). S46- If swallowed, seek medical advice immediately and show this container or label. S60- This material and its container must be disposed of as hazardous waste. S61- Avoid release to the environment. Refer to special instructions/Safety data sheets.

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 0

Reactivity: 0

Personal Protection:

National Fire Protection Association (U.S.A.):

Health: 3

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Face shield.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:22 PM

Last Updated: 05/21/2013 12:00 PM

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Material Safety Data Sheet



Carbon Dioxide/Inert Gas Mixture

1. Product and company identification

Product name	: Carbon Dioxide/Inert Gas Mixture
Synonym	: N/A
Trade name	: Helistar A1025, A415, CS, GV, HiDep & SS, Robostar SS, Stargold, C2, C5, C8, C10, C17, C25 & C40, Autoweld, Beer Gas, Draftgaz, Mig Mix Gold, Extendapak 10 to 29 & 62
Material uses	: Not available.
Manufacturer	: Praxair Canada Inc. 1 City Centre Drive Suite 1200 Mississauga, ON L5B 1M2
MSDS #	: E-6751-I
Validation date	: October 15, 2013.
Print date	: October 15, 2013.
<u>In case of emergency</u>	: Emergencies: * 1-800-363-0042 *Call emergency numbers 24 hours a day only for spills, leaks, fire, exposure, or accidents involving this product. For routine information, contact your supplier or Praxair sales representative.
Product type	: Gas.

2. Hazards identification

Physical state	: Gas.
Odor	: Not available.
Emergency overview	: DANGER! HIGH PRESSURE GAS. Can cause rapid suffocation. Can increase respiration and heart rate. May cause dizziness and drowsiness. Self-contained breathing apparatus may be required by rescue workers. Contains gas under pressure. In a fire or if heated, a pressure increase will occur and the container may burst or explode. Do not puncture or incinerate container. Avoid breathing gas. Use only with adequate ventilation.
Routes of entry	: Inhalation
<u>Potential acute health effects</u>	
Inhalation	: Asphyxiant. Effects are due to lack of oxygen. Moderate concentrations may cause headaches, drowsiness, dizziness, excitation, excess salivation, vomiting, and unconsciousness. Lack of oxygen can kill.
Ingestion	: As this product is a gas, refer to the inhalation section.
Skin	: Contact with rapidly expanding gas may cause burns or frostbite.
Eyes	: Contact with rapidly expanding gas may cause burns or frostbite.
<u>Potential chronic health effects</u>	
Chronic effects	: No known significant effects or critical hazards.
Carcinogenicity	: No known significant effects or critical hazards.
Mutagenicity	: No known significant effects or critical hazards.
Teratogenicity	: No known significant effects or critical hazards.
Developmental effects	: No known significant effects or critical hazards.
Fertility effects	: No known significant effects or critical hazards.
Target organs	: No known significant effects or critical hazards
<u>Over-exposure signs/symptoms</u>	
Inhalation	: No specific data.
Ingestion	: No specific data.
Skin	: No specific data.

2. Hazards identification

- Eyes** : No specific data.
- Medical conditions aggravated by over-exposure** : Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

See toxicological information (section 11)

3. Composition/information on ingredients

Canada

<u>Name</u>	<u>CAS number</u>	<u>%</u>
carbon dioxide	124-38-9	0.1 - 99.999
AND CONTAINS ONE OR MORE OF THE FOLLOWING GASES:		
argon	7440-37-1	0-99.9
helium	7440-59-7	0-99.9
neon	7440-01-9	0-99.9
xenon	7440-63-3	0-99.9
krypton	7439-90-9	0-99.9
nitrogen	7727-37-9	0-99.9

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

4. First aid measures

- Eye contact** : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.
- Skin contact** : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.
- Inhalation** : Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.
- Ingestion** : As this product is a gas, refer to the inhalation section.
- Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.
- Notes to physician** : In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

5. Fire-fighting measures

- Flammability of the product** : Contains gas under pressure. In a fire or if heated, a pressure increase will occur and the container may burst or explode.

Extinguishing media

- Suitable** : Use an extinguishing agent suitable for the surrounding fire.
- Not suitable** : None known.
- Special exposure hazards** : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Contact supplier immediately for specialist advice. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.
- Hazardous thermal decomposition products** : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
nitrogen oxides
- Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

5. Fire-fighting measures

- Special remarks on fire hazards** : Not available.
- Special remarks on explosion hazards** : Not available.

6. Accidental release measures

- Personal precautions** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Avoid breathing gas. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see section 8).
- Environmental precautions** : Ensure emergency procedures to deal with accidental gas releases are in place to avoid contamination of the environment. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).
- Methods for cleaning up**
- Small spill** : Immediately contact emergency personnel. Stop leak if without risk.
- Large spill** : Immediately contact emergency personnel. Stop leak if without risk. Note: see section 1 for emergency contact information and section 13 for waste disposal.

7. Handling and storage

- Handling** : Put on appropriate personal protective equipment (see section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Contains gas under pressure. Avoid contact with eyes, skin and clothing. Avoid breathing gas. Empty containers retain product residue and can be hazardous. Do not puncture or incinerate container.
- Protect cylinder from damage. Never attempt to lift a cylinder by its cap; the cap is intended solely to protect the valve. Never insert an object (e.g., wrench, screwdriver, pry bar) into cap openings; doing so may damage the valve and cause a leak. Use an adjustable strap wrench to remove over-tight or rusted caps. Open valve slowly. If valve is hard to open, discontinue use and contact your supplier. Close valve after each use; keep closed even when empty.
- Storage** : Store in accordance with local regulations. Store in a segregated and approved area. Store in a dry, cool and well-ventilated area, away from incompatible materials (see section 10). Keep container tightly closed and sealed until ready for use.
- OTHER HAZARDOUS CONDITIONS OF HANDLING, STORAGE, AND USE:**
- High pressure gas.** Use piping and equipment adequately designed to withstand pressures to be encountered. Gas can cause rapid suffocation due to oxygen deficiency. Store and use with adequate ventilation. Close valve after each use; keep closed even when empty. **Prevent reverse flow.** Reverse flow into cylinder may cause a rupture. Use a check valve or other protective device in any line or piping from the cylinder. **Never work on a pressured system.** If there is a leak, close the cylinder valve. Blow the system down in an environmentally safe manner in compliance with all federal, provincial, and local laws, then repair the leak. **Never place a compressed gas cylinder where it may become part of an electrical circuit.**
- PRECAUTIONS TO BE TAKEN IN STORAGE:**
- Store and use with adequate ventilation. Firmly secure cylinders upright to keep them from falling or being knocked over. Screw valve protection cap firmly in place by hand. Store only where temperature will not exceed 52°C/125°F. Store full and empty cylinders separately. Use a first-in, first-out inventory system to prevent storing full cylinders for long periods.
- RECOMMENDED PUBLICATIONS:**
- Additional information on storage, handling, and use of this product is provided in **NFPA 55: Standard for the Storage, Use, and Handling of Compressed and Liquefied Gases in Portable Cylinders**, published by the National Fire Protection Association.

See also Praxair publication P-14-153, Guidelines for Handling Gas Cylinders and

7. Handling and storage

Containers. Obtain from your local supplier.

8. Exposure controls/personal protection

Occupational exposure limits		TWA (8 hours)			STEL (15 mins)			Ceiling			Notations
Ingredient	List name	ppm	mg/m ³	Other	ppm	mg/m ³	Other	ppm	mg/m ³	Other	
carbon dioxide	US ACGIH 1/2009	5000	9000	-	30000	54000	-	-	-	-	
	AB 4/2009	5000	9000	-	30000	54000	-	-	-	-	
	BC 10/2009	5000	-	-	15000	-	-	-	-	-	
	ON 8/2008	5000	9000	-	30000	54000	-	-	-	-	
	QC 6/2008	5000	9000	-	30000	54000	-	-	-	-	
argon	Simple asphyxiant.										[2]
helium											[2]
neon											[2]
nitrogen											[2]

[2]Oxygen Depletion [Asphyxiant]

Consult local authorities for acceptable exposure limits.

Recommended monitoring procedures : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.

Engineering measures : No special ventilation requirements. Good general ventilation should be sufficient to control worker exposure to airborne contaminants. If this product contains ingredients with exposure limits, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure below any recommended or statutory limits.

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal protection

Respiratory : Use respirable fume respirator or air supplied respirator when working in confined space or where local exhaust or ventilation does not keep exposure below TLV. Select in accordance with provincial regulations, local bylaws or guidelines. Selection should be based on the current CSA standard Z94.4, "Selection, Care, and Use of Respirators." Respirators should also be approved by NIOSH and MSHA.

Hands : Insulated neoprene

Eyes : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts. Select in accordance with the current CSA standard Z94.3, "Industrial Eye and Face Protection", and any provincial regulations, local bylaws or guidelines.

Skin : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Other protection : Metatarsal shoes for cylinder handling. Protective clothing where needed. Cuffless trousers should be worn outside the shoes. Select in accordance with the current CSA standard Z195, "Protective Foot Wear", and any provincial regulations, local bylaws or guidelines.

9. Physical and chemical properties

Physical state	: Gas.
Flash point	: Not available.
Burning time	: Not applicable.
Burning rate	: Not applicable.
Auto-ignition temperature	: Not available.
Flammable limits	: Not available.
Color	: Colorless.
Odor	: Not available.
Taste	: Not available.
Molecular weight	: Not applicable.
Molecular formula	: Not applicable.
pH	: Not available.
Boiling/condensation point	: Not available.
Melting/freezing point	: Not available.
Critical temperature	: Not available.
Relative density	: Not available.
Vapor pressure	: Not available.
Vapor density	: Not available.
Volatility	: Not available.
Odor threshold	: Not available.
Evaporation rate	: Not available.
Viscosity	: Not available.
Ionicity (in water)	: Not available.
Dispersibility properties	: Not available.
Solubility	: Not available.
Physical/chemical properties comments	: Not available.
COEFFICIENT OF WATER/OIL DISTRIBUTION:	: Not available.

10. Stability and reactivity

Chemical stability	: The product is stable.
Conditions to avoid	: No specific data.
Materials to avoid	: No specific data.
Hazardous decomposition products	: Under normal conditions of storage and use, hazardous decomposition products should not be produced.
Possibility of hazardous reactions	: Under normal conditions of storage and use, hazardous reactions will not occur.

11. Toxicological information

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
carbon dioxide	LC50 Inhalation Gas.	Rat	470000 ppm	30 minutes

Conclusion/Summary : Not available.

Chronic toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Not available.				

Conclusion/Summary : Not available.

11. Toxicological information

Product/ingredient name **Result** **Species** **Score** **Exposure** **Observation**
Not available.

Sensitizer

Product/ingredient name **Route of exposure** **Species** **Result**

Not available.

Conclusion/Summary : Not available.

Carcinogenicity

Product/ingredient name **Result** **Species** **Dose** **Exposure**
Not available.

Conclusion/Summary : Not available.

Classification

Product/ingredient name **ACGIH** **IARC** **EPA** **NIOSH** **NTP** **OSHA**
Not available.

Mutagenicity

Product/ingredient name **Test** **Experiment** **Result**
Not available.

Conclusion/Summary : Not available.

Teratogenicity

Product/ingredient name **Result** **Species** **Dose** **Exposure**
Not available.

Conclusion/Summary : Not available.

Reproductive toxicity

Product/ingredient name **Maternal toxicity** **Fertility** **Development toxin** **Species** **Dose** **Exposure**

Not available.

Conclusion/Summary : Not available.

Synergistic products : Not available.

12. Ecological information

Ecotoxicity : No known significant effects or critical hazards.

Aquatic ecotoxicity

Product/ingredient name **Test** **Result** **Species** **Exposure**
Not available.

Conclusion/Summary : Not available.

Persistence/degradability

Product/ingredient name **Test** **Result** **Dose** **Inoculum**
Not available.

Conclusion/Summary : Not available.

Octanol/water partition coefficient : Not available.

Bioconcentration factor : Not available.

Mobility : Not available.

Toxicity of the products of biodegradation : Not available.

Other adverse effects : No known significant effects or critical hazards.


13. Disposal considerations

- Waste disposal** : The generation of waste should be avoided or minimized wherever possible. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe way. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Do not puncture or incinerate container. Empty pressure vessels should be returned to the supplier.
- Waste stream** : Not available.
- RCRA classification** : Not available.

Disposal should be in accordance with applicable regional, national, and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

14. Transport information

Regulatory information	UN number	Proper shipping name	Classes	PG*	Label	Additional information
TDG Classification	UN1956	Compressed gas, n.o.s (for a quantity of carbon dioxide between 0.5% - 99.9999%, indicate "carbon dioxide", otherwise indicate the most important component.)	2.2	-		- PRODUCT REPORTABLE QUANTITY (PRQ): Any accidental release in a quantity that could pose a danger to public safety or any sustained release of 10 minutes or more.

PG* : Packing group

SPECIAL SHIPPING INFORMATION:

Cylinders should be transported in a secure position, in a well-ventilated vehicle. Cylinders transported in an enclosed, nonventilated compartment of vehicle can present serious safety hazards.

15. Regulatory information

- United States inventory (TSCA 8b)** : All components are listed or exempted.
- WHMIS (Canada) Canadian lists** : **Class A:** Compressed gas.
CEPA Toxic substances: The following components are listed: Carbon dioxide
Canadian ARET: None of the components are listed.
Canadian NPRI: None of the components are listed.
Alberta Designated Substances: None of the components are listed.
Ontario Designated Substances: None of the components are listed.
Quebec Designated Substances: None of the components are listed.
- Canada inventory** : All components are listed or exempted.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

International regulations

- International lists** : **Australia inventory (AICS):** All components are listed or exempted.
China inventory (IECSC): All components are listed or exempted.
Japan inventory: Not determined.
Korea inventory: All components are listed or exempted.
New Zealand Inventory of Chemicals (NZIoC): Not determined.
Philippines inventory (PICCS): All components are listed or exempted.

15. Regulatory information

- Chemical Weapons Convention List Schedule I Chemicals** : Not listed
- Chemical Weapons Convention List Schedule II Chemicals** : Not listed
- Chemical Weapons Convention List Schedule III Chemicals** : Not listed

16. Other information

Label requirements : HIGH PRESSURE GAS. Can cause rapid suffocation. Can increase respiration and heart rate. May cause dizziness and drowsiness. Self-contained breathing apparatus may be required by rescue workers.

Hazardous Material Information System (U.S.A.) :

Health	0
Flammability	0
Physical hazards	2

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings are not required on MSDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

- References** :
- AV-1 Safe Handling and Storage of Compressed Gas
 - P-1 Safe Handling of Compressed Gases in Containers
 - P-14 Accident Prevention in Oxygen-Rich, Oxygen-Deficient Atmosphere
 - SB-2 Oxygen-Deficient Atmospheres
 - V-1 Compressed Gas Cylinder Valve Inlet and Outlet Connections
 - V-7 Standard Method of Determining Cylinder Valve Outlet Connections for Industrial Gas Mixtures
 - Handbook of Compressed Gases, Fifth Edition

Other special considerations : Not available.

Date of printing : 10/15/2013.

Date of issue : 10/15/2013.

Date of previous issue : No previous validation.

Version : 0.07

☑ Indicates information that has changed from previously issued version.

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

STANDARD VALVE CONNECTIONS FOR U.S. AND CANADA:

THREADED: For information on CGA Valves, please contact your Specialty Gas Representative.

PIN-INDEXED YOKE: Not applicable.

16. Other information

ULTRA-HIGH- INTEGRITY CONNECTION:

Not applicable.

Use the proper CGA connections. **DO NOT USE ADAPTERS.** Additional limited-standard connections may apply. See CGA pamphlets V-1 and V-7 listed below.

Ask your supplier about free Praxair safety literature as referred to in this MSDS and on the label for this product. Further information about this product can be found in the following pamphlets published by the Compressed Gas Association, Inc. (CGA), 4221 Walney Road, 5th Floor, Chantilly, VA 20151-2923, Telephone (703) 788-2700, Fax (703) 961-1831, website: www.cganet.com.

MIXTURES:

When two or more gases, or liquefied gases are mixed, their hazardous properties may combine to create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an Industrial Hygienist, or other trained person when you make your safety evaluation of the end product. Remember, gases and liquids have properties which can cause serious injury or death.

For more in-depth information for each component, refer to the pure product MSDS.

The information contained in this MSDS is generated from technical sources using the Chemmate Mixture MSDS system and the pure-product MSDS for each component. These mixtures are not tested as a whole for chemical, physical, or health effects.

The opinions expressed herein are those of qualified experts within Praxair Canada Inc. We believe that the information contained herein is current as of the date of this Material Safety Data Sheet. Since the use of this information and the conditions of use of the product are not within the control of Praxair Canada Inc., it is the user's obligation to determine the conditions of safe use of the product.

Praxair Canada Inc. requests the users of this product to study this Material Data Sheet (MSDS) and become aware of product hazards and safety information. To promote safe use of this product, a user should (1) notify its employees, agents and contractors of the information on this MSDS and any product hazards and safety information, (2) furnish this same information to each of its customers for the product, and (3) request such customers to notify their employees and customers for the product of the same product hazards and safety information.

*Praxair and the Flowing Airstream design are trademarks of
Praxair Canada Inc.*

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Praxair Canada Inc.
1 City Centre Drive
Suite 1200
Mississauga, ON L5B 1M2



MATERIAL SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT

Product Name: MOBIL 1 10W-30
Product Description: Synthetic Base Stocks and Additives
MSDS Number: 17648
Product Code: 2015101010J2
Intended Use: Engine oil

COMPANY IDENTIFICATION

Supplier: Imperial Oil Products Division
240 4th Avenue
Calgary, ALBERTA. T2P 3M9 Canada
24 Hour Environmental / Health Emergency Telephone: 1-866-232-9563
Transportation Emergency Phone Number: 1-866-232-9563
Product Technical Information: 1-800-268-3183
Supplier General Contact: 1-800-567-3776

SECTION 2 COMPOSITION / INFORMATION ON INGREDIENTS

No Reportable Hazardous Substance(s) or Complex Substance(s).

SECTION 3 HAZARDS IDENTIFICATION

This material is not considered to be hazardous according to regulatory guidelines see Section 15.

HEALTH EFFECTS

Excessive exposure may result in eye, skin, or respiratory irritation. High-pressure injection under skin may cause serious damage.

NFPA Hazard ID:	Health: 0	Flammability: 1	Reactivity: 0
HMIS Hazard ID:	Health: 0	Flammability: 1	Reactivity: 0

NOTE: This material should not be used for any other purpose than the intended use in Section 1 without expert advice. Health studies have shown that chemical exposure may cause potential human health risks which may vary from person to person.

SECTION 4 FIRST AID MEASURES

INHALATION

Remove from further exposure. For those providing assistance, avoid exposure to yourself or others. Use

adequate respiratory protection. If respiratory irritation, dizziness, nausea, or unconsciousness occurs, seek immediate medical assistance. If breathing has stopped, assist ventilation with a mechanical device or use mouth-to-mouth resuscitation.

SKIN CONTACT

Wash contact areas with soap and water. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

EYE CONTACT

Flush thoroughly with water. If irritation occurs, get medical assistance.

INGESTION

First aid is normally not required. Seek medical attention if discomfort occurs.

SECTION 5 FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA

Appropriate Extinguishing Media: Use water fog, foam, dry chemical or carbon dioxide (CO₂) to extinguish flames.

Inappropriate Extinguishing Media: Straight streams of water

FIRE FIGHTING

Fire Fighting Instructions: Evacuate area. Prevent run-off from fire control or dilution from entering streams, sewers or drinking water supply. Fire-fighters should use standard protective equipment and in enclosed spaces, self-contained breathing apparatus (SCBA). Use water spray to cool fire exposed surfaces and to protect personnel.

Hazardous Combustion Products: Smoke, Fume, Aldehydes, Sulphur oxides, Incomplete combustion products, Oxides of carbon

FLAMMABILITY PROPERTIES

Flash Point [Method]: >200°C (392°F) [ASTM D-92]

Flammable Limits (Approximate volume % in air): LEL: 0.9 UEL: 7.0

Autoignition Temperature: N/D

SECTION 6 ACCIDENTAL RELEASE MEASURES

NOTIFICATION PROCEDURES

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations.

PROTECTIVE MEASURES

Avoid contact with spilled material. See Section 5 for fire fighting information. See the Hazard Identification Section for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for advice on the minimum

requirements for personal protective equipment. Additional protective measures may be necessary, depending on the specific circumstances and/or the expert judgment of the emergency responders.

SPILL MANAGEMENT

Land Spill: Stop leak if you can do so without risk. Recover by pumping or with suitable absorbent.

Water Spill: Stop leak if you can do so without risk. Confine the spill immediately with booms. Warn other shipping. Remove from the surface by skimming or with suitable absorbents. Seek the advice of a specialist before using dispersants.

Water spill and land spill recommendations are based on the most likely spill scenario for this material; however, geographic conditions, wind, temperature, (and in the case of a water spill) wave and current direction and speed may greatly influence the appropriate action to be taken. For this reason, local experts should be consulted. Note: Local regulations may prescribe or limit action to be taken.

ENVIRONMENTAL PRECAUTIONS

Large Spills: Dyke far ahead of liquid spill for later recovery and disposal. Prevent entry into waterways, sewers, basements or confined areas.

SECTION 7 HANDLING AND STORAGE

HANDLING

Avoid contact with used product. Prevent small spills and leakage to avoid slip hazard. Material can accumulate static charges which may cause an electrical spark (ignition source). When the material is handled in bulk, an electrical spark could ignite any flammable vapors from liquids or residues that may be present (e.g., during switch-loading operations). Use proper bonding and/or earthing procedures. However, bonding and earthing may not eliminate the hazard from static accumulation. Consult local applicable standards for guidance. Additional references include American Petroleum Institute 2003 (Protection Against Ignitions Arising out of Static, Lightning and Stray Currents) or National Fire Protection Agency 77 (Recommended Practice on Static Electricity) or CENELEC CLC/TR 50404 (Electrostatics - Code of practice for the avoidance of hazards due to static electricity).

Static Accumulator: This material is a static accumulator.

STORAGE

The container choice, for example storage vessel, may effect static accumulation and dissipation. Do not store in open or unlabelled containers. Keep away from incompatible materials.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure limits/standards for materials that can be formed when handling this product: When mists/aerosols can occur the following is recommended: 5 mg/m³ - ACGIH TLV (inhalable fraction).

NOTE: Limits/standards shown for guidance only. Follow applicable regulations.

ENGINEERING CONTROLS

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Control measures to consider:

No special requirements under ordinary conditions of use and with adequate ventilation.

PERSONAL PROTECTION

Personal protective equipment selections vary based on potential exposure conditions such as applications, handling practices, concentration and ventilation. Information on the selection of protective equipment for use with this material, as provided below, is based upon intended, normal usage.

Respiratory Protection: If engineering controls do not maintain airborne contaminant concentrations at a level which is adequate to protect worker health, an approved respirator may be appropriate. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. Types of respirators to be considered for this material include:

No special requirements under ordinary conditions of use and with adequate ventilation.

For high airborne concentrations, use an approved supplied-air respirator, operated in positive pressure mode. Supplied air respirators with an escape bottle may be appropriate when oxygen levels are inadequate, gas/vapour warning properties are poor, or if air purifying filter capacity/rating may be exceeded.

Hand Protection: Any specific glove information provided is based on published literature and glove manufacturer data. Glove suitability and breakthrough time will differ depending on the specific use conditions. Contact the glove manufacturer for specific advice on glove selection and breakthrough times for your use conditions. Inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:

No protection is ordinarily required under normal conditions of use.

Eye Protection: If contact is likely, safety glasses with side shields are recommended.

Skin and Body Protection: Any specific clothing information provided is based on published literature or manufacturer data. The types of clothing to be considered for this material include:

No skin protection is ordinarily required under normal conditions of use. In accordance with good industrial hygiene practices, precautions should be taken to avoid skin contact.

Specific Hygiene Measures: Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practise good housekeeping.

ENVIRONMENTAL CONTROLS

Comply with applicable environmental regulations limiting discharge to air, water and soil. Protect the environment by applying appropriate control measures to prevent or limit emissions.

SECTION 9	PHYSICAL AND CHEMICAL PROPERTIES
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Note: Physical and chemical properties are provided for safety, health and environmental considerations only and may not fully represent product specifications. Contact the Supplier for additional information.

GENERAL INFORMATION

Physical State: Liquid
Colour: Amber

Odour: Characteristic
Odour Threshold: N/D

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

Relative Density (at 15 °C): 0.86
Flash Point [Method]: >200°C (392°F) [ASTM D-92]
Flammable Limits (Approximate volume % in air): LEL: 0.9 UEL: 7.0
Autoignition Temperature: N/D
Boiling Point / Range: N/D
Vapour Density (Air = 1): > 2 at 101 kPa [Estimated]
Vapour Pressure: < 0.013 kPa (0.1 mm Hg) at 20°C [Estimated]
Evaporation Rate (n-butyl acetate = 1): N/D
pH: N/A
Log Pow (n-Octanol/Water Partition Coefficient): N/D
Solubility in Water: Negligible
Viscosity: 67.4 cSt (67.4 mm²/sec) at 40°C | 10.7 cSt (10.7 mm²/sec) at 100°C
Oxidizing Properties: See Hazards Identification Section.

OTHER INFORMATION

Freezing Point: N/D
Melting Point: N/A
Pour Point: -36°C (-33°F)
Decomposition Temperature: N/D

SECTION 10 STABILITY AND REACTIVITY

STABILITY: Material is stable under normal conditions.

CONDITIONS TO AVOID: Excessive heat. High energy sources of ignition.

MATERIALS TO AVOID: Strong oxidizers

HAZARDOUS DECOMPOSITION PRODUCTS: Material does not decompose at ambient temperatures.

HAZARDOUS POLYMERIZATION: Will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

ACUTE TOXICITY

<u>Route of Exposure</u>	<u>Conclusion / Remarks</u>
Inhalation	
Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Irritation: No end point data for material.	Negligible hazard at ambient/normal handling temperatures. Based on assessment of the components.
Ingestion	
Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Skin	
Toxicity: No end point data for material.	Minimally Toxic. Based on assessment of the components.
Irritation: No end point data for material.	Negligible irritation to skin at ambient temperatures. Based on assessment of the components.

Eye	
Irritation: No end point data for material.	May cause mild, short-lasting discomfort to eyes. Based on assessment of the components.

CHRONIC/OTHER EFFECTS

For the product itself:

Diesel engine oils: Not carcinogenic in animals tests. Used and unused diesel engine oils did not produce any carcinogenic effects in chronic mouse skin painting studies. Oils that are used in gasoline engines may become hazardous and display the following properties: Carcinogenic in animal tests. Caused mutations in vitro. Possible allergen and photoallergen. Contains polycyclic aromatic compounds (PAC) from combustion products of gasoline and/or thermal degradation products.

Contains:

Synthetic base oils: Not expected to cause significant health effects under conditions of normal use, based on laboratory studies with the same or similar materials. Not mutagenic or genotoxic. Not sensitising in test animals and humans.

CMR Status: None.

--REGULATORY LISTS SEARCHED--

1 = IARC 1
 2 = IARC 2A

3 = IARC 2B
 4 = ACGIH ALL

5 = ACGIH A1
 6 = ACGIH A2

SECTION 12 ECOLOGICAL INFORMATION

The information given is based on data available for the material, the components of the material, and similar materials.

ECOTOXICITY

Material -- Not expected to be harmful to aquatic organisms.

MOBILITY

Base oil component -- Low solubility and floats and is expected to migrate from water to the land. Expected to partition to sediment and wastewater solids.

SECTION 13 DISPOSAL CONSIDERATIONS

Disposal recommendations based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

DISPOSAL RECOMMENDATIONS

Product is suitable for burning in an enclosed controlled burner for fuel value or disposal by supervised

incineration at very high temperatures to prevent formation of undesirable combustion products. Protect the environment. Dispose of used oil at designated sites. Minimize skin contact. Do not mix used oils with solvents, brake fluids or coolants.

REGULATORY DISPOSAL INFORMATION

Empty Container Warning Empty Container Warning (where applicable): Empty containers may contain residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions. Empty drums should be completely drained and safely stored until appropriately reconditioned or disposed. Empty containers should be taken for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. **DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION. THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.**

SECTION 14 TRANSPORT INFORMATION

LAND (TDG): Not Regulated for Land Transport

LAND (DOT): Not Regulated for Land Transport

SEA (IMDG): Not Regulated for Sea Transport according to IMDG-Code

AIR (IATA): Not Regulated for Air Transport

SECTION 15 REGULATORY INFORMATION

WHMIS Classification: Not controlled

This product has been classified in accordance with hazard criteria of the Controlled Products Regulations and the (M)SDS contains all the information required by the Controlled Products Regulations.

CEPA: All components of this material are either on the Canadian Domestic Substances List (DSL), exempt, or have been notified under CEPA.

Complies with the following national/regional chemical inventory requirements: AICS, DSL, IECSC, KECI, PICCS, TSCA

Special Cases:

Inventory	Status
ENCS	Restrictions Apply

The Following Ingredients are Cited on the Lists Below:

Chemical Name	CAS Number	List Citations
DIPHENYLAMINE	122-39-4	6
PHENOL,	118-82-1	1

4,4-METHYLENEBIS(2,6-BIS(1,1-DIMETHYLETHYL)-

--REGULATORY LISTS SEARCHED--

1 = TSCA 4
2 = TSCA 5a2

3 = TSCA 5e
4 = TSCA 6

5 = TSCA 12b
6 = NPRI

SECTION 16 OTHER INFORMATION

N/D = Not determined, N/A = Not applicable

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:

Revision Changes:

- Section 06: Protective Measures was modified.
- Section 09: Phys/Chem Properties Note was modified.
- Section 09: Pour Point C(F) was modified.
- Section 08: Comply with applicable regulations phrase was modified.
- Section 09: Vapour Pressure was modified.
- Hazard Identification: Health Hazards was modified.
- Section 11: Dermal Lethality Test Data was modified.
- Section 11: Dermal Lethality Test Comment was modified.
- Section 11: Oral Lethality Test Data was modified.
- Section 11: Inhalation Lethality Test Data was modified.
- Section 11: Dermal Irritation Test Data was modified.
- Section 11: Eye Irritation Test Data was modified.
- Section 11: Oral Lethality Test Comment was modified.
- Section 11: Inhalation Lethality Test Comment was modified.
- Section 11: Dermal Irritation Test Comment was modified.
- Section 11: Eye Irritation Test Comment was modified.
- Section 11: Inhalation Irritation Test Data was modified.
- Section 09: Relative Density - Header was modified.
- Section 09: Flash Point C(F) was modified.
- Section 09 Viscosity was modified.
- Section 09 Viscosity was modified.
- Section 14: LAND (TDG) - Header was modified.
- Section 15: National Chemical Inventory Listing was modified.
- Section 09: Relative Density was modified.
- Section 11: Additional Health Information was modified.
- Section 08: Exposure limits/standards was modified.
- Section 15: Special Cases Table was modified.
- Section 15: Canadian List Citations Table was modified.
- Section 01: Company Contact Methods Sorted by Priority was modified.
- Section 01: Product Code was added.
- Section 01: Product Code - Header was added.

WHMIS Classification: Not controlled

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Prepared by: Imperial Oil Limited, IH and Product Safety



Monarch Oil (Kitchener) Limited

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FAX (519) 743-9802

Material Safety Data Sheet

MONARCH KLIR CUT NO. 2

NO700

Material Identification and Use

Manufacturer's Name	NOCO Energy Corp.
Manufacturer's Address	2440 Sheridan Dr., Tonawanda, NY 14150 (U.S. and Canada)
Emergency Phone Number	1-800-424-9300 (Chemtrec)
Supplier's Address	P.O. Box 86, Tonawanda, NY 14151
Supplier Emergency Phone Number	1-800-500-6626
Product Name	NOCOCUT M SERIES
Product Code	NOC1360 MO NOC1365 M1 NOC1370 M2
Chemical Name and Synonym	Petroleum Hydrocarbon plus Additives
Product Use	Metalworking cutting fluid.

Chemical Ingredients

Product Components	CAS Number	% (Volume)
Hydrotreated heavy paraffinic distillate	64741-88-4	50 - 85
Severely solvent refined residuum	64742-62-7	7 - 25
Severely solvent refined light Paraffinic distillate	64741-89-5	30 - 35
Triglycerides / fatty acid	801628-2	4 - 6
Alkyl phosphate alkanolamine ester	141808-04-0	1 - 2
t-Dodecyl polysulfide	8583-56-2	3 - 4
WHMIS	Class B, Division 2B	

Physical Data

Form

Liquid

Appearance	Liquid
Odor	Minimal, bland
Color	Very Light, Pale Amber
Specific Gravity (water=1)	.872 to .880
Boiling Point	> 315°C (599°F)
Melting Point	N/A
Solubility in Water (by weight %)	0 at 20°C
Evaporation Rate	Not Determined
Vapor Pressure (mm Hg at 20° C)	0
Vapor Density (air = 1)	Not Volatile
pH (as is)	Not Applicable
Stability	Product is stable under normal conditions

Fire and Explosion Hazards

Conditions of Flammability	Addition of water or foam may cause frothing. Do not cut, drill or weld empty containers.
Extinguishing Media	Foam, Water Fog, Dry Chemical, Carbon Dioxide. Closed containers exposed to fire may be cooled with water.
Flashpoint and Method of Determination	410°F (210°C), COC
Flammable Limits in Air % B. V. Upper	Not Determined
Flammable Limits in Air % B. V. Lower	Not Determined
NFPA - Hazard Class	Health:1 Fire:1 Reactivity:0
Hazardous Combustion Products	From Burning; carbon monoxide, carbon dioxide and oxides of phosphorous.
Unusual Fire an Explosion Hazard	Do not cut, weld, braze, solder, drill, grind or expose containers, drums, tanks,etc. of product to heat, flame, sparks, static electricity or other sources of ignition; they may ignite explosively.
Special Fire Fighting Procedures	Wear self contained breathing apparatus when fire fighting in a confined space. Do not use water except as fog.

Reactivity Data

Chemical Stability	Stable
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Incompatible Materials	Keep away from strong oxidizing agents, such as, hydrogen peroxide, Bromine, chlorine and chromic acid.
Hazardous Decomposition	From burning oxides of carbon, sulfur, phosphates, and minor amounts of H ₂ S.
Hazardous Polymerization	Material is not known to polymerize.

Health Hazard Information

Routes of Entry

Skin Contact	Prolonged or repeated contact with skin may cause mild irritation and possibly dermatitis.
Eye	Mildly irritating to eyes.
Inhalation	If heated, sprayed or misted, may cause chemical pneumontis.
Ingestion	Low toxicity on ingestion. Has laxative effect.
Carcinogenicity	Not listed as a carcinogenic.
Health Hazard Data	Permissible Concentrations (air): See COMMENTS section Chronic effects of overexposure: no data available Acute toxicological properties: no data available

Emergency and First Aid Procedures

Eyes	In case of contact, flush eyes with large amounts of water for at least 15 minutes. Get medical attention.
Skin	Remove excess with cloth or paper. Wash skin thoroughly with soap and water or waterless hand cleaner. If irritation occurs, get medical attention.
Inhalation	If breathing is difficult, remove victim to fresh air, give artificial respiration if not breathing. Call a physician.
Ingestion	Do not ingest. If ingested, do not induce vomiting. Contact a physician immediately.

Preventative Measures

Ventilation Requirements	Use explosion proof ventilation as required to control vapor concentration. See COMMENTS section.
Respiratory Protection	If vapor concentration exceeds permissible exposure use NIOSH / MSHA certified respirator with dual organic vapor, mist and particulates cartridge.

Eye Protection	Safety glasses with side shields or goggles. (Chemical safety goggles)
Protective Gloves	Neoprene Type
Personal Hygiene	Wear effective plant clothing. Contaminated clothing should be removed and washed in soap and water. Cleanse skin thoroughly before meals with soap and water. Shower and eyewash facilities should be accessible.
Protective Equipment	None
Note	N/A

Environmental Procedures

Spills or Releases	If material is spilled or released to the atmosphere, steps should be taken to prevent discharges to streams or sewer systems. Transfer bulk of mixture into another container. Absorb residue with inert material such as earth, sand, or vermiculate. Sweep up and dispose as solid waste in accordance with local, state, and federal regulations. Spills or releases should be reported, if required to the appropriate local, state and federal regulatory agencies.
Disposal	Clean up action should be carefully planned and executed. Shipment, storage and/or disposal of waste materials are regulated and action to handle or dispose of spilled or released materials must meet all state, local, and federal rules.
Storage	Protect against physical damage. Separate from oxidizing materials. Store in cool well ventilated area of non-combustible construction away from possible sources of ignition. Do not handle or store at temperatures over (maximum storage temperature) 60°C (140°F)

Regulatory Information

Dept. of Transportation	DOT Shipping Name: NONE Hazard Class: NONE ID Number: NONE Special Transportation Notes - NONE
TSCA	All Components are Listed on EPA/TSCA Inventory.
CERCLA	This product is classified as an oil under section 311. Spills into or leading to surface water that cause sheen must be reported to the National Response Center at 1-800-424-8802.
RCRA	If this product becomes a waste it would not be a

	hazardous waste by RCRA - 40 CFR 261. Place in an appropriate disposal facility in compliance with local authorities.
SARA Title III - Section 302	Not Applicable
Proprietary Additive	Recommend PEL 5mg/m3 (mist)
Section 311/312	Dermal irritant, acute and chronic health hazard.
Section 313	This product does not contain any chemical in sufficient quantity to be subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR part 372.
Reportable Quantity	N/A
Freight Classification	Petroleum Lubricating Oil

Comments

If used in applications where a mist may be generated, observe a TWA/PEL of 5 mg/m3 for mineral oil mist (OSHA and ACGIH).

All components of this product are on the US TSCA Inventory and Canadian Domestic Substance List.

The additive manufacturers have declared the additive mixtures in this product a trade secret.

Preparation Date of Material Safety Data Sheet

Prepared By	Tom Goodnight
Phone number of Preparer	1-800-500-6626
Date Prepared	09/07/2000
Revised Date	08/25/2014

Disclaimer

We believe the statements, technical information and recommendations contained herein are reliable, but they are given without warranty or guarantee of any kind, express or implied, and we assume no responsibility for an loss, damage, or expense, direct or consequential, arising out of their use.



MATERIAL SAFETY DATA SHEET

PRODUCT: NATIONAL VACUUM PUMP OIL NFPA CODES: H F R
PRODUCT CODE: VPO 0 1 0
CHEMICAL NAME/FAMILY: PETROLEUM LUBRICATING OIL
DISTRIBUTOR: NATIONAL REFRIGERANTS, INC.
ADDRESS: 11401 Roosevelt Boulevard Phila., Pa. 19154
INFORMATION: 800-262-0012 EMERGENCY: 800-424-9300
DATE: 11/2012 PREPARER: Matt Callahan

COMPOSITION/INFORMATION ON INGREDIENTS

Highly refined mineral oils and additives.
The highly refined mineral oil contains <3% (w/w) DMSO-extract, according to IP346.

HAZARDOUS IDENTIFICATION

Emergency Overview

Appearance and Odor: Clear light brown. Liquid at room temperature. Slight hydrocarbon.
Health Hazards: High-pressure injection under the skin may cause serious damage including local necrosis.
Safety Hazards: Not classified as flammable but will burn.
Environmental Hazards: Not classified as dangerous for the environment.

Health Hazards: Not expected to be a health hazard when used under normal conditions.
Health Hazards Inhalation: Under normal conditions of use, this is not expected to be a primary route of exposure.
Skin Contact: Prolonged or repeated skin contact without proper cleaning can clog the pores of the skin resulting in disorders such as oil acne/folliculitis.
Eye Contact: May cause slight irritation to eyes.
Ingestion: Low toxicity if swallowed.
Other Information: High-pressure injection under the skin may cause serious damage including local necrosis. Used oil may contain harmful impurities.
Signs and Symptoms: Oil acne/folliculitis signs and symptoms may include formation of black pustules and spots on the skin of exposed areas. Local necrosis is evidenced by delayed onset of pain and tissue damage a few hours following injection. Ingestion may result in nausea, vomiting and/or diarrhea.
Aggravated Medical Condition: Pre-existing medical conditions of the following organ(s) or organ system(s) may be aggravated by exposure to this material: Skin.
Environmental Hazards: Not classified as dangerous for the environment.
Additional Information: Under normal conditions of use or in a foreseeable emergency, this product does not meet the definition of a hazardous chemical when evaluated according to the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

FIRST AID MEASURES

General Information: Not expected to be a health hazard when used under normal conditions.
Inhalation: No treatment necessary under normal conditions of use. If symptoms persist, obtain medical advice.
Skin Contact: Remove contaminated clothing. Flush exposed area with water and follow by washing with soap if available. If persistent irritation occurs, obtain medical attention. When using high pressure equipment, injection of product under the skin can occur. If high pressure injuries occur, the effected person should be sent immediately to a hospital. Do not wait for symptoms to develop. Obtain medical attention even in the absence of apparent wounds.
Eye Contact: Flush eye with copious quantities of water. If persistent irritation occurs, obtain medical attention.
Ingestion: In general no treatment is necessary unless large quantities are swallowed, however, get medical advice.
Advice to Physician: Treat symptomatically. High pressure injection injuries require prompt surgical intervention and possibly steroid therapy, to minimize tissue damage and loss of function. Because entry wounds are small and do not



MATERIAL SAFETY DATA SHEET

reflect the seriousness of the underlying damage, surgical exploration to determine the extent of involvement may be necessary. Local anesthetics or hot soaks should be avoided because they can contribute to swelling, vasospasm and ischaemia. Prompt surgical decompression, debridement and evacuation of foreign material should be performed under general anesthetics, and wide exploration is essential.

FIRE AND EXPLOSION HAZARD DATA

Clear fire area of all non-emergency personnel.

Flash point: Typical 400 °C / 752 °F (COC)

Upper / lower: Typical 1 - 10 %(V)(based on mineral oil)

Flammability or Explosion limits: Typical 1 - 10 %(V) (based on mineral oil)

Auto ignition temperature : > 320 °C / 608 °F

Specific Hazards : Hazardous combustion products may include: A complex mixture of airborne solid and liquid particulates and gases (smoke). Carbon monoxide. Unidentified organic and inorganic compounds.

Suitable Extinguishing Media: Foam, water spray or fog. Dry chemical powder, carbon dioxide, sand or earth may be used for small fires only.

Unsuitable Extinguishing Media: Do not use a jet stream of water.

Protective Equipment for Firefighters: Proper protective equipment including breathing apparatus must be worn when approaching a fire in a confined space.

ACCIDENTAL RELEASE MEASURES

Avoid contact with spilled or released material. For guidance on selection of personal protective equipment see Exposure Controls/Personal Protection Section of this Material Safety Data Sheet. See Disposal Considerations Section for information on disposal.

Observe all relevant local and international regulations.

Protective measures: Avoid contact with skin and eyes. Use appropriate containment to avoid environmental contamination. Prevent from spreading or entering drains, ditches or rivers by using sand, earth, or other appropriate barriers.

Clean Up Methods: Slippery when spilt. Avoid accidents, clean up immediately. Prevent from spreading by making a barrier with sand, earth or other containment material. Reclaim liquid directly or in an absorbent.

Soak up residue with an absorbent such as clay, sand or other suitable material and dispose of properly.

Additional Advice: Local authorities should be advised if significant spillages cannot be contained.

HANDLING AND STORAGE

General Precautions: Use local exhaust ventilation if there is risk of inhalation of vapors, mists or aerosols. Properly dispose of any contaminated rags or cleaning materials in order to prevent fires. Use the information in this data sheet as input to a risk assessment of local circumstances to help determine appropriate controls for safe handling, storage and disposal of this material.

Handling: Avoid prolonged or repeated contact with skin. Avoid inhaling vapor and/or mists. When handling product in drums, safety footwear should be worn and proper handling equipment should be used.

Storage: Keep container tightly closed and in a cool, well-ventilated place. Use properly labeled and closeable containers. Storage Temperature: 0 - 50 °C / 32 - 122 °F

Recommended Materials: For containers or container linings, use mild steel or high density polyethylene.

Unsuitable Materials: PVC.

Additional Information: Polyethylene containers should not be exposed to high temperatures because of possible risk of distortion.



MATERIAL SAFETY DATA SHEET

EXPOSURE CONTROLS/PERSONAL PROTECTION

Occupational Exposure Limits

Material Source Type ppm mg/m3 Notation

Oil mist, mineral	ACGIH TWA (Mist.)	5 mg/m3
Oil mist, mineral	ACGIH STEL (Mist.)	10 mg/m3

Exposure Controls: The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Select controls based on a risk assessment of local circumstances. Appropriate measures include: Adequate ventilation to control airborne concentrations. Where material is heated, sprayed or mist formed, there is greater potential for airborne concentrations to be generated.

Personal Protective Equipment: Personal protective equipment (PPE) should meet recommended national standards. Check with PPE suppliers.

Respiratory Protection: No respiratory protection is ordinarily required under normal conditions of use. In accordance with good industrial hygiene practices, precautions should be taken to avoid breathing of material. If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker health, select respiratory protection equipment suitable for the specific conditions of use and meeting relevant legislation. Check with respiratory protective equipment suppliers. Where air-filtering respirators are suitable, select an appropriate combination of mask and filter. Select a filter suitable for combined particulate /organic gases and vapors [boiling point >65 °C (149 °F)].

Hand Protection: Where hand contact with the product may occur the use of gloves approved to relevant standards (e.g. Europe: EN374, US: F739) made from the following materials may provide suitable chemical protection: PVC, neoprene or nitrile rubber gloves. Suitability and durability of a glove is dependent on usage, e.g. frequency and duration of contact, chemical resistance of glove material, glove thickness, dexterity. Always seek advice from glove suppliers. Contaminated gloves should be replaced. Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturizer is recommended.

Eye Protection: Wear safety glasses or full face shield if splashes are likely to occur.

Protective Clothing: Skin protection not ordinarily required beyond standard issue work clothes.

Monitoring Methods: Monitoring of the concentration of substances in the breathing zone of workers, or in the general workplace may be required to confirm compliance with an OEL and adequacy of exposure controls. For some substances biological monitoring may also be appropriate.

Environmental Exposure Controls: Minimize release to the environment. An environmental assessment must be made to ensure compliance with local environmental legislation.

PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Clear light brown. Liquid at room temperature.

Odor: Slight hydrocarbon.

pH : Not applicable.

Initial Boiling Point and Boiling Range: > 280 °C / 536 °F estimated value(s)

Pour point: Typical -15 °C / 5 °F

Flash point: Typical 400 °C / 752 °F (COC)

Upper / lower Flammability or Explosion limits: Typical 1 - 10 %(V) (based on mineral oil)

Auto-ignition temperature : > 320 °C / 608 °F

Vapor pressure : < 0.5 Pa at 20 °C / 68 °F (estimated value(s))

Specific gravity : Typical 0.87

Density: Typical 7.45 g/cm3

Water solubility: Negligible.

n-octanol/water partition coefficient (log Pow): > 6 (based on information on similar products)

Kinematic viscosity: Typical 40 mm2/s at 40 °C / 104 °F

Vapor density (air=1): > 1 (estimated value(s))

Evaporation rate (nBuAc=1): Data not available



MATERIAL SAFETY DATA SHEET

STABILITY AND REACTIVITY

Stability: Stable.

Conditions to Avoid: Extremes of temperature and direct sunlight.

Materials to Avoid: Strong oxidizing agents.

Hazardous Decomposition Products: Hazardous decomposition products are not expected to form during normal storage.

TOXICOLOGICAL INFORMATION

Basis for Assessment: Information given is based on data on the components and the toxicology of similar products.

Acute Oral Toxicity: Expected to be of low toxicity: LD50 > 5000 mg/kg, Rat

Acute Dermal Toxicity: Expected to be of low toxicity: LD50 > 5000 mg/kg, Rabbit

Acute Inhalation Toxicity: Not considered to be an inhalation hazard under normal conditions of use.

Skin Irritation: Expected to be slightly irritating. Prolonged or repeated skin contact without proper cleaning can clog the pores of the skin resulting in disorders such as oil acne/folliculitis.

Eye Irritation: Expected to be slightly irritating.

Respiratory Irritation: Inhalation of vapors or mists may cause irritation.

Sensitization: Not expected to be a skin sensitizer.

Repeated Dose Toxicity: Not expected to be a hazard.

Mutagenicity: Not considered a mutagenic hazard.

Carcinogenicity: Product contains mineral oils of types shown to be non-carcinogenic in animal skin-painting studies.

Highly refined mineral oils are not classified as carcinogenic by the International Agency for Research on Cancer (IARC).

Other components are not known to be associated with carcinogenic effects.

Reproductive and Developmental Toxicity: Not expected to be a hazard.

Additional Information: Used oils may contain harmful impurities that have accumulated during use. The concentration of such impurities will depend on use and they may present risks to health and the environment on disposal. ALL used oil should be handled with caution and skin contact avoided as far as possible. High pressure injection of product into the skin may lead to local necrosis if the product is not surgically removed.

ECOLOGICAL INFORMATION

Ecotoxicological data have not been determined specifically for this product. Information given is based on a knowledge of the components and the ecotoxicology of similar products.

Acute Toxicity: Poorly soluble mixture. May cause physical fouling of aquatic organisms. Expected to be practically non toxic: LL/EL/IL50 >100 mg/l (to aquatic organisms) (LL/EL50 expressed as the nominal amount of product required to prepare aqueous test extract). Mineral oil is not expected to cause any chronic effects to aquatic organisms at concentrations less than 1 mg/l.

Mobility: Liquid under most environmental conditions. Floats on water. If it enters soil, it will adsorb to soil particles and will not be mobile.

Persistence/degradability: Expected to be not readily biodegradable. Major constituents are expected to be inherently biodegradable, but the product contains components that may persist in the environment.

Bioaccumulation: Contains components with the potential for bioaccumulation.

Other Adverse Effects: Product is a mixture of non-volatile components, which are not expected to be released to air in any significant quantities. Not expected to have ozone depletion potential, photochemical ozone potential or global warming potential.



MATERIAL SAFETY DATA SHEET

DISPOSAL CONSIDERATIONS

Material Disposal: Recover or recycle if possible. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste classification and disposal methods in compliance with applicable regulations. Do not dispose into the environment, in drains or in water courses.

Container Disposal: Dispose in accordance with prevailing regulations, preferably to a recognized collector or contractor. The competence of the collector or contractor should be established beforehand.

Local Legislation: Disposal should be in accordance with applicable regional, national, and local laws and regulations.

TRANSPORTATION INFORMATION

US Department of Transportation Classification (49CFR)

This material is not subject to DOT regulations under 49 CFR Parts 171-180.

IMDG

This material is not classified as dangerous under IMDG regulations.

IATA (Country variations may apply)

This material is not classified as dangerous under IATA regulations.

REGULATORY INFORMATION

The regulatory information is not intended to be comprehensive. Other regulations may apply to this material.

Federal Regulatory Status

Notification Status

EINECS	All components listed or polymer exempt.
TSCA	All components listed.
DSL	All components listed.

SARA Hazard Categories (311/312)

No SARA 311/312 Hazards.

State Regulatory Status

California Safe Drinking Water and Toxic Enforcement Act (Proposition 65)

This material does not contain any chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

DISCLAIMER

National Refrigerants, Inc. believes that the information and recommendations contained herein (including data and statements) are accurate as of the date hereof. NO WARRANTY OF FITNESS FOR ANY PARTICULAR PURPOSE, WARRANTY OF MERCHANTABILITY, OR ANY OTHER WARRANTY, EXPRESSED OR IMPLIED, IS MADE CONCERNING THE INFORMATION PROVIDED HEREIN. The information provided herein relates only to the specific product designated and may not be valid where such product is used in combination with any other methods of use of the product and of the information referred to herein are beyond the control of National Refrigerants. National Refrigerants expressly disclaims any and all liability as to any results obtained or arising from any use of the product or reliance on such information.

NICKEL BASED ALLOY STEEL – MATERIAL SAFETY DATA SHEET

UNIFIEDALLOYS

NICKEL BASED ALLOY STEEL – MATERIAL SAFETY DATA SHEET

Alloys 200, 400, 600, 800 Series



NICKEL BASED ALLOY STEEL – MATERIAL SAFETY DATA SHEET

1. HAZARDOUS INGREDIENTS

Ingredients	CAS Number	TLV (2)
Aluminum (Al)	7429-90-5	10
Chromium (Cr)	7440-47-3	0.5
Cobalt (Co)	7440-48-4	0.1 (dust/fume)
Copper (Cu)	7440-50-8	1 (dust/mist)
Iron (Fe)	1309-37-1	5 (as iron oxide)
Manganese (Mn)	7439-96-5	5 (as dust ceiling)
Molybdenum (Mo)	7439-98-7	10 (insolub. comp.)
Nickel (Ni)	7440-02-0	1
Niobium (Nb)	none	none established
Silicon (Si)	7440-21-3	10 (total dust)
Tantalum (Ta)	7440-25-7	5
Titanium (Ti)	7440-32-6	10 (total dust)
Tungsten (W)	7440-33-7	5
Yttrium (Y)	7440-65-5	1

% Alloying Elements (1)

UNS Numbers	Al	Cr	Co	Cu	Fe	Mn	Mo	Ni	Nb	Si	Ta	Ti	W	Y
N02200 Series (Commercially Pure Ni alloy)		<2			<5			(95-99)				<5	<5	
N04400-N05500 Series (Ni-Cu alloy)	<5	<1		(27-68)	<1	<5		(31-67)		<1	<2			
N06600-N07700 Series (Ni-Cr alloy)	<5	(15-48)	(0-13)		(1-40)	<5	(2-10)	(39-80)	<5		<2	<3	<5	<1
N08800-N09900 Series (Ni-Fe-Cr alloy)	<5	(1-30)	(0-15)	<2	(30-84)	<1	<5	(1-42)	<5			<3		<1

(1) % of alloying material varies with grade of material.

(2) 1985-1986 ACGIH threshold limit value

2. PREPARATION INFORMATION

Prepared By: **UnifiedAlloys**
 Telephone: (780) 468-5656
 Note: **Contact Supplier (Quality Department) for additional information**

Preparation Date: January 1, 2013

3. PRODUCT / COMPANY INFORMATION

Material Use: The information in this MSDS was obtained from source which we believe are reliable; however, the information is provided without any representation or warranty, expressed or implied regarding the accuracy or correctness.

Importer / Supplier / Distributor:

UnifiedAlloys
 8835 – 50th Avenue
 Edmonton, Alberta CANADA
 T6E 5H4
 Emergency Phone #: (780) 468-5656 (on-call service)

The conditions or methods of handling, storage, use, and disposal of the product are beyond our control and may be beyond knowledge. For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage, or expense arising out of or in any way connected with the handling, storage, use, or disposal of the product.

Prepared By: **UnifiedAlloys**
 Telephone: (780) 468-5656
 Note: **Contact Supplier (Quality Department) for additional information - Page 1 of 3**

Preparation Date: January 1, 2013

NICKEL BASED ALLOY STEEL – MATERIAL SAFETY DATA SHEET

4. PHYSICAL DATA

Physical State: Solid
Odor: N/A
Evaporation Rate: N/A
Boiling Point: N/A
Melting Point: 2300 F
PH: N/A
Solubility in Water: N/A
Vapor Pressure: N/A
Density: 7
Appearance: Grey Black
Odor Threshold: N/A
Specific Gravity: (H₂O = 1) Approximately: 7
Freezing Point: N/A
Coefficient of Water/Oil Distribution: N/A

5. FIRE / EXPLOSION HAZARD

1. Conditions of flammability: Steel products (Copper Metal) does not present fire or explosion hazards under normal conditions. Fine metal particles such as those produced in grinding or sawing can burn. High concentrations of metal filings may present an explosion hazard.
2. Means of extinction: For molten metal use dry powder or sand. Do NOT use water on molten metals.
3. Flashpoint and method of determination: N/A (under normal conditions)
- 4/5. Upper and Lower flammable Limit: N/A (under normal conditions)
6. Auto-ignition temperature: N/A (under normal conditions)
7. Hazardous Combustion Products: N/A (under normal conditions)
8. Explosion Data: sensitivity to mechanical impact: N/A (under normal conditions)
9. Explosion Data: sensitivity to static discharge: N/A (under normal conditions)

6. REACTIVITY DATA

Chemical Stability: STABLE – under normal conditions of use and storage.
Conditions of Reactivity: N/A
Hazardous Decomposition Products: Metallic dust or fumes may be produced during welding, burning, grinding, and possibly machining.
Refer to ANSI Z49.1
Incompatibility to Other Substances: REACTS WITH STRONG ACIDS TO PRODUCE HYDROGEN GAS

7. TOXICOLOGICAL PROPERTIES

Effects of Acute Exposure to Material:

Short term exposure to fumes / dust may produce irritation of eyes and respiratory system. Inhalation of high concentrations of freshly formed oxide fumes of iron, manganese, and copper may cause metal fume fever characterized by a metallic taste in the mouth, dryness and irritation of the throat and influenza – like symptoms. Dermal contact of filings could cause infection / blood poisoning.

Effects of Chronic Exposure to Material:

Chronic inhalation of high concentrations of iron – oxide fumes or dust may lead to a benign pneumoconiosis (siderosis). Inhalation of high concentrations of ferric oxide may possibly enhance the risk of lung cancer development in the workers exposed to pulmonary carcinogens.

Carcinogenicity of Material:

Chromium and nickel and their compounds are listed in the 3rd Annual Report on Carcinogens as prepared by the National Toxicology Program (NTP). Exposure to high concentrations of dust and fumes can cause sensitization dermatitis, inflammation, and / or ulceration of the upper respiratory tract and possibly cancer of nasal passages and lungs. Recent epidemiological studies of workers melting and working alloys containing nickel / chromium have found no increased risk of cancer.

Irritancy of Material: N/A

Sensitization to Material: N/A

Mutagenicity of Material: N/A

Reproductive Effects: N/A

Teratogenicity of Material: N/A

Carcinogenicity of Material: N/A

NICKEL BASED ALLOY STEEL – MATERIAL SAFETY DATA SHEET

8. PREVENTATIVE MEASURES

Personal Protective Equipment: Dependant upon processes being performed on material. Each operator must be addressed for suitable equipment. All protective equipment is recommended during welding, burning and handling.

Gloves: Leather Faced (Protective gloves should be worn during welding, burning or handling operations)

Clothing: As required, dependent on the operations and local safety codes

Safety Glasses: goggles or face shields should be utilized as required by exposure.

Respiratory: NIOSH / MSHA approved dust and fume respirator should be used to avoid excessive inhalation of particles when exposure exceeds TLV's.

Footwear: CSA Z195.02 (Steel toed safety shoes)

Eye: Safety glasses, goggles or face shield should be worn as required by exposure.

Other: N/A

Engineering Controls (e.g. ventilation, enclosures, specify)

In welding, precautions should be taken for airborne contaminants which may originate from components of the welding rod. Arc or spark generated when welding or burning could be a source of ignition for combustible and flammable materials.

Leak and Spill Procedures: Fine turnings and small chips should be swept or vacuumed.

Waste Disposal: Used or unused product should be disposed of in accordance with Federal or Local laws and regulations.

Special Shipping Information: N/A

Handling Procedures: Trained and experienced personnel utilizing appropriate material handling equipment is recommended.

9. FIRST AID MEASURES

Skin: Maintain good personal hygiene, wash with soap and water. Seek medical attention if irritation persists.

Inhalation: Move to fresh air. Seek medical attention if necessary.

Eyes: Flush thoroughly with clean lukewarm water for 15 minutes. Seek medical attention.

Note: Respiratory disorders may be aggravated by exposure to metallic and/or organic/inorganic coating dusts or fumes. Consult a doctor if conditions persist.

Material Safety Data Sheet

Printing date 02/16/2012

Version 19

Reviewed on 02/16/2012

1 Identification of substance

· **Product details**

· **Trade name: Nitrogen Dioxide**

· **Article number:** 048-01-0009

· **Creation date:** 08/16/2006

· **Manufacturer/Supplier:**

Linde Canada Limited

5860 Chedworth Way

Mississauga, Ontario L5R 0A2

Telephone (905) 501-1700

24-HOUR EMERGENCY TELEPHONE NUMBER:

(905) 501-0802

Linde

575 Mountain Avenue

Murray Hill, NJ 07974

Telephone (908) 464-8100

24-HOUR EMERGENCY TELEPHONE NUMBER :

CHEMTREC (800) 424-9300 OR

Linde National Operations Center (800) 232-4726

Pse ensure that this MSDS is received by the appropriate person.

· **Information department:** Customer Service Centre: 1-866-385-5349

2 Composition/Data on components

· **Chemical characterization:**

· **CAS No. Description**

10102-44-0 Nitrogen dioxide

· **Identification number(s)**

· **EINECS Number:** 233-272-6

· **Index number:** 007-002-00-0

3 Hazards identification

· **Hazard description:**



Very toxic

· **WHMIS-symbols:**

A - Compressed gas

D1A - Very toxic material causing immediate and serious toxic effects

E - Corrosive material



· **HMIS-ratings (scale 0 - 4)**

HEALTH 4

Health = 4

FIRE 0

Fire = 0

REACTIVITY 0

Reactivity = 0

(Contd. on page 2)

Material Safety Data Sheet

Printing date 02/16/2012

Version 19

Reviewed on 02/16/2012

Trade name: Nitrogen Dioxide

(Contd. of page 1)

· **NFPA ratings (scale 0 - 4)**

Health = 4
Fire = 0
Reactivity = 0

· **Information pertaining to particular dangers for man and environment:**

Very toxic by inhalation.

Causes burns.

· **Classification system:**

The classification is in line with internationally approved calculation standards. It is expanded, however, by information from technical literature and by information furnished by supplier companies.

· **GHS label elements**

Danger

3.1/1 - Fatal if inhaled.



Danger

3.2/1B - Causes severe skin burns and eye damage.



Warning

2.5/C - Contains gas under pressure; may explode if heated.

· **Response:**

IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do.

Continue rinsing.

Immediately call a POISON CENTER or doctor/physician.

Specific treatment is urgent (see on this label).

· **Storage:**

Store locked up.

Protect from sunlight. Store in a well-ventilated place.

· **Disposal:**

Dispose of contents/container in accordance with local/regional/national/international regulations.

* **4 First aid measures**· **General information:**

Immediately remove any clothing soiled by the product.

Remove breathing apparatus only after contaminated clothing have been completely removed.

In case of irregular breathing or respiratory arrest provide artificial respiration.

· **After inhalation:**

Supply fresh air or oxygen; call for doctor.

In case of unconsciousness place patient stably on the body side position.

· **After skin contact:**

Immediately wash with water thoroughly for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention immediately

· **After eye contact:** Rinse opened eye for at least 15 minutes under running water. Then consult a doctor.

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Printing date 02/16/2012

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Reviewed on 02/16/2012

Trade name: Nitrogen Dioxide

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· **After swallowing:** Not applicable

* 5 Fire fighting measures

- **Suitable extinguishing agents:**
CO₂, powder or water spray. Fight larger fires with water spray or alcohol resistant foam.
- **Protective equipment:** Wear self-contained respiratory protective device.

* 6 Accidental release measures

- **Person-related safety precautions:**
Wear protective equipment. Keep unprotected persons away.
Ensure adequate ventilation.
Stop leak - ONLY if possible to do so without risk.
- **Measures for environmental protection:**
Prevent seepage into sewage system, workpits and/or cellars.
In case of gas release or seepage into the ground inform responsible authorities.
- **Measures for cleaning/collecting:**
Use neutralizing agent.
Dispose contaminated material as waste according to item 13.
Ensure adequate ventilation.

* 7 Handling and storage

- **Handling:**
- **Information for safe handling:**
Ensure good ventilation/exhaustion at the workplace.
Open and handle cylinder with care.
Handle with care. Avoid jolting, friction, and impact.
Use only in well ventilated areas.
Store container in a secured area. Limit access to authorized personnel only. Report any incidents involving thefts, misuse, or inventory shortages to law enforcement and the supplier. Security shall be provided in accordance with all local, state (provincial) and federal regulations.
- **Information about protection against explosions and fires:**
Keep ignition sources away - Do not smoke.
Keep respiratory protective device available.
Pressurized container: protect from sunlight and do not expose to temperatures exceeding 50°C. Do not pierce or burn, even after use.
- **Storage:**
- **Requirements to be met by storerooms and receptacles:**
Do not expose cylinder to temperatures higher than 50°C (122 °F)
Protect cylinders from physical damage. Store in cool, dry, well-ventilated area away from heavily trafficked areas and emergency exits. Do not allow the temperature where cylinders are stored to exceed 125°F (52°C).
Cylinders should be stored upright and firmly secured to prevent falling or being knocked over. Full and empty cylinders should be segregated. Use a "first in-first out" inventory system to prevent full cylinders being stored for excessive periods of time.
- **Information about storage in one common storage facility:**
Sources of ignition should be removed from storage area.
- **Further information about storage conditions:**
Keep cylinder valve tightly closed.

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Trade name: Nitrogen Dioxide

(Contd. of page 3)

Store in accordance with local fire code and/or building code or any pertaining regulations.

* **8 Exposure controls and personal protection**· **Additional information about design of technical systems:**

Adequate local ventilation.
Safety showers and eyewash stations should be nearby.

· **Components with limit values that require monitoring at the workplace:****10102-44-0 Nitrogen dioxide (23 - 100%)**

EL	Short-term value: C 1 ppm
EV	Short-term value: 9.4 mg/m ³ , 5 ppm
	Long-term value: 5.6 mg/m ³ , 3 ppm

· **Additional information:** The lists that were valid during the creation were used as basis.· **Personal protective equipment:**· **General protective and hygienic measures:**

Keep away from foodstuffs, beverages and feed.
Immediately remove all soiled and contaminated clothing.
Wash hands before breaks and at the end of work.
Store protective clothing separately.
Avoid contact with the eyes and skin.
Protective clothing and PPE should be kept free of oil and grease, generally in clean condition
PPE should be inspected and maintained regularly to retain effectiveness.

· **Breathing equipment:**

Use atmosphere-supplying respirators (e.g. supplied-air: demand, pressure-demand, or continuous-flow or self-contained breathing apparatus: demand or pressure-demand or combination supplied-air with auxiliary self-contained air supply atmosphere-supplying respirator) in case of insufficient ventilation.

· **Protection of hands:**

Protective gloves.

· **Material of gloves**

The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer.

· **Eye protection:** Safety glasses* **9 Physical and chemical properties**· **General Information**

Form:	Compressed gas
Color:	Red-brown
Odor:	Pungent

· **Change in condition**

Melting point/Melting range:	-11.2°C
Boiling point/Boiling range:	21°C

· **Flash point:** ≤ 21°C

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Reviewed on 02/16/2012

Trade name: Nitrogen Dioxide

(Contd. of page 4)

· **Danger of explosion:** Product does not present an explosion hazard.

* 10 Stability and reactivity

- **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
- **Materials to be avoided:**
- **Dangerous reactions** Reacts with water to form corrosive acids and to cause corrosion to some metals.
- **Dangerous products of decomposition:**
In case of fire or thermal decomposition toxic nitrogen oxides may be released.

* 11 Toxicological information

· **Acute toxicity:**

· **LD/LC50 values that are relevant for classification:**

10102-44-0 Nitrogen dioxide

Inhalative	LC50/4hr	115 ppm (rat)
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· **Primary irritant effect:**

· **on the skin:** Caustic effect on skin and mucous membranes.

· **on the eye:** Strong caustic effect.

· **Sensitization:** No sensitizing effects known.

· **Additional toxicological information:**

Swallowing will lead to a strong caustic effect on mouth and throat and to the danger of perforation of esophagus and stomach.

* 12 Ecological information

· **Additional ecological information:**

· **General notes:**

Generally not hazardous for water

Must not reach bodies of water or drainage ditch undiluted or unneutralized.

* 13 Disposal considerations

· **Product:**

· **Recommendation:** Unused product should be returned to vendor.

· **Uncleaned packagings:**

· **Recommendation:**

Cylinder and unused product should be returned to vendor. Disposable cylinder must be disposed of in accordance with local regulations.

· **Recommended cleansing agent:** None applicable.

CDN

(Contd. on page 6)

Material Safety Data Sheet

Printing date 02/16/2012

Version 19

Reviewed on 02/16/2012

Trade name: Nitrogen Dioxide

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* **14 Transport information**

· TDG and DOT regulations:



- Hazard class: 2
- Identification number: UN1067
- Proper shipping name (technical name): DINITROGEN TETROXIDE (NITROGEN DIOXIDE)
- Label: 2.3

· Maritime transport IMDG:



- IMDG Class: 2.3
- UN Number: 1067
- Label: 2.3
- Marine pollutant: No
- Proper shipping name: DINITROGEN TETROXIDE (NITROGEN DIOXIDE)

· Air transport ICAO-TI and IATA-DGR:



- ICAO/IATA Class: 2
- UN/ID Number: 1067
- Label: 2.3
- Proper shipping name: DINITROGEN TETROXIDE (NITROGEN DIOXIDE)

- UN "Model Regulation": UN1067, DINITROGEN TETROXIDE (NITROGEN DIOXIDE), 2.3

* **15 Regulations**

· Sara

· Section 355 (extremely hazardous substances):

Substance is listed.

· Section 313 (Specific toxic chemical listings):

Substance is not listed.

· TSCA (Toxic Substances Control Act):

Substance is listed.

· Proposition 65

· Chemicals known to cause cancer:

Substance is not listed.

· Chemicals known to cause reproductive toxicity for females:

Substance is not listed.

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Printing date 02/16/2012

Version 19

Reviewed on 02/16/2012

Trade name: Nitrogen Dioxide

(Contd. of page 6)

· Chemicals known to cause reproductive toxicity for males:

Substance is not listed.

· Chemicals known to cause developmental toxicity:

Substance is not listed.

· Cancerogenity categories**· EPA (Environmental Protection Agency)**

Substance is not listed.

· NTP (National Toxicology Program)

Substance is not listed.

· TLV (Threshold Limit Value established by ACGIH)

10102-44-0 Nitrogen dioxide

A4

· NIOSH-Ca (National Institute for Occupational Safety and Health)

Substance is not listed.

· OSHA-Ca (Occupational Safety & Health Administration)

Substance is not listed.

· Canadian substance listings:**· Canadian Domestic Substances List (DSL)**

Substance is listed.

· Canadian Ingredient Disclosure list (limit 0.1%)

Substance is not listed.

· Canadian Ingredient Disclosure list (limit 1%)

Substance is listed.

· Product related hazard informations:

The product was classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

· Hazard symbols:

Very toxic

· Risk phrases:

Very toxic by inhalation.
Causes burns.

· Safety phrases:

After contact with skin, was immediately with plenty of water
Keep container in a well-ventilated place.
In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
Wear suitable protective clothing, gloves and eye/face protection.
In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

Please refer to the section 3 for NFPA and HMIS Hazard Codes.

DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES

Although reasonable care has been taken in the preparation of this document, we extend no warranties and make no representations as to the accuracy or completeness of the information contained herein, and assume no

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Material Safety Data Sheet

Printing date 02/16/2012

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Reviewed on 02/16/2012

Trade name: Nitrogen Dioxide

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responsibility regarding the suitability of this information for the user's intended purposes or for the consequences of its use. Each individual should make a determination as to the suitability of the information for their particular purpose(s).

GENERAL DISCLAIMER

For terms and conditions, including limitation of liability, please refer to the purchase agreement in effect between Linde Inc. (or any of its affiliates and subsidiaries) and the purchaser.

· **Department issuing MSDS:** Customer Service Centre: 1-866-385-5349

· **Abbreviations and Acronyms:**

ACGIH: American Conference of Governmental Industrial Hygienists
CAS: Chemical Abstract Service (Division of the American Chemical Society)
DOT: US Department of Transportation
EINECS: European Inventory of Existing Commercial Chemical Substances
GHS: Globally Harmonized System of Classification and Labelling of Chemicals
HMIS: Hazardous Material Identification System
IATA: International Air Transportation Association
IATA-DGR: Dangerous Goods Regulations by the "International Air Transportation Association"
ICAO: International Civil Aviation Association
ICAO-TI: Technical Instructions by the "International Civil Aviation Organization (ICAO)"
IMDG: International Marine Code for Dangerous Goods
WHIMS: Workplace Hazardous Material Information System
LC50: Lethal Concentration, 50 Percent
LD50: Lethal Dose, 50 Percent
N/A: Not Applicable

CDN

Material Safety Data Sheet

Printing date 12/07/2011

Version 17

Reviewed on 12/07/2011

1 Identification of substance

· **Product details**

· **Trade name:** Nitrogen

· **Article number:** 003-01-0001

· **Creation date:** 11/27/2008

· **Manufacturer/Supplier:**

Linde Canada Limited

5860 Chedworth Way

Mississauga, Ontario L5R 0A2

Telephone (905) 501-1700

24-HOUR EMERGENCY TELEPHONE NUMBER:

(905) 501-0802

Linde

575 Mountain Avenue

Murray Hill, NJ 07974

Telephone (908) 464-8100

24-HOUR EMERGENCY TELEPHONE NUMBER :

CHEMTREC (800) 424-9300 OR

Linde National Operations Center (800) 232-4726

Pse ensure that this MSDS is received by the appropriate person.

· **Information department:** Customer Service Centre: 1-866-385-5349

2 Composition/Data on components

· **Chemical characterization:**

· **CAS No. Description**

7727-37-9 Nitrogen Gaseous

· **Identification number(s)**

· **EINECS Number:** 231-783-9

· **Chemical characterization**

· **Dangerous components:**

· **Chemical components**

7727-37-9	Nitrogen Gaseous	23-100%
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3 Hazards identification

· **Hazard description:**

· **WHMIS-symbols:**

A - Compressed gas



· **HMIS-ratings (scale 0 - 4)**

HEALTH	0	Health = 0
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FIRE	0	Fire = 0
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REACTIVITY	0	Reactivity = 0
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(Contd. on page 2)

Material Safety Data Sheet

Printing date 12/07/2011

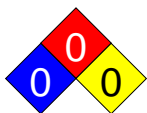
Version 17

Reviewed on 12/07/2011

Trade name: Nitrogen

(Contd. of page 1)

- **NFPA ratings (scale 0 - 4)**



Health = 0
Fire = 0
Reactivity = 0

- **Information pertaining to particular dangers for man and environment:** Not applicable.

- **Classification system:**

The classification is in line with internationally approved calculation standards. It is expanded, however, by information from technical literature and by information furnished by supplier companies.

- **GHS label elements**



Warning

2.5/C - Contains gas under pressure; may explode if heated.

- **Storage:**

Protect from sunlight. Store in a well-ventilated place.

4 First aid measures

- **After inhalation:** Supply fresh air; consult doctor in case of complaints.
- **After skin contact:** Generally the product does not irritate the skin.
- **After eye contact:** Rinse opened eye for at least 15 minutes under running water. Then consult a doctor.
- **After swallowing:** Not applicable

5 Fire fighting measures

- **Suitable extinguishing agents:**
CO₂, powder or water spray. Fight larger fires with water spray or alcohol resistant foam.
- **Protective equipment:** Wear self-contained respiratory protective device.

6 Accidental release measures

- **Person-related safety precautions:**
Wear protective equipment. Keep unprotected persons away.
Ensure adequate ventilation.
Stop leak - ONLY if possible to do so without risk.
- **Measures for environmental protection:** Prevent seepage into sewage system, workpits and/or cellars.
- **Measures for cleaning/collecting:** Ensure adequate ventilation.
- **Additional information:** No dangerous substances are released.

7 Handling and storage

- **Handling:**
- **Information for safe handling:**
Ensure good ventilation/exhaustion at the workplace.
Handle with care. Avoid jolting, friction, and impact.
Use only in well ventilated areas.
Store container in a secured area. Limit access to authorized personnel only. Report any incidents involving thefts, misuse, or inventory shortages to law enforcement and the supplier. Security shall be provided in accordance with all local, state (provincial) and federal regulations.

(Contd. on page 3)

CDN

Material Safety Data Sheet

Printing date 12/07/2011

Version 17

Reviewed on 12/07/2011

Trade name: Nitrogen

(Contd. of page 2)

- **Information about protection against explosions and fires:**
Keep ignition sources away - Do not smoke.
Pressurized container: protect from sunlight and do not expose to temperatures exceeding 50°C. Do not pierce or burn, even after use.
- **Storage:**
- **Requirements to be met by storerooms and receptacles:**
Do not expose cylinder to temperatures higher than 50°C (122 °F)
Protect cylinders from physical damage. Store in cool, dry, well-ventilated area away from heavily trafficked areas and emergency exits. Do not allow the temperature where cylinders are stored to exceed 125°F (52°C). Cylinders should be stored upright and firmly secured to prevent falling or being knocked over. Full and empty cylinders should be segregated. Use a "first in-first out" inventory system to prevent full cylinders being stored for excessive periods of time.
- **Information about storage in one common storage facility:**
Sources of ignition should be removed from storage area.
- **Further information about storage conditions:**
Store in accordance with local fire code and/or building code or any pertaining regulations.

8 Exposure controls and personal protection

- **Additional information about design of technical systems:**
Adequate local ventilation.
Safety showers and eyewash stations should be nearby.
 - **Components with limit values that require monitoring at the workplace:**
- | | |
|--|-------------------|
| 7727-37-9 Nitrogen Gaseous (23 - 100%) | |
| EL | Simple asphyxiant |
- **Additional information:** The lists that were valid during the creation were used as basis.

- **Personal protective equipment:**
- **General protective and hygienic measures:**
Protective clothing and PPE should be kept free of oil and grease, generally in clean condition
PPE should be inspected and maintained regularly to retain effectiveness.
- **Breathing equipment:**
Use atmosphere-supplying respirators (e.g. supplied-air: demand, pressure-demand, or continuous-flow or self-contained breathing apparatus: demand or pressure-demand or combination supplied-air with auxiliary self-contained air supply atmosphere-supplying respirator) in case of insufficient ventilation.
- **Protection of hands:**



Protective gloves.

- **Material of gloves**
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer.
- **Eye protection:** Safety glasses

9 Physical and chemical properties

General Information

Form:	Gaseous.
Color:	Colorless

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CDN

Material Safety Data Sheet

Printing date 12/07/2011

Version 17

Reviewed on 12/07/2011

Trade name: Nitrogen

(Contd. of page 3)

Odor:	Odorless
--------------	----------

<ul style="list-style-type: none"> · Change in condition
--

<ul style="list-style-type: none"> <ul style="list-style-type: none"> · Melting point/Melting range: -210°C
--

<ul style="list-style-type: none"> <ul style="list-style-type: none"> · Boiling point/Boiling range: -268°C
--

<ul style="list-style-type: none"> · Flash point: 	Not applicable.
---	-----------------

<ul style="list-style-type: none"> · Danger of explosion: 	Product does not present an explosion hazard.
---	---

10 Stability and reactivity

- **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
- **Materials to be avoided:**
- **Dangerous reactions** No dangerous reactions known.
- **Dangerous products of decomposition:** No dangerous decomposition products known.

11 Toxicological information

- **Acute toxicity:**
- **LD/LC50 values that are relevant for classification:** LC50 - None available
- **Primary irritant effect:**
- **on the skin:** No irritating effect.
- **on the eye:** No irritating effect.
- **Sensitization:** No sensitizing effects known.
- **Additional toxicological information:**
When used and handled according to specifications, the product does not have any harmful effects according to our experience and the information provided to us.
The substance is not subject to classification.

12 Ecological information

- **Additional ecological information:**
- **General notes:** Generally not hazardous for water

13 Disposal considerations

- **Product:**
- **Recommendation:** Unused product should be returned to vendor.
- **Uncleaned packagings:**
- **Recommendation:**
Cylinder and unused product should be returned to vendor. Disposable cylinder must be disposed of in accordance with local regulations.
- **Recommended cleansing agent:** None applicable.

CDN

(Contd. on page 5)

Material Safety Data Sheet

Printing date 12/07/2011

Version 17

Reviewed on 12/07/2011

Trade name: Nitrogen

(Contd. of page 4)

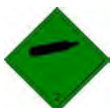
* 14 Transport information

· TDG and DOT regulations:



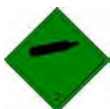
- Hazard class: 2
- Identification number: UN1066
- Proper shipping name (technical name): AZOTE COMPRIMÉ
- Label: 2.2
- Packaging group: -

· Maritime transport IMDG:



- IMDG Class: 2
- UN Number: 1066
- Label: 2.2
- Marine pollutant: No
- Proper shipping name: NITROGEN, COMPRESSED

· Air transport ICAO-TI and IATA-DGR:



- ICAO/IATA Class: 2
- UN/ID Number: 1066
- Label: 2.2
- Proper shipping name: NITROGEN, COMPRESSED

- UN "Model Regulation": UN1066, NITROGEN, COMPRESSED, 2.2

* 15 Regulations

· Sara

· Section 355 (extremely hazardous substances):

Substance is not listed.

· Section 313 (Specific toxic chemical listings):

Substance is not listed.

· TSCA (Toxic Substances Control Act):

Substance is listed.

· Proposition 65

· Chemicals known to cause cancer:

Substance is not listed.

· Chemicals known to cause reproductive toxicity for females:

Substance is not listed.

(Contd. on page 6)

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Trade name: Nitrogen

(Contd. of page 5)

· **Chemicals known to cause reproductive toxicity for males:**

Substance is not listed.

· **Chemicals known to cause developmental toxicity:**

Substance is not listed.

· **Carcinogenicity categories**· **EPA (Environmental Protection Agency)**

Substance is not listed.

· **NTP (National Toxicology Program)**

Substance is not listed.

· **TLV (Threshold Limit Value established by ACGIH)**

Substance is not listed.

· **NIOSH-Ca (National Institute for Occupational Safety and Health)**

Substance is not listed.

· **OSHA-Ca (Occupational Safety & Health Administration)**

Substance is not listed.

· **Canadian substance listings:**· **Canadian Domestic Substances List (DSL)**

Substance is not listed.

· **Canadian Ingredient Disclosure list (limit 0.1%)**

Substance is not listed.

· **Canadian Ingredient Disclosure list (limit 1%)**

Substance is not listed.

· **Product related hazard informations:**

Observe the general safety regulations when handling chemicals.

The substance is not subject to classification according to the sources of literature known to us.

The product was classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

· **Safety phrases:**

Keep container in a well-ventilated place.

Do not breathe gas/fumes/vapour/spray (appropriate wording to be specified by the manufacturer).

16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

Please refer to the section 3 for NFPA and HMIS Hazard Codes.

DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES

Although reasonable care has been taken in the preparation of this document, we extend no warranties and make no representations as to the accuracy or completeness of the information contained herein, and assume no responsibility regarding the suitability of this information for the user's intended purposes or for the consequences of its use. Each individual should make a determination as to the suitability of the information for their particular purpose(s).

GENERAL DISCLAIMER

For terms and conditions, including limitation of liability, please refer to the purchase agreement in effect between Linde Inc. (or any of its affiliates and subsidiaries) and the purchaser.

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Material Safety Data Sheet

Printing date 12/07/2011

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Reviewed on 12/07/2011

Trade name: Nitrogen

(Contd. of page 6)

· **Department issuing MSDS:** Customer Service Centre: 1-866-385-5349

· **Abbreviations and Acronyms:**

ACGIH: American Conference of Governmental Industrial Hygienists
CAS: Chemical Abstract Service (Division of the American Chemical Society)
DOT: US Department of Transportation
EINECS: European Inventory of Existing Commercial Chemical Substances
GHS: Globally Harmonized System of Classification and Labelling of Chemicals
HMIS: Hazardous Material Identification System
IATA: International Air Transportation Association
IATA-DGR: Dangerous Goods Regulations by the "International Air Transportation Association"
ICAO: International Civil Aviation Association
ICAO-TI: Technical Instructions by the "International Civil Aviation Organization (ICAO)"
IMDG: International Marine Code for Dangerous Goods
WHIMS: Workplace Hazardous Material Information System
LC50: Lethal Concentration, 50 Percent
LD50: Lethal Dose, 50 Percent
N/A: Not Applicable

CDN



OXYGEN, GAS

Material Safety Data Sheet

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name	OXYGEN, GAS
Product Code(s)	G-1, 1024
UN-Number	UN1072
Recommended Use	Compressed gas.
Synonyms	LASER Oxygen; Oxygen, Compressed
Supplier Address*	<p>Linde Gas North America LLC - Linde Merchant Production Inc. - Linde LLC 575 Mountain Ave. Murray Hill, NJ07974 Phone: 908-464-8100 www.lindeus.com</p> <p>Linde Gas Puerto Rico, Inc. Las Palmas Village Road No. 869, Street No. 7 Catano, Puerto Rico 00962 Phone: 787-641-7445 www.pr.lindegas.com</p> <p>Linde Canada Limited 5860 Chedworth Way Mississauga, Ontario L5R 0A2 Phone: 905-501-1700 www.lindecana.com</p>

* May include subsidiaries or affiliate companies/ divisions.

For additional product information contact your local customer service.

Chemical Emergency Phone Number Chemtrec: 1-800-424-9300 for US/ 703-527-3887 outside US

2. HAZARDS IDENTIFICATION

<p>WARNING!</p> <p style="font-size: 1.2em; font-weight: bold; margin: 10px 0;">Emergency Overview</p> <p style="text-align: center; margin: 5px 0;">Oxidizer</p> <p style="text-align: center; margin: 5px 0;">Contact with combustible material may cause fire</p> <p style="text-align: center; margin: 5px 0;">Contents under pressure</p> <p style="text-align: center; margin: 5px 0;">Keep at temperatures below 52°C/ 125°F</p> <table border="0" style="width: 100%; margin-top: 10px;"> <tr> <td style="width: 33%;">Appearance Colorless</td> <td style="width: 33%;">Physical State Compressed gas.</td> <td style="width: 33%;">Odor Odorless</td> </tr> </table>	Appearance Colorless	Physical State Compressed gas.	Odor Odorless
Appearance Colorless	Physical State Compressed gas.	Odor Odorless	

OSHA Regulatory Status This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Potential Health Effects

Principle Routes of Exposure	Inhalation.
Acute Toxicity	
Inhalation	Oxygen is not acutely toxic under normal pressure. Oxygen is more toxic when inhaled at elevated pressures. Depending upon pressure and duration of exposure, pure oxygen at elevated pressures may cause cramps, dizziness, difficulty breathing, convulsions, edema and death.
Eyes	None known. Contact with rapidly expanding gas near the point of release may cause frostbite.
Skin	None known. Contact with rapidly expanding gas near the point of release may cause frostbite.
Skin Absorption Hazard	No known hazard in contact with skin.
Ingestion	None known.
Chronic Effects	Prolonged inhalation of high oxygen concentrations (>75%) may affect coordination, attention, and cause tiredness of respiratory irritation
Aggravated Medical Conditions	Chronic obstructive pulmonary disease.
Environmental Hazard	See Section 12 for additional Ecological Information.

3. COMPOSITION/ INFORMATION ON INGREDIENTS

Chemical Name	CAS-No	Volume %	Chemical Formula
Oxygen	7782-44-7	>99	O ₂

4. FIRST AID MEASURES

Eye Contact	None under normal use. Get medical attention if symptoms occur.
Skin Contact	None under normal use. Get medical attention if symptoms occur.
Inhalation	Move victim to fresh air. Seek immediate medical attention/ advice.
Ingestion	None under normal use. Get medical attention if symptoms occur.
Notes to Physician	Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Flammable Properties	Oxidizer. May vigorously accelerate combustion.
Suitable Extinguishing Media	Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
Explosion Data	
Sensitivity to Mechanical Impact	None
Sensitivity to Static Discharge	None

Specific Hazards Arising from the Chemical	May ignite combustibles (wood paper, oil, clothing, etc.). High oxygen concentrations vigorously accelerate combustion. Cylinders may rupture under extreme heat. Continue to cool fire exposed cylinders until flames are extinguished. Damaged cylinders should be handled only by specialists.
Protective Equipment and Precautions for Firefighters	As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/ NIOSH (approved or equivalent) and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions	Ensure adequate ventilation. Monitor oxygen level.
Environmental Precautions	Prevent spreading of vapors through sewers, ventilation systems and confined areas.
Methods for Containment	Stop the flow of gas or remove cylinder to outdoor location if this can be done without risk. If leak is in container or container valve, contact the appropriate emergency telephone number in Section 1 or call your closest Linde location.
Methods for Cleaning Up	Return cylinder to Linde or an authorized distributor.

7. HANDLING AND STORAGE

Handling	<p>Dry product is non-corrosive and may be used with all materials of construction. Moisture causes metal oxides which are formed with air to be hydrated so that they include volume and lose their protective role (rust formation). Concentrations of SO₂, Cl₂, salt, etc. in the moisture enhances the rusting of metals in air. Carbon steels and low alloy steels are acceptable for use at lower pressures. For high pressure applications stainless steels are acceptable as are copper and its alloys, nickel and its alloys, brass bronze, silicon alloys, Monel®, Inconel®, and beryllium. Lead and silver or lead tin alloys are good gasket materials. Teflon®, Teflon® composites, or Kel-F® are preferred non-metallic gasket materials.</p> <p>Oxygen should not be used as a substitute for compressed air in pneumatic equipment since they generally contain flammable lubricants. Equipment able to use oxygen must be "cleaned for oxygen service". Check with the equipment supplier to verify oxygen compatibility for the service conditions.</p> <p>Stationary customer site vessels should be operated in accordance with the manufacturer's and Linde's instruction. Do not attempt to repair, adjust or in any other way modify the operation of these vessels. If there is a malfunction or other type of operations problem with the vessel, contact the closest Linde location immediately for assistance. "NO SMOKING" signs should be posted in storage and use areas. Containers of liquid oxygen should be separated from flammable gas containers by a minimum distance of 20 ft., or by a barrier of non-combustible material at least 5 ft. high having a fire resistance rating of 1/ 2 hour.</p>
-----------------	--

Use only in ventilated areas. Never attempt to lift a cylinder by its valve protection cap. Protect cylinders from physical damage; do not drag, roll, slide or drop. When moving cylinders, even for short distance, use a cart designed to transport cylinders. Use equipment rated for cylinder pressure. Use backflow preventive device in piping. Never insert an object (e.g. wrench, screw driver, pry bar, etc.) into valve cap openings. Doing so may damage valve, causing leak to occur.

Use an adjustable strap wrench to remove over-tight or rusted caps. Close valve after each use and when empty. If user experiences any difficulty operating cylinder valve discontinue use and contact supplier.

Never put cylinders into trunks of cars or unventilated areas of passenger vehicles. Never attempt to refill a compressed gas cylinder without the owner's written consent. Never strike an arc on a compressed gas cylinder or make a cylinder a part of an electrical circuit.

For additional recommendations, consult Compressed Gas Association's Pamphlets SB-7, G-4.3, G-4.1, G-4.4, P-2.5, G-4.9, P-14, and SB-2.

Storage

Protect from physical damage. Cylinders should be stored upright with valve protection cap in place and firmly secured to prevent falling. Store in cool, dry, well-ventilated area of non-combustible construction away from heavily trafficked areas and emergency exits. Keep at temperatures below 52°C / 125°F. Full and empty cylinders should be segregated. Use a "first in-first out" inventory system to prevent full cylinders from being stored for excessive periods of time. Always store and handle compressed gas cylinders in accordance with Compressed Gas Association, pamphlet CGA-P1, Safe Handling of Compressed Gases in Containers.

8. EXPOSURE CONTROLS/ PERSONAL PROTECTION

Exposure Guidelines

This product does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.

Engineering Measures

Showers. Eyewash stations. Ventilation systems.

Ventilation

Use local exhaust in combination with general ventilation as necessary to keep oxygen concentrations below 23.5%.

Personal Protective Equipment

Eye/ Face Protection

Wear protective eyewear (safety glasses).

Skin and Body Protection

Work gloves and safety shoes are recommended when handling cylinders. Gloves must be clean and free from grease or oil.

Respiratory Protection

General Use

No special protective equipment required.

Emergency Use

No special protective equipment required.

Hygiene Measures

Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Colorless.	Odor	Odorless.
Odor Threshold	No information available	Physical State	Compressed gas
Flash Point	No information available.	Autoignition Temperature	No information available.
Decomposition Temperature	No information available.	Boiling Point/ Boiling Range	-182.9 °C / -297.3 °F
Freezing Point	-218.8 °C / -361.8 °F	Molecular Weight	32.00
Water Solubility	Slightly soluble	Evaporation Rate	No information available
Vapor Pressure	Above critical temp.	Vapor Density	1.326 kg/ m ³ (0.083 lb/ ft ³) @21.1°C
VOC Content (%)	Not applicable.	Partition Coefficient: n-octanol/ water	Log P -0.65
Specific Vol. @ 21.1°C & 1 atm	12.1 ft ³ / lb	Critical Pressure	731.4 psia
Critical Temperature	-118.57°C / -215.4°F	Flammability Limits in Air	
		Upper	Not applicable
		Lower	Not applicable

10. STABILITY AND REACTIVITY

Stability	Stable.
Incompatible Products	Combustible materials. Organic material. Reducing agents.
Conditions to Avoid	Keep away from open flames, hot surfaces and sources of ignition.
Hazardous Decomposition Products	None known.
Hazardous Polymerization	Hazardous polymerization does not occur.

11. TOXICOLOGICAL INFORMATION

Acute Toxicity

LD50 Oral: No information available.

LD50 Dermal: No information available.

LC50 Inhalation: No information available.

Inhalation Symptoms of overexposure are dizziness, headache, tiredness, nausea, unconsciousness, cessation of breathing.

Poisoning began in dogs 36 hours after inhalation of pure oxygen at atmospheric pressure. Distress was seen within 48 hours and death within 60 hours.

Eye Contact The incompletely developed retinal circulation is more susceptible to toxic levels of oxygen. In premature infants, arterial oxygen tension above 150 mm Hg may cause retrolental fibroplasia. Permanent blindness may occur several months later. One case of severe retinal damage in an adult was reported. An individual suffering from myasthenia gravis developed irreversible retinal atrophy after breathing 80% oxygen for 150 days.

Repeated Dose Toxicity No information available.

Chronic Toxicity

Chronic Toxicity	Prolonged inhalation of high oxygen concentrations (>75%) may affect coordination, attention, and cause tiredness of respiratory irritation.
Carcinogenicity	Contains no ingredient listed as a carcinogen.
Irritation	No information available.
Sensitization	No information available.
Reproductive Toxicity	No information available.
Developmental Toxicity	No information available.
Synergistic Materials	None known.
Target Organ Effects	None known.

12. ECOLOGICAL INFORMATION

Ecotoxicity

Will not bioconcentrate.

Ozone depletion potential; ODP; (R-11 = 1): Does not contain ozone depleting chemical (40 CFR Part 82).

13. DISPOSAL CONSIDERATIONS

Waste Disposal Methods Do not attempt to dispose of residual waste or unused quantities. Return in the shipping container PROPERLY LABELED WITH ANY VALVE OUTLET PLUGS OR CAPS SECURED AND VALVE PROTECTION CAP IN PLACE to Linde for proper disposal.

14. TRANSPORT INFORMATION

DOT

Proper shipping name	Oxygen, compressed
Hazard Class	2.2
Subsidiary Class	5.1
UN-Number	UN1072
Description	UN1072,Oxygen, compressed,2.2,(5.1)

TDG

Proper Shipping Name	Oxygen, compressed
Hazard Class	2.2
Subsidiary Class	(5.1)
UN-Number	UN1072
Description	UN1072,OXYGEN, COMPRESSED,2.2(5.1)

MEX

Proper Shipping Name	Oxygen, compressed
-----------------------------	--------------------

Hazard Class	2.2
Subsidiary Class	5.1
UN-Number	UN1072
Description	UN1072 Oxygen, compressed,2.2

IATA

UN-Number	UN1072
Proper Shipping Name	Oxygen, compressed
Hazard Class	2.2
Subsidiary Class	5.1
ERG Code	2X
Description	UN1072,Oxygen, compressed,2.2(5.1)
Maximum Quantity for Passenger	75 kg
Maximum Quantity for Cargo Only	150 kg
Limited Quantity	No information available.

IMDG/ IMO

Proper Shipping Name	Oxygen, compressed
Hazard Class	2.2
Subsidiary Class	5.1
UN-Number	UN1072
EmS No.	F-C, S-W
Description	UN1072, Oxygen, compressed,2.2(5.1)

ADR

Proper Shipping Name	Oxygen, compressed
Hazard Class	2.2
UN-Number	UN1072
Classification Code	1O
Description	UN1072 Oxygen, compressed,2.2,
ADR/ RID-Labels	5.1

15. REGULATORY INFORMATION

International Inventories

TSCA	Complies
DSL	Complies
EINECS/ ELINCS	Complies

Legend

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/ NDSL - Canadian Domestic Substances List/ Non-Domestic Substances List
EINECS/ ELINCS - European Inventory of Existing Commercial Chemical Substances/ EU List of Notified Chemical Substances

U.S. Federal Regulations

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372.

SARA 311/ 312 Hazard Categories

Acute Health Hazard No
Chronic Health Hazard No
Fire Hazard Yes
Sudden Release of Pressure Hazard Yes
Reactive Hazard No

Clean Water Act

This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42).

Risk and Process Safety Management Programs

This material, as supplied, does not contain any regulated substances with specified thresholds under 40 CFR Part 68.

This product does not contain any substances regulated as Highly Hazardous Chemicals pursuant to the 29 CFR Part 1910.110.

Clean Air Act, Section 112 Hazardous Air Pollutants (HAPS) (see 40 CFR 61)

This product does not contain any substances regulated as hazardous air pollutants (HAPS) under Section 112 of the Clean Air Act Amendments of 1990.

CERCLA/ SARA

This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material.

U.S. State Regulations

California Proposition 65

This product does not contain any Proposition 65 chemicals.

U.S. State Right-to-Know Regulations

Chemical Name	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Oxygen	X	X	X	-	X

International Regulations

Canada

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS Hazard Class

- A Compressed gases
- C Oxidizing materials



Prepared By Product Stewardship
23 British American Blvd.
Latham, NY 12110
1-800-572-6501

Issuing Date 05-Mar-2010

Revision Date 27-Sep-2013

Revision Number 2

Revision Note Not applicable.

<u>NFPA</u>	Health Hazard 0	Flammability 0	Stability 0	Physical and Chemical Hazards OX
<u>HMIS</u>	Health Hazard 0	Flammability 0	Physical Hazard 3	Personal Protection -

Note: Ratings were assigned in accordance with Compressed Gas Association (CGA) guidelines as published in CGA Pamphlet P-19-2009, CGA Recommended Hazard Ratings for Compressed Gases, 3rd Edition.

General Disclaimer

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End of Safety Data Sheet



OXYGEN, REFRIGERATED LIQUID

Material Safety Data Sheet

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name	OXYGEN, REFRIGERATED LIQUID
Product Code(s)	G-102
UN-Number	UN1073
Recommended Use	Refrigerant.
Synonyms	Liquid Oxygen; LOX
Supplier Address*	<p>Linde Gas North America LLC - Linde Merchant Production Inc. - Linde LLC 575 Mountain Ave. Murray Hill, NJ07974 Phone: 908-464-8100 www.lindeus.com</p> <p>Linde Gas Puerto Rico, Inc. Las Palmas Village Road No. 869, Street No. 7 Catano, Puerto Rico 00962 Phone: 787-641-7445 www.pr.lindegas.com</p> <p>Linde Canada Limited 5860 Chedworth Way Mississauga, Ontario L5R 0A2 Phone: 905-501-1700 www.lindecana.com</p>

* May include subsidiaries or affiliate companies/ divisions.

For additional product information contact your local customer service.

Chemical Emergency Phone Number Chemtrec: 1-800-424-9300 for US/ 703-527-3887 outside US

2. HAZARDS IDENTIFICATION

WARNING!		
Emergency Overview		
Oxidizer		
Contact with combustible material may cause fire		
Contact with liquid may cause frostbite		
Contents under pressure		
Keep at temperatures below 52°C/ 125°F		
Appearance Pale blue	Physical State Cryogenic Liquid.	Odor Odorless

OSHA Regulatory Status

This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Potential Health Effects

Principle Routes of Exposure Eye contact. Skin contact. Inhalation.

Acute Toxicity

Inhalation Oxygen is not acutely toxic under normal pressure. Oxygen is more toxic when inhaled at elevated pressures. Depending upon pressure and duration of exposure, pure oxygen at elevated pressures may cause cramps, dizziness, difficulty breathing, convulsions, edema and death.

Eyes This product is a gas at room temperature. Contact with liquid may cause frostbite.

Skin This product is a gas at room temperature. Contact with liquid may cause frostbite.

Skin Absorption Hazard No known hazard in contact with skin.

Ingestion None known.

Chronic Effects Prolonged inhalation of high oxygen concentrations (>75%) may affect coordination, attention, and cause tiredness of respiratory irritation

Aggravated Medical Conditions Chronic obstructive pulmonary disease.

Environmental Hazard See Section 12 for additional Ecological Information.

3. COMPOSITION/ INFORMATION ON INGREDIENTS

Chemical Name	CAS-No	Volume %	Chemical Formula
Oxygen	7782-44-7	>99	O ₂

4. FIRST AID MEASURES

Eye Contact None required for gas. If frostbite is suspected, flush eyes with cool water for 15 minutes and obtain immediate medical attention.

Skin Contact None required for gas. For dermal contact or suspected frostbite, remove contaminated clothing and flush affected areas with lukewarm water. DO NOT USE HOT WATER. A physician should see the patient promptly if contact with the product has resulted in blistering of the dermal surface or in deep tissue freezing.

Inhalation Move victim to fresh air. Seek immediate medical attention/ advice.

Ingestion None under normal use. Get medical attention if symptoms occur.

Notes to Physician Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Flammable Properties Oxidizer. May vigorously accelerate combustion.

Suitable Extinguishing Media Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Explosion Data

Sensitivity to Mechanical Impact	None
Sensitivity to Static Discharge	None
Specific Hazards Arising from the Chemical	May ignite combustibles (wood paper, oil, clothing, etc.). High oxygen concentrations vigorously accelerate combustion. Cylinders may rupture under extreme heat. Continue to cool fire exposed cylinders until flames are extinguished. Damaged cylinders should be handled only by specialists.
Protective Equipment and Precautions for Firefighters	As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/ NIOSH (approved or equivalent) and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions	Ensure adequate ventilation. Monitor oxygen level.
Environmental Precautions	Prevent spreading of vapors through sewers, ventilation systems and confined areas.
Methods for Containment	Stop the flow of gas or remove cylinder to outdoor location if this can be done without risk. If leak is in container or container valve, contact the appropriate emergency telephone number in Section 1 or call your closest Linde location.
Methods for Cleaning Up	Return cylinder to Linde or an authorized distributor.

7. HANDLING AND STORAGE

Handling	<p>Liquid oxygen cannot be handled in carbon or low alloy steel, 18-8 and 18-10 stainless steel are acceptable as are copper and its alloys, brass bronze, silicon alloys, Monel® , Inconel® , and beryllium. Teflon® , Teflon® composites, or Kel-F® are preferred non-metallic gasket materials.</p> <p>Oxygen should not be used as a substitute for compressed air in pneumatic equipment since they generally contain flammable lubricants. Equipment able to use oxygen must be "cleaned for oxygen service". Check with the equipment supplier to verify oxygen compatibility for the service conditions.</p> <p>Stationary customer site vessels should be operated in accordance with the manufacturer's and Linde's instruction. Do not attempt to repair, adjust or in any other way modify the operation of these vessels. If there is a malfunction or other type of operations problem with the vessel, contact the closest Linde location immediately for assistance. "NO SMOKING" signs should be posted in storage and use areas. Containers of liquid oxygen should be separated from flammable gas containers by a minimum distance of 20 ft., or by a barrier of non-combustible material at least 5 ft. high having a fire resistance rating of 1/ 2 hour.</p>
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Use only in ventilated areas. Never attempt to lift a cylinder by its valve protection cap. Protect cylinders from physical damage; do not drag, roll, slide or drop. When moving cylinders, even for short distance, use a cart designed to transport cylinders. Use equipment rated for cylinder pressure. Use backflow preventive device in piping. Never insert an object (e.g. wrench, screw driver, pry bar, etc.) into valve cap openings. Doing so may damage valve, causing leak to occur.

Use an adjustable strap wrench to remove over-tight or rusted caps. Close valve after each use and when empty. If user experiences any difficulty operating cylinder valve discontinue use and contact supplier.

Never put cylinders into trunks of cars or unventilated areas of passenger vehicles. Never attempt to refill a compressed gas cylinder without the owner's written consent. Never strike an arc on a compressed gas cylinder or make a cylinder a part of an electrical circuit.

For additional recommendations, consult Compressed Gas Association's Pamphlets SB-7, G-4.3, G-4.1, G-4.4, P-2.5, G-4.9, P-14, and SB-2.

Storage

Protect from physical damage. Cylinders should be stored upright with valve protection cap in place and firmly secured to prevent falling. Store in cool, dry, well-ventilated area of non-combustible construction away from heavily trafficked areas and emergency exits. Keep at temperatures below 52°C/ 125°F. Full and empty cylinders should be segregated. Use a "first in-first out" inventory system to prevent full cylinders from being stored for excessive periods of time. Always store and handle compressed gas cylinders in accordance with Compressed Gas Association, pamphlet CGA-P1, Safe Handling of Compressed Gases in Containers.

8. EXPOSURE CONTROLS/ PERSONAL PROTECTION

Exposure Guidelines

This product does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.

Engineering Measures

Showers. Eyewash stations. Ventilation systems.

Ventilation

Use local exhaust in combination with general ventilation as necessary to keep oxygen concentrations below 23.5%.

Personal Protective Equipment

Eye/ Face Protection

Wear protective eyewear (safety glasses).

Skin and Body Protection

Work gloves and safety shoes are recommended when handling cylinders. Wear cold insulating gloves when handling liquid. Gloves must be clean and free from grease or oil.

Respiratory Protection

General Use

No special protective equipment required.

Hygiene Measures

Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Pale blue.	Odor	Odorless.
Odor Threshold	No information available	Physical State	Cryogenic Liquid
Flash Point	No information available.	Autoignition Temperature	No information available.
Decomposition Temperature	No information available.	Boiling Point/ Boiling Range	-182.9 °C / -297.3 °F
Freezing Point	-218.8 °C / -361.8 °F	Molecular Weight	32.00
Water Solubility	Slightly soluble	Evaporation Rate	No information available
Vapor Pressure	760 mmHg @ -183°C	Vapor Density	1.14 (air = 1)
VOC Content (%)	Not applicable.	Flammability Limits in Air	
		Upper	Not applicable
		Lower	Not applicable

10. STABILITY AND REACTIVITY

Stability	Stable.
Incompatible Products	Combustible materials. Organic material. Reducing agents.
Conditions to Avoid	Keep away from open flames, hot surfaces and sources of ignition.
Hazardous Decomposition Products	None known.
Hazardous Polymerization	Hazardous polymerization does not occur.

11. TOXICOLOGICAL INFORMATION

Acute Toxicity

LD50 Oral:	No information available.
LD50 Dermal:	No information available.
LC50 Inhalation:	No information available.
Inhalation	Symptoms of overexposure are dizziness, headache, tiredness, nausea, unconsciousness, cessation of breathing. Poisoning began in dogs 36 hours after inhalation of pure oxygen at atmospheric pressure. Distress was seen within 48 hours and death within 60 hours.
Eye Contact	The incompletely developed retinal circulation is more susceptible to toxic levels of oxygen. In premature infants, arterial oxygen tension above 150 mm Hg may cause retrolental fibroplasia. Permanent blindness may occur several months later. One case of severe retinal damage in an adult was reported. An individual suffering from myasthenia gravis developed irreversible retinal atrophy after breathing 80% oxygen for 150 days.
Repeated Dose Toxicity	No information available.

Chronic Toxicity

Chronic Toxicity	Prolonged inhalation of high oxygen concentrations (>75%) may affect coordination, attention, and cause tiredness of respiratory irritation.
Carcinogenicity	Contains no ingredient listed as a carcinogen.

Irritation	No information available.
Sensitization	No information available.
Reproductive Toxicity	No information available.
Developmental Toxicity	No information available.
Synergistic Materials	None known.
Target Organ Effects	None known.

12. ECOLOGICAL INFORMATION

Ecotoxicity

Will not bioconcentrate.

Ozone depletion potential; ODP; (R-11 = 1): Does not contain ozone depleting chemical (40 CFR Part 82).

13. DISPOSAL CONSIDERATIONS

Waste Disposal Methods Do not attempt to dispose of residual waste or unused quantities. Return in the shipping container PROPERLY LABELED WITH ANY VALVE OUTLET PLUGS OR CAPS SECURED AND VALVE PROTECTION CAP IN PLACE to Linde for proper disposal.

14. TRANSPORT INFORMATION

DOT

Proper shipping name	Oxygen, refrigerated liquid
Hazard Class	2.2
Subsidiary Class	5.1
UN-Number	UN1073
Description	UN1073,Oxygen, refrigerated liquid,2.2,(5.1)
Emergency Response Guide Number	122

TDG

Proper Shipping Name	Oxygen, refrigerated liquid
Hazard Class	2.2
Subsidiary Class	(5.1)
UN-Number	UN1073
Description	UN1073,OXYGEN, REFRIGERATED LIQUID,2.2(5.1)

MEX

Proper Shipping Name	Oxygen, refrigerated liquid
Hazard Class	2.2

Subsidiary Class	5.1
UN-Number	UN1073
Description	UN1073 Oxygen, refrigerated liquid,2.2

IATA

UN-Number	UN1073
Proper Shipping Name	Oxygen, refrigerated liquid
Hazard Class	2.2
Subsidiary Class	5.1
ERG Code	2X
Description	UN1073,Oxygen, refrigerated liquid,2.2(5.1)
Maximum Quantity for Passenger	Forbidden
Maximum Quantity for Cargo Only	Forbidden
Limited Quantity	No information available.

IMDG/ IMO

Proper Shipping Name	Oxygen, refrigerated liquid
Hazard Class	2.2
Subsidiary Class	5.1
UN-Number	UN1073
EmS No.	F-C, S-W
Description	UN1073, Oxygen, refrigerated liquid,2.2(5.1)

ADR

Proper Shipping Name	Oxygen, refrigerated liquid
Hazard Class	2.2
UN-Number	UN1073
Classification Code	3O
Description	UN1073 Oxygen, refrigerated liquid,2.2,
ADR/ RID-Labels	5.1

15. REGULATORY INFORMATION

International Inventories

TSCA	Complies
DSL	Complies
EINECS/ ELINCS	Complies

Legend

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/ NDSL - Canadian Domestic Substances List/ Non-Domestic Substances List
EINECS/ ELINCS - European Inventory of Existing Commercial Chemical Substances/ EU List of Notified Chemical Substances

U.S. Federal Regulations

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372.

SARA 311/ 312 Hazard Categories

Acute Health Hazard	No
Chronic Health Hazard	No
Fire Hazard	Yes
Sudden Release of Pressure Hazard	Yes
Reactive Hazard	No

Clean Water Act

This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42).

Risk and Process Safety Management Programs

This material, as supplied, does not contain any regulated substances with specified thresholds under 40 CFR Part 68.
This product does not contain any substances regulated as Highly Hazardous Chemicals pursuant to the 29 CFR Part 1910.110.

Clean Air Act, Section 112 Hazardous Air Pollutants (HAPS) (see 40 CFR 61)

This product does not contain any substances regulated as hazardous air pollutants (HAPS) under Section 112 of the Clean Air Act Amendments of 1990.

CERCLA/ SARA

This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material.

U.S. State Regulations

California Proposition 65

This product does not contain any Proposition 65 chemicals.

U.S. State Right-to-Know Regulations

Chemical Name	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Oxygen	X	X	X	-	X

International Regulations

Canada

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS Hazard Class

- A Compressed gases
- C Oxidizing materials



Prepared By Product Stewardship
23 British American Blvd.
Latham, NY 12110
1-800-572-6501

Issuing Date 05-Mar-2010

Revision Date 27-Sep-2013

Revision Number 2

Revision Note Not applicable.

<u>NFPA</u>	Health Hazard 3	Flammability 0	Stability 0	Physical and Chemical Hazards OX
<u>HMIS</u>	Health Hazard 3	Flammability 0	Physical Hazard 2	Personal Protection -

Note: Ratings were assigned in accordance with Compressed Gas Association (CGA) guidelines as published in CGA Pamphlet P-19-2009, CGA Recommended Hazard Ratings for Compressed Gases, 3rd Edition.

General Disclaimer

For terms and conditions, including limitation of liability, please refer to the purchase agreement in effect between Linde LLC, Linde Merchant Production, Inc. or Linde Gas North America LLC (or any of their affiliates and subsidiaries) and the purchaser.

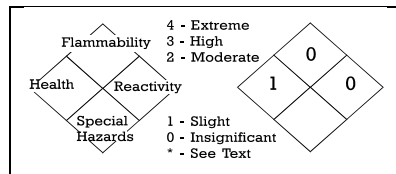
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End of Safety Data Sheet

Product: **Pipeliners 70S-G**

Date: **2/23/2012**



Section VI - Health Hazard Data and Toxicological Properties

Acute Lethality Values: LC₅₀ means the concentration of a substance in air that when administered by means of inhalation over a specified length of time in an animal assay, is expected to cause the death of 50% of a defined animal population.

LD₅₀ means the single dose of a substance that, when administered by a defined route in an animal assay, is expected to cause the death of 50% of a defined animal population.

Threshold Limit Value: The ACGIH recommended general limit for Welding Fume NOS - (Not Otherwise Specified) is 5 mg/m³. The TLV-TWA is the time-weighted average concentration for a normal 8-hour workday and a 40 hour workweek, to which nearly all workers may be repeatedly exposed, day after day, without adverse effect. See Section VII for specific fume constituents which may modify this TLV. Threshold Limit Values are figures published by the American Conference of Government Industrial Hygienists.

Effects of Overexposure: Electric arc welding may create one or more of the following health hazards:
Fumes and Gases can be dangerous to your health. Common entry is by inhalation. Other possible routes are skin contact and ingestion.

Short-term (acute) overexposure to welding fumes may result in discomfort such as metal fume fever, dizziness, nausea, or dryness or irritation of nose, throat, or eyes. May aggravate pre-existing respiratory problems (e.g. asthma, emphysema).

Long-term (chronic) overexposure to welding fumes can lead to siderosis (iron deposits in lung) and may affect pulmonary function. Manganese overexposure can affect the central nervous system, resulting in impaired speech and movement. Bronchitis and some lung fibrosis have been reported.

Arc Rays can injure eyes and burn skin. *Skin cancer has been reported.*

Electric Shock can kill. If welding must be performed in damp locations or with wet clothing, on metal structures or when in cramped positions such as sitting, kneeling or lying, or if there is a high risk of unavoidable or accidental contact with workpiece, use the following equipment: Semiautomatic DC Welder, DC Manual (Stick) Welder, or AC Welder with Reduced Voltage Control.

Section VII - Reactivity Data

Hazardous Decomposition Products: Welding fumes and gases cannot be classified simply. The composition and quantity of both are dependent upon the metal being welded, the process, procedure and electrodes used.

Other conditions which also influence the composition and quantity of the fumes and gases to which workers may be exposed include: coatings on the metal being welded (such as paint, plating, or galvanizing), the number of welders and the volume of the worker area, the quality and amount of ventilation, the position of the welder's head with respect to the fume plume, as well as the presence of contaminants in the atmosphere (such as chlorinated hydrocarbon vapors from cleaning and degreasing activities.)

When the electrode is consumed, the fume and gas decomposition products generated are different in percent and form from the ingredients listed in Section III. Decomposition products of normal operation include those originating from the volatilization, reaction, or oxidation of the materials shown in Section III, plus those from the base metal and coating, etc., as noted above.

Reasonably expected fume constituents of this product would include: Primarily iron oxide; secondarily complex oxides of copper, manganese and silicon when used with gas shielding.

Maximum fume exposure guideline for this product (based on manganese content) is 2.5 milligrams per cubic meter.

Gaseous reaction products may include carbon monoxide and carbon dioxide. Ozone and nitrogen oxides may be formed by the radiation from the arc.

Determine the composition and quantity of fumes and gases to which workers are exposed by taking an air sample from inside the welder's helmet if worn or in the worker's breathing zone. Improve ventilation if exposures are not below limits. See ANSI/AWS F1.1, F1.2, F1.3 and F1.5, available from the American Welding Society, 550 N.W. LeJeune Road, Miami, FL 33126.

Section VIII - Preventive Measures and Precautions for Safe Handling and Use

Read and understand the manufacturer's instruction and the precautionary label on the product. Request Lincoln Safety Publication E205. See Canadian Standards Association Standard CSA-W117.2 "Safety in Welding, Cutting, and Allied Processes" published by the Canadian Standards Association, 178 Rexdale Blvd., Rexdale, Ontario M9W1R3 for more details on many of the following:

Ventilation: Use enough ventilation, local exhaust at the arc, or both to keep the fumes and gases from the worker's breathing zone and the general area.

Train the welder to keep his head out of the fumes. *Keep exposure as low as possible.*

Respiratory Protection: Use respirable fume respirator or air supplied respirator when welding in confined space or general work area when local exhaust or ventilation does not keep exposure below TLV.

Eye Protection: Wear helmet or use face shield with filter lens shade number 12 or darker. Shield others by providing screens and flash goggles.

Protective Clothing: Wear hand, head, and body protection which help to prevent injury from radiation, sparks and electrical shock. See W117.2.

At a minimum this includes welder's gloves and a protective face shield, and may include arm protectors, aprons, hats, shoulder protection, as well as dark substantial clothing. Train the welder not to permit electrically live parts or electrodes to contact skin or clothing or gloves if they are wet. Insulate from work and ground.

Disposal Information: Discard any product, residue, disposable container, or liner as ordinary waste in an environmentally acceptable manner according to Federal, State and Local regulations unless otherwise noted. No applicable ecological information available.

Section IX - Emergency and First Aid Procedures

Call for medical aid. Employ first aid techniques recommended by the Canadian Red Cross. IF BREATHING IS DIFFICULT give oxygen. IF NOT BREATHING employ CPR (Cardiopulmonary Resuscitation) techniques. IN CASE OF ELECTRICAL SHOCK, turn off power and follow recommended treatment. In all cases call a physician.

Printing date 26.09.2012

Revision: 26.09.2012

1 Identification of the substance/mixture and of the company/undertaking

- **1.1 Product identifier**
- **Trade name: Powdered Chalk; Blue, Green, Orange**
- **Article number:** Section 16
- **1.2 Relevant identified uses of the substance or mixture and uses advised against**
No further relevant information available.
- **Application of the substance / the preparation** Product Component
- **1.3 Details of the supplier of the Safety Data Sheet**
- **Manufacturer/Supplier:**
The L.S. Starrett Company
121 Crescent St.
Athol, MA 01331
(978) 249-3551
- **Further information obtainable from:** Product Safety Department
- **1.4 Emergency telephone number:**
ChemTel Inc.
(800)255-3924, +1 (813)248-0585

2 Hazards identification

- **2.1 Classification of the substance or mixture**
- **Classification according to Regulation (EC) No 1272/2008**
The product is not classified according to the CLP regulation.
- **Classification according to Directive 67/548/EEC or Directive 1999/45/EC** Not applicable.
- **Information concerning particular hazards for human and environment:**
The product has to be labelled due to the calculation procedure of the "General Classification guideline for preparations of the EU" in the latest valid version.
- **Classification system:**
The classification is according to the latest editions of the EU-lists, and extended by company and literature data.
The classification is in accordance with the latest editions of international substances lists, and is supplemented by information from technical literature and by information provided by the company.
- **2.2 Label elements**
- **Labelling according to Regulation (EC) No 1272/2008** N/A
- **Hazard pictograms** N/A
- **Signal word** N/A
- **Hazard statements**
Safety data sheet available on request.
- **Hazard description:**
- **WHMIS-symbols:** Not hazardous under WHMIS.
- **NFPA ratings (scale 0 - 4)**



Health = 1
Fire = 0
Reactivity = 0

(Contd. on page 2)

Safety Data Sheet

according to 1907/2006/EC (REACH),
1272/2008/EC (CLP), and GHS

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Trade name: Powdered Chalk; Blue, Green, Orange

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· HMIS-ratings (scale 0 - 4)

HEALTH	1	Health = *1
FIRE	0	Fire = 0
REACTIVITY	0	Reactivity = 0

* - Indicates a long term health hazard from repeated or prolonged exposures.

· HMIS Long Term Health Hazard Substances

14808-60-7	Quartz (SiO ₂)
------------	----------------------------

· 2.3 Other hazards

· Results of PBT and vPvB assessment

· PBT: Not applicable.

· vPvB: Not applicable.

3 Composition/information on ingredients

· 3.2 Mixtures

· **Description:** Mixture of substances listed below with nonhazardous additions.

· Dangerous components:

CAS: 471-34-1 EINECS: 207-439-9	calcium carbonate substance with a Community workplace exposure limit	50-100%
CAS: 14808-60-7 EINECS: 238-878-4	Quartz (SiO ₂) ☒ Xn R48/20 ☒ STOT RE 2, H373	< 1,0%

· **Additional information:** For the wording of the listed risk phrases refer to section 16.

4 First aid measures

· 4.1 Description of first aid measures

· **After inhalation:** Supply fresh air; consult doctor in case of complaints.

· After skin contact:

Generally the product does not irritate the skin.

Clean with water and soap.

· After eye contact:

Rinse opened eye for several minutes under running water.

Remove contact lenses if worn.

Rinse opened eye for several minutes under running water. If symptoms persist, consult a doctor.

· After swallowing:

Rinse out mouth and then drink plenty of water.

Seek immediate medical advice.

· 4.2 Most important symptoms and effects, both acute and delayed

No further relevant information available.

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- **4.3 Indication of any immediate medical attention and special treatment needed**
 No further relevant information available.

5 Firefighting measures

- **5.1 Extinguishing media**
- **Suitable extinguishing agents:** Use fire extinguishing methods suitable to surrounding conditions.
- **5.2 Special hazards arising from the substance or mixture** No further relevant information available.
- **5.3 Advice for firefighters**
- **Protective equipment:**
 Wear self-contained respiratory protective device.
 Wear fully protective suit.

6 Accidental release measures

- **6.1 Personal precautions, protective equipment and emergency procedures**
 Ensure adequate ventilation
- **6.2 Environmental precautions:** No special measures required.
- **6.3 Methods and material for containment and cleaning up:** Pick up mechanically.
- **6.4 Reference to other sections**
 See Section 7 for information on safe handling.
 See Section 8 for information on personal protection equipment.
 See Section 13 for disposal information.

7 Handling and storage

- **7.1 Precautions for safe handling** Prevent formation of dust.
- **Information about fire - and explosion protection:** No special measures required.
- **7.2 Conditions for safe storage, including any incompatibilities**
- **Storage:**
- **Requirements to be met by storerooms and receptacles:**
 Store in a cool location.
 Protect from humidity and water.
- **Information about storage in one common storage facility:**
 Do not store together with acids.
 Store away from water.
- **Further information about storage conditions:**
 Store in cool, dry conditions in well sealed receptacles.
 Protect from humidity and water.
- **7.3 Specific end use(s)** No further relevant information available.

(Contd. on page 4)

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8 Exposure controls/personal protection

- **Additional information about design of technical facilities:** No further data; see item 7.

- **8.1 Control parameters**

- **Ingredients with limit values that require monitoring at the workplace:**

471-34-1 calcium carbonate

PEL (USA)	15* 5** mg/m ³ *total dust **respirable fraction
REL (USA)	10* 5** mg/m ³ *total dust **respirable fraction
TLV (USA)	TLV withdrawn

14808-60-7 Quartz (SiO₂)

PEL (USA)	see Quartz listing
REL (USA)	0,05* mg/m ³ *respirable dust; See Pocket Guide App. A
TLV (USA)	0,025* mg/m ³ *as respirable fraction
EL (Canada)	0,025 mg/m ³ ACGIH A2; IARC 1
EV (Canada)	0,10* mg/m ³ *respirable fraction

- **Additional information:** The lists valid during the making were used as basis.

- **8.2 Exposure controls**

- **Personal protective equipment:**

- **General protective and hygienic measures:**

The usual precautionary measures are to be adhered to when handling chemicals.

- **Respiratory protection:** Not necessary if room is well-ventilated.

- **Protection of hands:** Not required.

- **Material of gloves:** Not required.

- **Eye protection:**



Safety glasses

- **Body protection:** Not required.

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Trade name: Powdered Chalk; Blue, Green, Orange

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9 Physical and chemical properties

· 9.1 Information on basic physical and chemical properties

· General Information

· Appearance:

Form:	Powder
Colour:	According to product specification
	Blue
	Green
	Orange

· Odour: Odourless

· Odour threshold: Not determined.

· pH-value at 20°C: < 8,8

· Change in condition

Melting point/Melting range: Undetermined.

Boiling point/Boiling range: Undetermined.

· Flash point: Not applicable.

· Flammability (solid, gaseous): Not determined.

· Ignition temperature: Not determined.

· Decomposition temperature: Not determined.

· Self-igniting: Product is not selfigniting.

· Danger of explosion: Product does not present an explosion hazard.

· Explosion limits:

Lower: Not determined.

Upper: Not determined.

· Vapour pressure at 20°C: 0 hPa

· Density at 20°C: 2,65 g/cm³

· Relative density: Not determined.

· Vapour density: Not applicable.

· Evaporation rate: Not applicable.

· Solubility in / Miscibility with

water at 20°C: 0,013 g/l

· Partition coefficient (n-octanol/water): Not determined.

· Viscosity:

Dynamic: Not applicable.

Kinematic: Not applicable.

· 9.2 Other information: No further relevant information available.

(Contd. on page 6)

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Trade name: Powdered Chalk; Blue, Green, Orange

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10 Stability and reactivity

- **10.1 Reactivity**
- **10.2 Chemical stability**
- **Thermal decomposition / conditions to be avoided:**
No decomposition if used and stored according to specifications.
- **10.3 Possibility of hazardous reactions** Reacts with strong acids.
- **10.4 Conditions to avoid** No further relevant information available.
- **10.5 Incompatible materials:** No further relevant information available.
- **10.6 Hazardous decomposition products:** Carbon dioxide

11 Toxicological information

- **11.1 Information on toxicological effects**
- **Acute toxicity:**
- **Primary irritant effect:**
- **on the skin:** No irritant effect.
- **on the eye:** Slight irritant effect on eyes.
- **Sensitization:** No sensitizing effects known.
- **Additional toxicological information:**
The product shows the following dangers according to the calculation method of the General EU Classification Guidelines for Preparations as issued in the latest version:
Irritant

12 Ecological information

- **12.1 Toxicity**
- **Aquatic toxicity:** No further relevant information available.
- **12.2 Persistence and degradability**
Anorganic product, is not removable from water by biological cleaning process
This product is according to previous experiences inert and non-degradable.
- **12.3 Bioaccumulative potential** Does not accumulate in organisms
- **12.4 Mobility in soil** No further relevant information available.
- **Additional ecological information:**
- **General notes:** Generally not hazardous for water
- **12.5 Results of PBT and vPvB assessment**
- **PBT:** Not applicable.
- **vPvB:** Not applicable.
- **12.6 Other adverse effects** No further relevant information available.

(Contd. on page 7)

Safety Data Sheet
 according to 1907/2006/EC (REACH),
 1272/2008/EC (CLP), and GHS

Printing date 26.09.2012

Revision: 26.09.2012

Trade name: Powdered Chalk; Blue, Green, Orange

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13 Disposal considerations· **13.1 Waste treatment methods**· **Recommendation**

Can be disposed of with household garbage after consulting with the waste disposal facility operator and the pertinent authorities and adhering to the necessary technical regulations.

Can be burned with household garbage after consulting with the waste disposal facility operator and the pertinent authorities and adhering to the necessary technical regulations.

· **Uncleaned packaging:**

· **Recommendation:** Disposal must be made according to official regulations.

· **Recommended cleansing agents:** Water, if necessary together with cleansing agents.

14 Transport information· **14.1 UN-Number**

· DOT, ADR, ADN, IMDG, IATA N/A

· **14.2 UN proper shipping name**

· DOT, ADR, ADN, IMDG, IATA N/A

· **14.3 Transport hazard class(es)**

· DOT, ADR, ADN, IMDG, IATA

· Class N/A

· **14.4 Packing group**

· DOT, ADR, IMDG, IATA N/A

· **14.5 Environmental hazards:**

· Marine pollutant: No

· **14.6 Special precautions for user**

Not applicable.

· **14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code**

Not applicable.

· **UN "Model Regulation":**

-

15 Regulatory information· **15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**

· United States (USA)

· SARA

· **Section 355 (extremely hazardous substances):**

None of the ingredients is listed.

· **Section 313 (Specific toxic chemical listings):**

None of the ingredients is listed.

(Contd. on page 8)

Safety Data Sheet
 according to 1907/2006/EC (REACH),
 1272/2008/EC (CLP), and GHS

Printing date 26.09.2012

Revision: 26.09.2012

Trade name: Powdered Chalk; Blue, Green, Orange

(Contd. of page 7)

· TSCA (Toxic Substances Control Act):

All ingredients are listed.

· Proposition 65 (California):

· Chemicals known to cause cancer: Present in trace quantities.

14808-60-7 Quartz (SiO ₂)

· Chemicals known to cause reproductive toxicity for females:
--

None of the ingredients is listed.

· Chemicals known to cause reproductive toxicity for males:
--

None of the ingredients is listed.

· Chemicals known to cause developmental toxicity:

None of the ingredients is listed.

· Carcinogenic Categories

· EPA (Environmental Protection Agency)
--

None of the ingredients is listed.

· IARC (International Agency for Research on Cancer)

None of the ingredients is listed.

· TLV (Threshold Limit Value established by ACGIH)

None of the ingredients is listed.

· NIOSH-Ca (National Institute for Occupational Safety and Health)

None of the ingredients is listed.

· OSHA-Ca (Occupational Safety & Health Administration)
--

None of the ingredients is listed.

· Canada

· Canadian Domestic Substances List (DSL)
--

All ingredients are listed.

· Canadian Ingredient Disclosure list (limit 0.1%)

None of the ingredients is listed.

· Canadian Ingredient Disclosure list (limit 1%)

7631-86-9 silicon dioxide, chemically prepared
--

· 15.2 Chemical safety assessment: A Chemical Safety Assessment has not been carried out.
--

16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

· Relevant phrases

H373 May cause damage to organs through prolonged or repeated exposure.

R48/20 Harmful: danger of serious damage to health by prolonged exposure through inhalation.
--

(Contd. on page 9)

Safety Data Sheet
according to 1907/2006/EC (REACH),
1272/2008/EC (CLP), and GHS

Printing date 26.09.2012

Revision: 26.09.2012

Trade name: Powdered Chalk; Blue, Green, Orange

(Contd. of page 8)

Abbreviations and acronyms:

ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)

IMDG: International Maritime Code for Dangerous Goods

DOT: US Department of Transportation

IATA: International Air Transport Association

GHS: Globally Harmonized System of Classification and Labelling of Chemicals

ACGIH: American Conference of Governmental Industrial Hygienists

NFPA: National Fire Protection Association (USA)

HMIS: Hazardous Materials Identification System (USA)

WHMIS: Workplace Hazardous Materials Information System (Canada)



MATERIAL SAFETY DATA SHEET

1. Product and Company Identification

Material name D8J36Series
Version # 01
Product use Inkjet printing
CAS # Mixture
Company identification Hewlett-Packard (Canada) Co.
5150 Spectrum Way
Mississauga, Ontario
Canada
L4W 5G1
Telephone 1-905-206-4725
or 1-888-447-4636
Hewlett-Packard health effects line
(Toll-free within the US) 1-800-457-4209
(Direct) 1-760-710-0048
HP Customer Care Line
(Toll-free within the US) 1-800-474-6836
(Direct) 1-208-323-2551
Email: hpcustomer.inquiries@hp.com

2. Hazards Identification

Emergency overview Contact with skin and eyes may result in irritation.
Other hazards Carbon black is classified by the IARC as a Group 2B carcinogen (the substance is possibly carcinogenic to humans). Carbon black in this preparation, due to its bound form, does not present this carcinogenic risk. None of the other ingredients in this preparation are classified as carcinogens according to ACGIH, EU, IARC, MAK, NTP or OSHA. Potential routes of overexposure to this product are skin and eye contact. Inhalation of vapor and ingestion are not expected to be significant routes of exposure for this product under normal use conditions. Complete toxicity data are not available for this specific formulation.

3. Composition / Information on Ingredients

Hazardous components	CAS #	Percent
2-pyrrolidone	616-45-5	< 20
Non-hazardous components	CAS #	Percent
Water	7732-18-5	> 70
Substituted diol	Proprietary	< 2.5
Tetraethylene glycol	112-60-7	< 2.5

Composition comments This ink supply contains an aqueous ink formulation. The components of this product have been evaluated in accordance with the hazard criteria of the Canada Controlled Products Regulations. Carbon black is present only in a bound form in this preparation.

4. First Aid Measures

First aid procedures

Eye contact Do not rub eyes. Immediately flush with large amounts of clean, warm water (low pressure) for at least 15 minutes or until particles are removed. If irritation persists get medical attention.

Skin contact Wash affected areas thoroughly with mild soap and water. If irritation persists get medical attention.

Inhalation Move to fresh air. If symptoms persist, get medical attention.

Ingestion If ingestion of a large amount does occur, seek medical attention.

General advice No information

5. Fire Fighting Measures

Flash point ≥ 200.00 °F (≥ 93.33 °C) Setaflash Closed Tester

Flammable properties None known.

Extinguishing media

Suitable extinguishing media CO₂, water, dry chemical, or foam For small (incipient) fires, use media such as foam, sand, dry chemical, or carbon dioxide. For large fires use very large (flooding) quantities of water and/or foam, applied as a mist or spray.

Unsuitable extinguishing media None known.

Fire fighting equipment/instructions Not available.

Specific methods None established.

Explosion data

Sensitivity to static discharge Not available.

Sensitivity to mechanical impact Not available.

Hazardous combustion products Refer to section 10.

6. Accidental Release Measures

Personal precautions Wear appropriate personal protective equipment.

Environmental precautions Do not let product enter drains. Do not flush into surface water or sanitary sewer system.

Methods for cleaning up Soak up with inert absorbent material.

Other information Soak up with inert absorbent material. Slowly vacuum or sweep the material into a bag or other sealed container. Dispose of in compliance with federal, state, and local regulations. See also section 13 Disposal considerations.

7. Handling and Storage

Handling Avoid contact with skin, eyes and clothing.

Storage Keep out of the reach of children. Keep away from excessive heat or cold.

8. Exposure Controls / Personal Protection

Occupational exposure limits

No exposure limits noted for ingredient(s).

Personal protective equipment

General Use personal protective equipment to minimize exposure to skin and eye.

Exposure guidelines Exposure limits have not been established for this product.

Engineering controls Use in a well ventilated area.

9. Physical & Chemical Properties

Appearance Not available.

Physical state Not available.

Form Not available.

Color Black. or Dark Grey

Odor Not available.

Odor threshold Not available.

pH 9.3 - 9.7

Vapor pressure Not determined

Boiling point Not determined

Melting point/Freezing point Not available.

Solubility (water) Soluble in water

Specific gravity	Not available.
Relative density	Not available.
Flash point	>= 200.00 °F (>= 93.33 °C) Setaflash Closed Tester
Flammability limits in air, upper, % by volume	Not available.
Flammability limits in air, lower, % by volume	Not determined
Auto-ignition temperature	Not available.
VOC	< 182 g/l
Evaporation rate	Not determined
Viscosity	>= 2 cp
Other data	
Oxidizing properties	Not determined

10. Chemical Stability & Reactivity Information

Chemical stability	Stable under recommended storage conditions.
Conditions to avoid	No information available
Incompatible materials	Incompatible with strong bases and oxidizing agents.
Hazardous decomposition products	Upon decomposition, this product may yield gaseous nitrogen oxides, carbon monoxide, carbon dioxide and/or low molecular weight hydrocarbons.
Possibility of hazardous reactions	Will not occur.

11. Toxicological Information

Toxicological data

Components	Species	Test Results
2-pyrrolidone (CAS 616-45-5)		
Acute		
<i>Oral</i>		
LD50	Guinea pig	6500 mg/kg
	Rat	6500 mg/kg
Substituted diol (CAS Proprietary)		
Acute		
<i>Dermal</i>		
LD50	Rabbit	> 2000 mg/kg
<i>Inhalation</i>		
LC50	Rat	> 5.1 mg/l, 4 Hours
<i>Oral</i>		
LD50	Rat	> 5000 mg/kg
Tetraethylene glycol (CAS 112-60-7)		
Acute		
<i>Dermal</i>		
LD50	Rabbit	22570 mg/kg
<i>Oral</i>		
LD50	Rat	32700 mg/kg
		29 g/kg
Carcinogenicity	Carbon black is classified as a carcinogen by the IARC (possibly carcinogenic to humans, Group 2B) and by the State of California under Proposition 65. In their evaluations of carbon black, both organizations indicate that exposure to carbon black, per se, does not occur when it remains bound within a product matrix, specifically, rubber, ink, or paint.	
Further information	Complete toxicity data are not available for this specific formulation Refer to Section 2 for potential health effects and Section 4 for first aid measures.	

12. Ecological Information

Ecotoxicological data

Components

Species

Test Results

2-pyrrolidone (CAS 616-45-5)

Aquatic

Crustacea

EC50

Water flea (*Daphnia pulex*)

13.21 mg/l, 48 hours

Ecotoxicity

No data available.

Aquatic toxicity

This product has not been tested for ecological effects.

Persistence and degradability

Not available.

Partition coefficient

2-pyrrolidone

-0.85

13. Disposal Considerations

Disposal instructions

Do not dispose of together with general office waste. Do not allow this material to drain into sewers/water supplies.

Dispose of waste material according to Local, State, Federal, and Provincial Environmental Regulations.

Ensure collection and disposal with an appropriately licensed waste contractor.

HP's Planet Partners (trademark) supplies recycling program enables simple, convenient recycling of HP original inkjet and LaserJet supplies. For more information and to determine if this service is available in your location, please visit <http://www.hp.com/recycle>.

14. Transport Information

TDG

Not regulated as dangerous goods.

IATA

Not regulated as dangerous goods.

IMDG

Not regulated as dangerous goods.

RID

Not regulated as dangerous goods.

Further information

Not a dangerous good under DOT, IATA, ADR, IMDG, or RID.

15. Regulatory Information

WHMIS status

Non-controlled

Other information

Exposure Limits (See Section 8): Executive regulation of Minister of Labour and Social Policy dated Nov. 29, 2002 concerning the highest exposure limits and volume of factors harmful for health and environment at work (Official Journal of Laws no 217/2002 item 1833 with further amendments).

Other regulations

All chemical substances in this HP product have been notified or are exempt from notification under chemical substances notification laws in the following countries: US (TSCA), EU (EINECS/ELINCS), Switzerland, Canada (DSL/NDL), Australia, Japan, Philippines, South Korea, New Zealand, and China.

16. Other Information

HMIS® ratings

Health: 1

Flammability: 1

Physical hazard: 0

NFPA ratings

Health: 1

Flammability: 1

Instability: 0

Disclaimer

This Safety Data Sheet document is provided without charge to customers of Hewlett-Packard Company. Data is the most current known to Hewlett-Packard Company at the time of preparation of this document and is believed to be accurate. It should not be construed as guaranteeing specific properties of the products as described or suitability for a particular application. This document was prepared to the requirements of the jurisdiction specified in Section 1 above and may not meet regulatory requirements in other countries.

Issue date

02-Dec-2013

This data sheet contains changes from the previous version in section(s):

1. Product and Company Identification: Alternate Trade Names
Hazards Identification: Other hazards
5. Fire Fighting Measures: Suitable extinguishing media
9. Physical & Chemical Properties: Multiple Properties
11. Toxicological Information: Further information
13. Disposal Considerations: Disposal instructions
15. Regulatory Information: Other information

Manufacturer information

Hewlett-Packard Company
3000 Hanover Street
Palo Alto, California 94304-1112 US
(Direct) 1-503-494-7199
(Toll-free within the US) 1-800-457-4209

Explanation of abbreviations

ACGIH	American Conference of Governmental Industrial Hygienists
CAS	Chemical Abstracts Service
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
CFR	Code of Federal Regulations
COC	Cleveland Open Cup
DOT	Department of Transportation
EPCRA	Emergency Planning and Community Right-to-Know Act (aka SARA)
IARC	International Agency for Research on Cancer
NIOSH	National Institute for Occupational Safety and Health
NTP	National Toxicology Program
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
RCRA	Resource Conservation and Recovery Act
REC	Recommended
REL	Recommended Exposure Limit
SARA	Superfund Amendments and Reauthorization Act of 1986
STEL	Short-Term Exposure Limit
TCLP	Toxicity Characteristics Leaching Procedure
TLV	Threshold Limit Value
TSCA	Toxic Substances Control Act
VOC	Volatile Organic Compounds

SECTION 1 – PRODUCT INFORMATION

Product Name:	Propane	Supplier:	Superior Propane A Division of Superior Plus LP 1111 - 49th Avenue N.E. Calgary, AB T2E 8V2 Business: (403) 730-7500
Trade Name:	LPG (Liquefied Petroleum Gas), LP-Gas		
Chemical Formula:	C ₃ H ₈		
WHMIS Classification	Class A – Compressed Gas Class B, Division 1 – Flammable G	24-Hour Emergency Contact:	Canutec (613) 996-6666

Application and Use: Propane is commonly used as a fuel for heating, cooking, automobiles, forklift trucks, crop drying and welding and cutting operations. Propane is used in industry as a refrigerant, solvent and as a chemical feedstock.

SECTION 2 – HAZARDOUS INGREDIENTS

COMPONENTS	CAS No	% VOLUME (v/v)	LD 50 (RAT, ORAL)
Propane	74-98-6	90% -99%	Not Applicable
Propylene	115-07-1	0% - 5%	Not Applicable
Ethane	74-84-0	0% - 5%	Not Applicable
Butane and heavier hydro carbons	106-97-8	0% - 2.5%	Not Applicable

Occupational Exposure Limit:

Based upon animal test data, the acute toxicity of this product is expected to be inhalation: 4 hour LC50 = 280,000 ppm (Rat)

Note: Composition is typical for HD-5 Propane per The Canadian General Standard Board CGSB 3.14 National Standard of Canada. Exact composition will vary from shipment to shipment.

SECTION 3 – CHEMICAL AND PHYSICAL DATA

Form:	Liquid and vapour while stored under pressure	pH:	Not available
Boiling Point:	-42°C @ 1 atm	Solubility in Water:	Slight, 6.1% by volume @ 17.8°C
Freezing Point:	-188°C	Specific Gravity:	0.51 (water = 1)
Evaporation Rate:	Rapid (Gas at normal ambient conditions)	Appearance/Odour:	Colourless liquid and vapour while stored under pressure. Colourless and odourless gas in natural state at any concentration. Commercial propane has an odourant added, ethyl mercaptan, which has an odour similar to boiling cabbage.
Vapour Pressure:	1435 kPa (maximum) @ 37.8°C		
Vapour Density:	1.52 (Air = 1)		
Coefficient of Water/Oil Distribution:	Not available	Odour Threshold:	4800 ppm

With proper handling, transportation and storage, adding a chemical odourant such as ethyl mercaptan has proven to be a very effective warning device, but all odourants have certain limitations. The effectiveness of the odourant may be diminished by a person's sense of smell, by competing odours and by oxidation which may cause a potentially dangerous situation.

SECTION 4 – FIRE OR EXPLOSION HAZARD

Flash Point:	-103.4°C	<p>Fire Extinguishing Precautions: Use water spray to cool exposed cylinders or tanks. Do not extinguish fire unless the source of the escaping gas that is fueling the fire can be turned off. Fire can be extinguished with carbon dioxide and/or dry chemical (BC). Container metal shells require cooling with water to prevent impingement and the weakening of metal. If sufficient water is not available to protect the container shell from weakening, the area will be required to be evacuated. If gas has not ignited, liquid or vapour may be dispersed by water spray or flooding.</p> <p>Special Fire Fighting Equipment: Protective clothing, hose monitors, fog nozzles, self-contained breathing apparatus material, drains and openings to building</p>
Method:	Closed cup	
Flammable Limits:	Lower 2.4%, Upper 9.5%	
Auto Ignition Temperature:	432 °C	
Hazardous Combustion Products:	Carbon monoxide can be produced when primary air and secondary air are deficient while combustion is taking place.	
Fire and Explosive Hazards:	Explosive air - vapour allowed to leak to atmosphere.	
Sensitivity to Impact:	No	
Sensitivity to Static Discharge:	Yes	

SECTION 5 – REACTIVITY DATA

Stability: Stable

Conditions to Avoid: Keep separate from oxidizing agents. Gas explodes spontaneously when mixed with chloride dioxide. Incompatibility: Remove sources of ignition and observe distance requirements for storage tanks from combustible

Hazardous Decomposition Products: Deficient primary and secondary air can produce carbon monoxide.

Hazardous Polymerization: Will not occur.

SECTION 6 – TOXICOLOGICAL PROPERTIES OF MATERIAL

Routes of Entry: Skin Contact, Eye Contact, Inhalation

Inhalation: Simple asphyxiant. No effect at concentrations of 10,000 ppm (peak exposures). Higher concentrations may cause central nervous system disorder and/or damage. Lack of oxygen may cause dizziness, loss of coordination, weakness, fatigue, euphoria, mental confusion, blurred vision, convulsions, breathing failure, coma and death. Breathing high vapour concentrations (saturated vapours) for a few minutes may be fatal. Saturated vapours may be encountered in confined spaces and/or under conditions of poor ventilation. Avoid breathing vapours or mist.

Skin and Eye Contact: Exposure to vapourizing liquid may cause frostbite (cold burns) and permanent eye damage.

Ingestion: Not considered to be a hazard.

Acute Exposure: Contact with Liquefied Petroleum Gas may cause frostbite or cold burns. Propane acts as a simple asphyxiant as oxygen content in air is displaced by the propane. At increasing concentration levels, propane may cause dizziness, headaches, loss of coordination, fatigue, unconsciousness and death.

Chronic Exposure: No reported effects from long term low level exposure.

Sensitization to Product: Not known to be a sensitizer.

Occupational Exposure Limits: American Conference of Governmental Industrial Hygienists (ACGIH) lists as a simple asphyxiant.

ACGIH TLV: 1000 ppm

Carcinogenicity, Reproductive Toxicity, Teratogenicity, Mutagenicity: No effects reported.

Other Toxicological Effects: None

SECTION 7 – PREVENTATIVE MEASURES

Eyes: Safety glasses or chemical goggles are recommended when transferring product.

Skin: Insulated gloves required if contact with liquid or liquid cooled equipment is expected. Wear gloves and long sleeves when transferring product.

Inhalation: Where concentration in air would reduce the oxygen level below 18% air or exceed occupational exposure limits in section 6, self-contained breathing apparatus is required.

Ventilation: Use in well-ventilated areas. Use with explosion proof mechanical ventilation in confined spaces or poorly ventilated areas.

SECTION 8 – EMERGENCY AND FIRST AID PROCEDURES

Eyes: Should eye contact with liquid occur, flush eyes with lukewarm water for 15 minutes. Obtain immediate medical care.

Skin: In case of "Cold Burn" from contact with liquid, immediately place affected area in lukewarm water and keep at this temperature until circulation returns. If fingers or hands are frostbitten, have the victim hold his hand next to his body such as under the armpit. Obtain immediate medical care.

Ingestion: None considered necessary.

Inhalation: Remove person to fresh air. If breathing is difficult or has stopped, administer artificial respiration. Obtain immediate medical care.

Spill or Leak: Eliminate leak if possible. Eliminate source of ignition. Ensure cylinder is upright. Disperse vapours with hose streams using fog nozzles. Monitor low areas as propane is heavier than air and can settle into low areas. Remain upwind of leak. Keep people away. Prevent vapour and/or liquid from entering into sewers, basements or confined areas.

SECTION 9 – TRANSPORTATION, HANDLING AND STORAGE

- Transport and store cylinders and tanks secured in an upright position in a ventilated space away from ignition sources (so the pressure relief valve is in contact with the vapour space of the cylinder or tank).
- Cylinders that are not in use must have the valves in the closed position and be equipped with a protective cap or guard.

Transportation of Dangerous Goods (TDG)
TDG Classification: Flammable Gas 2.1

- Do not store with oxidizing agents, oxygen, or chlorine cylinders.
- Empty cylinders and tanks may contain product residue. Do not pressurize, cut, heat or weld empty containers.
- Transport, handle and store according to applicable federal and provincial codes and regulations.

TDG Shipping Name: Liquefied Petroleum Gas (Propane)
PIN Number: UN1075

SECTION 10 – PREPARATION INFORMATION

Prepared by: Superior Propane
Health Safety and Environment Team

Telephone: (403) 730-7500
Revision: January 17, 2014
Supersedes: January 17, 2011

The information contained herein is believed to be accurate. It is provided independently of any sale of the product. It is not intended to constitute performance information concerning the product. No express warranty, implied warranty of merchantability or fitness for a particular purpose is made with respect to the product information contained herein.



MATERIAL SAFETY DATA SHEET

SECTION 1. PRODUCT IDENTIFICATION

MATERIAL NAME: PVC Pipe and Fittings
PRODUCT USE: Water, sewer, conduit, duct and industrial piping

SECTION 2. PREPARATION INFORMATION

MANUFACTURER/SUPPLIER: IPEX Inc.
807 Pharmacy Avenue
Scarborough, Ontario
Canada
M1L 3K2

TELEPHONE NO.: (416) 445-3400
PREPARED BY: Health, Safety and Environment
DATE PREPARED: February 22nd 2012

SECTION 3. HAZARDOUS INGREDIENTS

This is not a "controlled product" under the Hazardous Products Act. PVC is inert in all intended applications.

INGREDIENT NAME	CAS NUMBER	APPROXIMATE CONCENTRATION %	LD ₅₀ /LC ₅₀	EXPOSURE LIMIT TLV ACGIH mg/m ³
PVC Resin Blend	Not applicable	100%	Not available	Not available

SECTION 4. PHYSICAL DATA

PHYSICAL STATE: Solid

ODOUR AND APPEARANCE: White, blue, green, grey or orange, odourless

BOILING POINT: 385°F (196°C)

FREEZING POINT: Not applicable

VAPOUR PRESSURE: Not applicable

VAPOUR DENSITY: Not applicable

SPECIFIC GRAVITY: 1.4 – 1.65

pH: Not applicable

ODOUR THRESHOLD: Not applicable

EVAPORATION RATE: Not applicable

COEFFICIENT WATER/OIL DISTR: Not applicable

MSDS: PVC Pipe and Fittings	Revision Level: # 5	Prepared Date: 2012 02 22	Page 1 of 4
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SECTION 5. FIRE OR EXPLOSION HAZARD

FIRE FIGHTING:	Wear self-contained breathing apparatus (SCBA) equipped with a full face piece and operated in a pressure-demand mode or other positive-pressure mode and protective clothing. Personnel not having suitable respiratory protection must leave the area to prevent significant exposure to toxic gases from combustion, burning, or decomposition. In an enclosed or poorly ventilated area, wear SCBA during cleanup immediately after a fire as well as during the attack phase of fire fighting operations. Run off water from fire fighting may have corrosive effects.
EXTINGUISHING MEDIA:	Water spray, carbon dioxide, foam, dry chemical
HAZARDOUS COMBUSTION PRODUCTS:	Hydrogen Chloride, Carbon Dioxide, Carbon Monoxide, other substances dependent on fire conditions
FLASH POINT:	734°F (390°C) approx.
LOWER FLAMMABLE LIMIT:	Not applicable.
UPPER FLAMMABLE LIMIT:	Not applicable.
AUTOIGNITION:	800°F (425°C) (ASTM D-1929) approx.
CONDITIONS OF FLAMMABILITY:	Only if highly heated and exposed to a continuous source of ignition. PVC pipe will not support combustion.
IMPACT SENSITIVITY:	Not available
STATIC DISCHARGE:	Not available

SECTION 6. REACTIVITY DATA

STABILITY:	Not available.
REACTIVITY:	Not available
INCOMPATIBILITY WITH OTHER SUBSTANCES:	Not available
HAZARDOUS DECOMPOSITION:	See section 5

SECTION 7. TOXICOLOGICAL PROPERTIES

EFFECTS OF ACUTE EXPOSURE TO PRODUCT:	No acute health effects reported with the inhalation of PVC dust; dust may irritate the eyes.
EFFECTS OF CHRONIC EXPOSURE TO PRODUCT:	Vinyl resin is not known to cause any disease. Dust exposure should always be minimized. Routine inhalation of dust of any kind should be

MSDS: PVC Pipe and Fittings	Revision Level: # 5	Prepared Date: 2012 02 22	Page 2 of 4
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avoided. Exercise care when dumping bags, sweeping, mixing or doing other tasks which can create dust.

ROUTES OF ENTRY: Inhalation, eye contact with dust (only when cutting or grinding)

SENTITIZATION: None known

IRRITANCY: Not available

CHRONIC/CARCINOGENICITY: Not available

REPRODUCTIVE TOXICITY: Not available

TERATOGENICITY: Not available

MUTAGENICITY: Not available

TOXICOLOGICALLY SYNERGISTIC PRODUCTS: Not available

SECTION 8. PREVENTIVE MEASURES

PERSONAL PROTECTIVE EQUIPMENT TO BE USED: When cutting, the use of eye protection and a NIOSH-approved respirator for dust is recommended.

ENGINEERING CONTROLS TO BE USED: Ventilate adequately when cutting.

WASTE DISPOSAL: Handle in accordance with federal, state, provincial and municipal regulations.

PROCEDURES TO BE FOLLOWED IN CASE OF LEAK OR SPILL: Pipe fragments and debris should be swept up and removed to a disposal container.

HANDLING PROCEDURES AND EQUIPMENT: Avoid creating and breathing PVC dust

STORAGE REQUIREMENTS: None

SPECIAL SHIPPING INFORMATION: Not applicable

SECTION 9. EMERGENCY AND FIRST AID MEASURES

SPECIFIC FIRST AID MEASURES: No situation is likely to arise from routine handling of PVC pipes.

EYES: Remove particles with clean water. If irritation persists, consult a physician.

SKIN: Wash with soap and water

INGESTION: Do not induce vomiting; consult a physician.

INHALATION: If irritation persists, consult a physician

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Prepared by: Amy Slattery	Checked by: Stan Rodriguez <i>[Signature]</i>	Approved by: <i>[Signature]</i>	





SECTION 10. ADDITIONAL GENERAL INFORMATION

Disclaimer

The information contained in this material safety data sheet is based on information available to IPEX Inc. and is believed to be accurate. Where this information is based on data developed by third parties, IPEX Inc. expressly denies liability. IPEX Inc. makes no warranty, expressed or implied, regarding the accuracy of this information or data or the results obtained from its use. All recommendations are made without guarantee, since the conditions of use of this product are beyond IPEX Inc.'s control. IPEX Inc. assumes no responsibility for any damages resulting from the use of this product described herein.

Please consult IPEX Inc. for further information.

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Protective RECOATABLE EPOXY PRIMER & Marine Coatings

PART G	B67A5	LIGHT GRAY
PART G	B67H5	TAN
PART G	B67R5	RED OXIDE
PART H	B67V5	HARDENER

Revised: February 11, 2013

PRODUCT INFORMATION

4.45

PRODUCT DESCRIPTION

RECOATABLE EPOXY PRIMER is a rust inhibitive high build catalyzed polyamide/bisphenol A epoxy primer designed for fast dry and quick or extended recoatability.

- Meets Class A requirements for Slip Coefficient, .50 (Red Oxide only)
- Long pot life
- High build coating for economical application
- One year recoatability
- Low temperature application - down to 35°F (1.5°C)
- Corrosion resistant (contains zinc phosphate)
- Outstanding application properties

PRODUCT CHARACTERISTICS

Finish:	Flat
Color:	Red Oxide, Tan, Light Gray
Volume Solids:	65% ± 2%, mixed
Weight Solids:	81% ± 2%, mixed
VOC (EPA Method 24):	Unreduced: <320 g/L; 2.67 lb/gal mixed Reduced 5%: <340 g/L; 2.88 lb/gal
Mix Ratio:	1:1 by volume

Recommended Spreading Rate per coat:

	Minimum	Maximum
Wet mils (microns)	6.0 (150)	9.0 (225)
Dry mils (microns)	4.0* (100)	6.0* (150)
~Coverage sq ft/gal (m ² /L)	175 (4.3)	260 (6.4)
Theoretical coverage sq ft/gal (m ² /L) @ 1 mil / 25 microns dft	1040 (25.5)	

*See Performance Tips section

NOTE: Brush or roll application may require multiple coats to achieve maximum film thickness and uniformity of appearance.

Drying Schedule @ 6.0 mils wet (150 microns):

	@ 35°F/1.5°C	@ 77°F/25°C 50% RH	@ 120°F/49°C
To touch:	1 hour	15 minutes	10 minutes
Tack free:	2 hours	30 minutes	15 minutes
To recoat:			
minimum:	6 hours	2 hours	30 minutes
maximum:	1 year	1 year	1 year
To cure:	14 days	14 days	2 days
<i>If maximum recoat time is exceeded, abrade surface before recoating.</i>			
<i>Drying time is temperature, humidity, and film thickness dependent.</i>			
Pot Life:	8+ hours	8 hours	3 hours
Sweat-in-time:	1 hour	30 minutes	10 minutes

Shelf Life:	36 months, unopened Store indoors at 40°F (4.5°C) to 100°F (38°C).
Flash Point:	80°F (27°C), PMCC, mixed
Reducer/Clean Up:	Below 80°F (27°C): Reducer #54, R7K54 Above 80°F (27°C): Reducer #100, R7K100 or R7K104
In California:	Reducer R7K111

RECOMMENDED USES

For use as a shop or field applied epoxy primer where a variable recoat window is required due to construction schedules, distribution logistics and environmental considerations. Affords flexibility in projects when completion schedules cannot be specified.

- Primer for structural steel
- Paper mills
- Power plants
- Suitable for use in USDA inspected facilities
- Nuclear Power Plants
- Nuclear fabrication shops
- This product meets specific design requirements for non-safety related nuclear plant applications in Level II, III and Balance of Plant, and DOE nuclear facilities*.
- Marine applications
- Storage tanks
- DOE Nuclear Fuel Facilities
- DOE Nuclear Weapons Facilities

* Nuclear qualifications are NRC license specific to the facility.

PERFORMANCE CHARACTERISTICS

Substrate*: Steel

Surface Preparation*: SSPC-SP6/NACE 3

System Tested*:

1 ct. Recoatable Epoxy Primer @ 5.0 mils (125 microns) dft

*unless otherwise noted below

Test Name	Test Method	Results
Abrasion Resistance	ASTM D4060, CS17 wheel, 1000 cycles, 1 kg load	200 mg loss
Accelerated Weathering - QUV¹	ASTM D4587, QUV-A, 5,000 hours	Passes
Adhesion	ASTM D4541	1050 psi
Corrosion Weathering	ASTM D5894, 13 cycles, 4,368 hours	Rating 10 per ASTM D714 for Blistering; Rating 7 per ASTM D610 for Rusting
Direct Impact Resistance	ASTM D2794	160 in. lbs.
Dry Heat Resistance	ASTM D2485	250°F (121°C) (dis-colors)
Flexibility	ASTM D522, 180° bend, 1" mandrel	Passes
Moisture Condensation Resistance	ASTM D4585, 100°F (38°C), 2000 hours	Passes, no cracking or delamination
Pencil Hardness	ASTM D3363	3H
Salt Fog Resistance¹	ASTM B117, 5,600 hours	Passes, no cracking or delamination
Slip Coefficient, Red Oxide**	AISC Specification for Structural Joints Using ASTM A325 or ASTM A490 Bolts	Class A, 0.50
Surface Burning*	ASTM E84/NFPA 255	Flame Spread Index 15; Smoke Development Index 30

*System tested (Report No. IM54.1157-02-01):
Recoatable Epoxy Primer @ 4.6 mils (115 microns) dft
Macropoxy 646 @ 5.0 mils (125 microns) dft

**Refer to Slip Certification document

Epoxy coatings may darken or yellow following application and curing.

Provides performance comparable to products formulated to federal specifications: Mil-P-23377, Mil-P-53022

Footnotes:
¹ Acrolon 218 HS topcoat



Protective RECOATABLE EPOXY PRIMER

& Marine Coatings

PART G	B67A5	LIGHT GRAY
PART G	B67H5	TAN
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PRODUCT INFORMATION

4.45

RECOMMENDED SYSTEMS	SURFACE PREPARATION																																																																																																																						
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	Packaging: Part G: 1 gallon (3.78L) and 5 gallon (18.9L) containers Part H: 1 gallon (3.78L) and 5 gallon (18.9L) containers Weight: 13.26 ± 0.2 lb/gal ; 1.6 Kg/L, mixed																																																																																																																						
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	The Sherwin-Williams Company warrants our products to be free of manufacturing defects in accord with applicable Sherwin-Williams quality control procedures. Liability for products proven defective, if any, is limited to replacement of the defective product or the refund of the purchase price paid for the defective product as determined by Sherwin-Williams. NO OTHER WARRANTY OR GUARANTEE OF ANY KIND IS MADE BY SHERWIN-WILLIAMS, EXPRESSED OR IMPLIED, STATUTORY, BY OPERATION OF LAW OR OTHERWISE, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.																																																																																																																						

The systems listed above are representative of the product's use, other systems may be appropriate.

DISCLAIMER

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Protective RECOATABLE EPOXY PRIMER & Marine Coatings

PART G	B67A5	LIGHT GRAY
PART G	B67H5	TAN
PART G	B67R5	RED OXIDE
PART H	B67V5	HARDENER

Revised: February 11, 2013

APPLICATION BULLETIN

4.45

SURFACE PREPARATIONS

Surface must be clean, dry, and in sound condition. Remove all oil, dust, grease, dirt, loose rust, and other foreign material to ensure adequate adhesion.

Iron & Steel (atmospheric service)

Remove all oil and grease from surface by Solvent Cleaning per SSPC-SP1. Minimum surface preparation is Commercial Blast Cleaning per SSPC-SP6/NACE 3. For better performance, use Near White Metal Blast Cleaning per SSPC-SP10/NACE 2. Blast clean all surfaces using a sharp, angular abrasive for optimum surface profile (2 mils / 50 microns). Prime any bare steel the same day as it is cleaned.

Galvanized Steel

Allow to weather a minimum of six months prior to coating. Solvent Clean per SSPC-SP1. When weathering is not possible, or the surface has been treated with chromates or silicates, first Solvent Clean per SSPC-SP1 and apply a test patch. Allow paint to dry at least one week before testing adhesion. If adhesion is poor, brush blasting per SSPC-SP7 is necessary to remove these treatments. Rusty galvanizing requires a minimum of Hand Tool Cleaning per SSPC-SP2, prime the area the same day as cleaned.

In preparing galvanized steel substrates for the application of FIRETEX intumescent coating systems, Surface Preparation Specification SSPC-SP 16 must be followed obtaining a surface profile of minimum 1.5 mils (38 microns). Optimum surface profile will not exceed 2.0 mils (50 microns).

Previously Painted Surfaces

If in sound condition, clean the surface of all foreign material. Smooth, hard or glossy coatings and surfaces should be dulled by abrading the surface. Apply a test area, allowing paint to dry one week before testing adhesion. If adhesion is poor, or if this product attacks the previous finish, removal of the previous coating may be necessary. If paint is peeling or badly weathered, clean surface to sound substrate and treat as a new surface as above.

APPLICATION CONDITIONS

Temperature:
 air and surface: 35°F (1.6°C) minimum, 140°F (60°C) maximum
 material: 50°F (10°C) minimum
 At least 5°F (2.8°C) above dew point

Relative humidity: 85% maximum

APPLICATION EQUIPMENT

The following is a guide. Changes in pressures and tip sizes may be needed for proper spray characteristics. Always purge spray equipment before use with listed reducer. Any reduction must be compliant with existing VOC regulations and compatible with the existing environmental and application conditions.

Reducer/Clean Up

Below 80°F (27°C) Reducer #54, R7K54
 Above 80°F (27°C) Reducer #100, R7K100 or R7K104
 In California..... Reducer R7K111

Airless Spray

Pressure..... 2400 psi
 Hose..... 1/4" ID
 Tip..... .017"
 Filter..... 60 mesh
 Reduction..... As needed up to 5% by volume

Brush

Brush..... Natural Bristle
 Reduction..... Not recommended

Roller

Cover 3/8" - 1/2" woven with solvent resistant core
 Reduction..... Not recommended

Plural Component Spray ... Acceptable

Refer to April 2010 Technical Bulletin - "Application Guidelines for Macropoxy 646 & Recoatable Epoxy Primer Utilizing Plural Component Equipment"

If specific application equipment is not listed above, equivalent equipment may be substituted.

Surface Preparation Standards

Condition of Surface	ISO 8501-1 BS7079:A1	Swedish Std. SIS055900	SSPC	NACE
White Metal	Sa 3	Sa 3	SP 5	1
Near White Metal	Sa 2.5	Sa 2.5	SP 10	2
Commercial Blast	Sa 1	Sa 1	SP 6	3
Brush-Off Blast	Sa 1	Sa 1	SP 7	4
Hand Tool Cleaning	St 2	St 2	SP 2	-
Pitted & Rusted	D St 2	D St 2	SP 2	-
Rusted	C St 3	C St 3	SP 3	-
Power Tool Cleaning	D St 3	D St 3	SP 3	-



Protective RECOATABLE EPOXY PRIMER

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APPLICATION BULLETIN

4.45

APPLICATION PROCEDURES

Surface preparation must be completed as indicated.

Mix contents of each component thoroughly with low speed power agitation. Make certain no pigment remains on the bottom of the cans. Then combine one part by volume of Part G with one part by volume of Part H. Thoroughly agitate the mixture with power agitation. Allow the material to sweat-in as indicated. Re-stir before using.

If reducer solvent is used, add only after both components have been thoroughly mixed, after sweat-in.

Apply paint at the recommended film thickness and spreading rate as indicated below:

Recommended Spreading Rate per coat:

	Minimum	Maximum
Wet mils (microns)	6.0 (150)	9.0 (225)
Dry mils (microns)	4.0* (100)	6.0* (150)
~Coverage sq ft/gal (m ² /L)	175 (4.3)	260 (6.4)
Theoretical coverage sq ft/gal (m ² /L) @ 1 mil / 25 microns dft	1040 (25.5)	

*See Performance Tips section

NOTE: Brush or roll application may require multiple coats to achieve maximum film thickness and uniformity of appearance.

Drying Schedule @ 6.0 mils wet (150 microns):

	@ 35°F/1.5°C	@ 77°F/25°C 50% RH	@ 120°F/49°C
To touch:	1 hour	15 minutes	10 minutes
Tack free:	2 hours	30 minutes	15 minutes
To recoat:			
minimum:	6 hours	2 hours	30 minutes
maximum:	1 year	1 year	1 year
To cure:	14 days	14 days	2 days

*If maximum recoat time is exceeded, abrade surface before recoating.
Drying time is temperature, humidity, and film thickness dependent.*

Pot Life:	8+ hours	8 hours	3 hours
Sweat-in-time:	1 hour	30 minutes	10 minutes

Application of coating above maximum or below minimum recommended spreading rate may adversely affect coating performance.

CLEAN UP INSTRUCTIONS

Clean spills and spatters immediately with Reducer #54, R7K54. Clean tools immediately after use with Reducer #54, R7K54. Follow manufacturer's safety recommendations when using any solvent.

DISCLAIMER

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PERFORMANCE TIPS

Stripe coat all crevices, welds, and sharp angles to prevent early failure in these areas.

When using spray application, use a 50% overlap with each pass of the gun to avoid holidays, bare areas, and pinholes. If necessary, cross spray at a right angle.

Spreading rates are calculated on volume solids and do not include an application loss factor due to surface profile, roughness or porosity of the surface, skill and technique of the applicator, method of application, various surface irregularities, material lost during mixing, spillage, overthinning, climatic conditions, and excessive film build.

Excessive reduction of material can affect film build, appearance, and adhesion.

Do not apply the material beyond recommended pot life.

Do not mix previously catalyzed material with new.

In order to avoid blockage of spray equipment, clean equipment before use or before periods of extended downtime with Reducer #54, R7K54.

Material must be at least 50°F (10°C) prior to catalyzing.

Quik-Kick Epoxy Accelerator is acceptable for use. See data page 4.99 for details.

When coating over aluminum and galvanizing, recommended dft is 2-4 mils (50-100 microns).

Refer to Product Information sheet for additional performance characteristics and properties.

SAFETY PRECAUTIONS

Refer to the MSDS sheet before use.

Published technical data and instructions are subject to change without notice. Contact your Sherwin-Williams representative for additional technical data and instructions.

WARRANTY

The Sherwin-Williams Company warrants our products to be free of manufacturing defects in accord with applicable Sherwin-Williams quality control procedures. Liability for products proven defective, if any, is limited to replacement of the defective product or the refund of the purchase price paid for the defective product as determined by Sherwin-Williams. NO OTHER WARRANTY OR GUARANTEE OF ANY KIND IS MADE BY SHERWIN-WILLIAMS, EXPRESSED OR IMPLIED, STATUTORY, BY OPERATION OF LAW OR OTHERWISE, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

MATERIAL SAFETY DATA SHEET

R00699
07 00

DATE OF PREPARATION
Sep 23, 2013

SECTION 1 — PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NUMBER

R00699

PRODUCT NAME

RUST TOUGH® Rust Preventive Enamel (Aerosol), Red Oxide Primer

MANUFACTURER'S NAME

THE SHERWIN-WILLIAMS COMPANY
KRYLON PRODUCTS GROUP
Cleveland, OH 44115

Telephone Numbers and Websites

Product Information	(800) 247-3266 www.kpg-industrial.com
Regulatory Information	(216) 566-2902 www.paintdocs.com
Medical Emergency	(216) 566-2917
Transportation Emergency*	(800) 424-9300
<i>*for Chemical Emergency ONLY (spill, leak, fire, exposure, or accident)</i>	

SECTION 2 — COMPOSITION/INFORMATION ON INGREDIENTS

% by Weight	CAS Number	Ingredient	Units	Vapor Pressure
14	74-98-6	Propane		
		ACGIH TLV	1000 PPM	760 mm
		OSHA PEL	1000 PPM	
6	106-97-8	Butane		
		ACGIH TLV	1000 PPM	760 mm
		OSHA PEL	800 PPM	
4	64742-89-8	V. M. & P. Naphtha		
		ACGIH TLV	300 PPM	12 mm
		OSHA PEL	300 PPM	
		OSHA PEL	400 PPM STEL	
19	108-88-3	Toluene		
		ACGIH TLV	20 PPM	22 mm
		OSHA PEL	100 ppm (Skin)	
		OSHA PEL	150 ppm (Skin) STEL	
2	78-83-1	2-Methyl-1-propanol		
		ACGIH TLV	50 PPM	8.7 mm
		OSHA PEL	50 PPM	
35	67-64-1	Acetone		
		ACGIH TLV	500 PPM	180 mm
		ACGIH TLV	750 PPM STEL	
		OSHA PEL	1000 PPM	
7	14807-96-6	Talc		
		ACGIH TLV	2 mg/m3 as Resp. Dust	
		OSHA PEL	2 mg/m3 as Resp. Dust	

SECTION 3 — HAZARDS IDENTIFICATION

ROUTES OF EXPOSURE

INHALATION of vapor or spray mist.
EYE or SKIN contact with the product, vapor or spray mist.

EFFECTS OF OVEREXPOSURE

EYES: Irritation.
SKIN: Prolonged or repeated exposure may cause irritation.
INHALATION: Irritation of the upper respiratory system.

HMIS Codes

Health	2
Flammability	3
Reactivity	0

May cause nervous system depression. Extreme overexposure may result in unconsciousness and possibly death. Prolonged overexposure to hazardous ingredients in Section 2 may cause adverse chronic effects to the following organs or systems:

- the liver
- the urinary system
- the cardiovascular system
- the reproductive system

SIGNS AND SYMPTOMS OF OVEREXPOSURE

Headache, dizziness, nausea, and loss of coordination are indications of excessive exposure to vapors or spray mists. Redness and itching or burning sensation may indicate eye or excessive skin exposure.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE

None generally recognized.

CANCER INFORMATION

For complete discussion of toxicology data refer to Section 11.

SECTION 4 — FIRST AID MEASURES

EYES: Flush eyes with large amounts of water for 15 minutes. Get medical attention.

SKIN: Wash affected area thoroughly with soap and water. Remove contaminated clothing and laundry before re-use.

INHALATION: If affected, remove from exposure. Restore breathing. Keep warm and quiet.

INGESTION: Do not induce vomiting. Get medical attention immediately.

SECTION 5 — FIRE FIGHTING MEASURES

FLASH POINT	LEL	UEL	EXTINGUISHING MEDIA
Propellant < 0 °F	0.9	12.8	Carbon Dioxide, Dry Chemical, Foam

UNUSUAL FIRE AND EXPLOSION HAZARDS

Containers may explode when exposed to extreme heat.

Application to hot surfaces requires special precautions.

During emergency conditions overexposure to decomposition products may cause a health hazard. Symptoms may not be immediately apparent. Obtain medical attention.

SPECIAL FIRE FIGHTING PROCEDURES

Full protective equipment including self-contained breathing apparatus should be used.

Water spray may be ineffective. If water is used, fog nozzles are preferable. Water may be used to cool closed containers to prevent pressure build-up and possible autoignition or explosion when exposed to extreme heat.

SECTION 6 — ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Remove all sources of ignition. Ventilate the area.

Remove with inert absorbent.

SECTION 7 — HANDLING AND STORAGE

STORAGE CATEGORY

Not Available

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Keep away from heat, sparks, and open flame. Vapors will accumulate readily and may ignite explosively.

During use and until all vapors are gone: Keep area ventilated - Do not smoke - Extinguish all flames, pilot lights, and heaters - Turn off stoves, electric tools and appliances, and any other sources of ignition.

Consult NFPA Code. Use approved Bonding and Grounding procedures.

Contents under pressure. Do not puncture, incinerate, or expose to temperature above 120F. Heat from sunlight, radiators, stoves, hot water, and other heat sources could cause container to burst. Do not take internally. Keep out of the reach of children.

SECTION 8 — EXPOSURE CONTROLS/PERSONAL PROTECTION

PRECAUTIONS TO BE TAKEN IN USE

Use only with adequate ventilation.

Avoid contact with skin and eyes. Avoid breathing vapor and spray mist.

Wash hands after using.

This coating may contain materials classified as nuisance particulates (listed "as Dust" in Section 2) which may be present at hazardous levels only during sanding or abrading of the dried film. If no specific dusts are listed in Section 2, the applicable limits for nuisance dusts are ACGIH TLV 10 mg/m³ (total dust), 3 mg/m³ (respirable fraction), OSHA PEL 15 mg/m³ (total dust), 5 mg/m³ (respirable fraction).

VENTILATION

Local exhaust preferable. General exhaust acceptable if the exposure to materials in Section 2 is maintained below applicable exposure limits. Refer to OSHA Standards 1910.94, 1910.107, 1910.108.

RESPIRATORY PROTECTION

If personal exposure cannot be controlled below applicable limits by ventilation, wear a properly fitted organic vapor/particulate respirator approved by NIOSH/MSHA for protection against materials in Section 2.

When sanding or abrading the dried film, wear a dust/mist respirator approved by NIOSH/MSHA for dust which may be generated from this product, underlying paint, or the abrasive.

PROTECTIVE GLOVES

None required for normal application of aerosol products where minimal skin contact is expected. For long or repeated contact, wear chemical resistant gloves.

EYE PROTECTION

Wear safety spectacles with unperforated sideshields.

OTHER PRECAUTIONS

Intentional misuse by deliberately concentrating and inhaling the contents can be harmful or fatal.

SECTION 9 — PHYSICAL AND CHEMICAL PROPERTIES

PRODUCT WEIGHT	6.76 lb/gal	809 g/l
SPECIFIC GRAVITY	0.81	
BOILING POINT	<0 - 325 °F	<-18 - 162 °C
MELTING POINT	Not Available	
VOLATILE VOLUME	91%	
EVAPORATION RATE	Faster than ether	
VAPOR DENSITY	Heavier than air	
SOLUBILITY IN WATER	Not Available	
pH	7.0	
VOLATILE ORGANIC COMPOUNDS (VOC Theoretical - As Packaged)	Less Water and Federally Exempt Solvents	
	Volatile Weight 45.35%	

SECTION 10 — STABILITY AND REACTIVITY**STABILITY — Stable****CONDITIONS TO AVOID**

None known.

INCOMPATIBILITY

None known.

HAZARDOUS DECOMPOSITION PRODUCTS

By fire: Carbon Dioxide, Carbon Monoxide

HAZARDOUS POLYMERIZATION

Will not occur

SECTION 11 — TOXICOLOGICAL INFORMATION**CHRONIC HEALTH HAZARDS**

No ingredient in this product is an IARC, NTP or OSHA listed carcinogen.

Reports have associated repeated and prolonged overexposure to solvents with permanent brain and nervous system damage.

TOXICOLOGY DATA

CAS No.	Ingredient Name			
74-98-6	Propane	LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available
106-97-8	Butane	LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available
64742-89-8	V. M. & P. Naphtha	LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available
108-88-3	Toluene	LC50 RAT	4HR	4000 ppm
		LD50 RAT		5000 mg/kg
78-83-1	2-Methyl-1-propanol	LC50 RAT	4HR	Not Available
		LD50 RAT		2460 mg/kg
67-64-1	Acetone	LC50 RAT	4HR	Not Available
		LD50 RAT		5800 mg/kg
14807-96-6	Talc	LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available

SECTION 12 — ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION

No data available.

SECTION 13 — DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD

Waste from this product may be hazardous as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261.

Waste must be tested for ignitability to determine the applicable EPA hazardous waste numbers.

Do not incinerate. Depressurize container. Dispose of in accordance with Federal, State/Provincial, and Local regulations regarding pollution.

SECTION 14 — TRANSPORT INFORMATION

Multi-modal shipping descriptions are provided for informational purposes and do not consider container sizes. The presence of a shipping description for a particular mode of transport (ocean, air, etc.), does not indicate that the product is packaged suitably for that mode of transport. All packaging must be reviewed for suitability prior to shipment, and compliance with the applicable regulations is the sole responsibility of the person offering the product for transport.

US Ground (DOT)

May be classed as LTD. QTY. OR ORM-D

UN1950, AEROSOLS, 2.1, LIMITED QUANTITY, (ERG#126)

Canada (TDG)

May be classed as LTD. QTY. OR ORM-D

UN1950, AEROSOLS, CLASS 2.1, LIMITED QUANTITY, (ERG#126)

IMO

May be shipped as Limited Quantity

UN1950, AEROSOLS, CLASS 2.1, LIMITED QUANTITY, EmS F-D, S-U

IATA/ICAO

UN1950, AEROSOLS, FLAMMABLE, 2.1, LIMITED QUANTITY

SECTION 15 — REGULATORY INFORMATION

SARA 313 (40 CFR 372.65C) SUPPLIER NOTIFICATION

CAS No.	CHEMICAL/COMPOUND	% by WT	% Element
108-88-3	Toluene	19	

CALIFORNIA PROPOSITION 65

WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

TSCA CERTIFICATION

All chemicals in this product are listed, or are exempt from listing, on the TSCA Inventory.

SECTION 16 — OTHER INFORMATION

This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

The above information pertains to this product as currently formulated, and is based on the information available at this time. Addition of reducers or other additives to this product may substantially alter the composition and hazards of the product. Since conditions of use are outside our control, we make no warranties, express or implied, and assume no liability in connection with any use of this information.

Material Safety Data Sheet



GASOLINE, UNLEADED



1. Product and company identification

- Product name** : GASOLINE, UNLEADED
- Synonym** : Regular, Unleaded Gasoline (US Grade), Mid-Grade, Plus, Super, WinterGas, SummerGas, Supreme, SuperClean WinterGas, RegularClean, PlusClean, Premium, marked or dyed gasoline, TQRUL, transitional quality regular unleaded, BOB, Blendstock for Oxygenate Blending, Conventional Gasoline.
- Code** : W102E, SAP: 102 to 117
- Material uses** : Unleaded gasoline is used in spark ignition engines including motor vehicles, inboard and outboard boat engines, small engines such as chain saws and lawn mowers, and recreational vehicles.
- Manufacturer** : PETRO-CANADA
P.O. Box 2844
150 – 6th Avenue South-West
Calgary, Alberta
T2P 3E3
- In case of emergency** : Petro-Canada: 403-296-3000
Canotec Transportation: 613-996-6666
Poison Control Centre: Consult local telephone directory for emergency number(s).

2. Hazards identification

- Physical state** : Clear liquid.
- Odour** : Gasoline
- WHMIS (Canada)** :  
Class B-2: Flammable liquid
Class D-2A: Material causing other toxic effects (Very toxic).
Class D-2B: Material causing other toxic effects (Toxic).
- OSHA/HCS status** : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
- Emergency overview** : WARNING!
FLAMMABLE LIQUID AND VAPOUR. CAUSES RESPIRATORY TRACT, EYE AND SKIN IRRITATION. CANCER HAZARD - CONTAINS MATERIAL WHICH CAN CAUSE CANCER. CONTAINS MATERIAL WHICH MAY CAUSE HERITABLE GENETIC EFFECTS.
Flammable liquid. Irritating to eyes, respiratory system and skin. Keep away from heat, sparks and flame. Avoid exposure - obtain special instructions before use. Do not breathe vapour or mist. Avoid contact with eyes, skin and clothing. Contains material which can cause cancer. Risk of cancer depends on duration and level of exposure. Contains material which may cause heritable genetic effects. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. Wash thoroughly after handling.
- Routes of entry** : Dermal contact. Eye contact. Inhalation. Ingestion.
- Potential acute health effects**
- Inhalation** : Inhalation of this product may cause respiratory tract irritation. Inhalation of this product may cause respiratory tract irritation and Central Nervous System (CNS) Depression, symptoms of which may include; weakness, dizziness, slurred speech, drowsiness, unconsciousness and in cases of severe overexposure; coma and death.
- Ingestion** : Ingestion of this product may cause gastro-intestinal irritation. Aspiration of this product may result in severe irritation or burns to the respiratory tract. Ingestion of this product may cause Central Nervous System (CNS) Depression, symptoms of which may include; weakness, dizziness, slurred speech, drowsiness, unconsciousness and in cases of severe overexposure; coma and death.

2 . Hazards identification

- Skin** : Irritating to skin.
- Eyes** : Irritating to eyes.
- Potential chronic health effects**
- Chronic effects** : This product contains an ingredient or ingredients, which have been shown to cause chronic toxic effects. Repeated or prolonged exposure to the substance can produce blood disorders.
- Carcinogenicity** : Contains material which can cause cancer. Risk of cancer depends on duration and level of exposure.
- Mutagenicity** : Contains material which may cause heritable genetic effects.
- Teratogenicity** : No known significant effects or critical hazards.
- Developmental effects** : No known significant effects or critical hazards.
- Fertility effects** : No known significant effects or critical hazards.
- Medical conditions aggravated by over-exposure** : Repeated or prolonged contact with spray or mist may produce chronic eye irritation and severe skin irritation. Repeated skin exposure can produce local skin destruction or dermatitis.

See toxicological information (Section 11)

3 . Composition/information on ingredients

<u>Name</u>	<u>CAS number</u>	<u>%</u>
Gasoline	86290-81-5	85-100
Toluene	108-88-3	15-40*
Benzene	71-43-2	0.5-1.5
Ethanol	64-17-5	0.1-0.3

*Montreal: may vary from 3-40%

*Edmonton: may vary from 1-5%

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

4 . First-aid measures

- Eye contact** : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.
- Skin contact** : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash skin thoroughly with soap and water or use recognised skin cleanser. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.
- Inhalation** : Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.
- Ingestion** : Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.
- Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.
- Notes to physician** : No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

5 . Fire-fighting measures

- Flammability of the product** : Flammable liquid (NFPA) .
- Extinguishing media**
- Suitable** : Use dry chemical, CO₂, water spray (fog) or foam.
- Not suitable** : Do not use water jet.
- Special exposure hazards** : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.
- Products of combustion** : Carbon oxides (CO, CO₂), nitrogen oxides (NO_x), polynuclear aromatic hydrocarbons, phenols, aldehydes, ketones, smoke and irritating vapours as products of incomplete combustion.
- Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.
- Special remarks on fire hazards** : Extremely flammable in presence of open flames, sparks, shocks, and heat. Vapours are heavier than air and may travel considerable distance to sources of ignition and flash back. Rapid escape of vapour may generate static charge causing ignition. May accumulate in confined spaces.
- Special remarks on explosion hazards** : Do not pressurise, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Containers may explode in heat of fire. Vapours may form explosive mixtures with air.

6 . Accidental release measures

- Personal precautions** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilt material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing vapour or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see Section 8).
- Environmental precautions** : Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).
- Methods for cleaning up**
- Small spill** : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor.
- Large spill** : Stop leak if without risk. Move containers from spill area. Approach the release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilt product. Note: see section 1 for emergency contact information and section 13 for waste disposal.

7 . Handling and storage

- Handling** : Put on appropriate personal protective equipment (see Section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. Avoid exposure - obtain special instructions before use. Do not get in eyes or on skin or clothing. Do not ingest. Avoid breathing vapour or mist. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly

7 . Handling and storage

closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use non-sparking tools. Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by earthing and bonding containers and equipment before transferring material. Empty containers retain product residue and can be hazardous. Do not reuse container.

Storage

- : Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabelled containers. Use appropriate containment to avoid environmental contamination. Ensure the storage containers are grounded/bonded.

8 . Exposure controls/personal protection

Ingredient	Exposure limits
Gasoline	ACGIH TLV (United States). TWA: 300 ppm 8 hour(s). STEL: 500 ppm 15 minute(s).
Toluene	ACGIH TLV (United States). TWA: 20 ppm 8 hour(s).
Benzene	ACGIH TLV (United States). Absorbed through skin. TWA: 0.5 ppm 8 hour(s). STEL: 2.5 ppm 15 minute(s).
Ethanol	ACGIH TLV (United States). STEL: 1000 ppm 15 minute(s).

Consult local authorities for acceptable exposure limits.

Recommended monitoring procedures

- : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.

Engineering measures

- : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapour or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

Hygiene measures

- : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal protection

Respiratory

- : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator. Recommended: A NIOSH-approved air-purifying respirator with an organic vapour cartridge or canister may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits. Protection provided by air-purifying respirators is limited. Use a positive-pressure, air-supplied respirator if there is any potential for uncontrolled release, exposure levels are unknown, or any other circumstances where air-purifying respirators may not provide adequate protection.

8 . Exposure controls/personal protection

- Hands** : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.
Recommended: polyvinyl alcohol (PVA), Viton®. Consult your PPE provider for breakthrough times and the specific glove that is best for you based on your use patterns. It should be realized that eventually any material regardless of their imperviousness, will get permeated by chemicals. Therefore, protective gloves should be regularly checked for wear and tear. At the first signs of hardening and cracks, they should be changed.
- Eyes** : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts.
- Skin** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Environmental exposure controls** : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

9 . Physical and chemical properties

- Physical state** : Clear liquid.
- Flash point** : Closed cup: -50 to -38°C (-58 to -36.4°F) [Tagliabue.]
- Auto-ignition temperature** : 257°C (494.6°F) (NFPA)
- Flammable limits** : Lower: 1.3% (NFPA)
Upper: 7.6% (NFPA)
- Colour** : Clear to slightly yellow or green, undyed liquid. May be dyed red for taxation purposes.
- Odour** : Gasoline
- Odour threshold** : Not available.
- pH** : Not available.
- Boiling/condensation point** : 25 to 220°C (77 to 428°F) (ASTM D86)
- Melting/freezing point** : Not available.
- Relative density** : 0.685 to 0.8 kg/L @ 15°C (59°F)
- Vapour pressure** : <107 kPa (<802.5 mm Hg) @ 37.8°C (100°F)
- Vapour density** : 3 to 4 [Air = 1] (NFPA)
- Volatility** : Not available.
- Evaporation rate** : Not available.
- Viscosity** : Not available.
- Pour point** : Not available.
- Solubility** : Hydrocarbon components virtually insoluble in water. Soluble in alcohol, ether, chloroform and benzene. Dissolves fats, oils and natural resins.

10 . Stability and reactivity

- Chemical stability** : The product is stable.
- Hazardous polymerisation** : Under normal conditions of storage and use, hazardous polymerisation will not occur.
- Materials to avoid** : Reactive with oxidising agents, acids and interhalogens.
- Hazardous decomposition products** : May release CO_x, NO_x, phenols, polycyclic aromatic hydrocarbons, aldehydes, ketones, smoke and irritating vapours when heated to decomposition.

11 . Toxicological information

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Gasoline	LD50 Dermal	Rabbit	>5000 mg/kg	-
	LD50 Oral	Rat	13600 mg/kg	-
Toluene	LD50 Dermal	Rabbit	12125 mg/kg	-
	LD50 Oral	Rat	636 mg/kg	-
	LC50 Inhalation Vapour	Rat	7585 ppm	4 hours
	LD50 Dermal	Rabbit	>8240 mg/kg	-
Benzene	LD50 Oral	Rat	930 mg/kg	-
	LC50 Inhalation Vapour	Rat	13700 ppm	4 hours
	LD50 Oral	Rat	7060 mg/kg	-
Ethanol	LC50 Inhalation Vapour	Rat	>32380 ppm	4 hours

Conclusion/Summary : Not available.

Chronic toxicity

Conclusion/Summary : Not available.

Irritation/Corrosion

Conclusion/Summary : Not available.

Sensitiser

Conclusion/Summary : Not available.

Carcinogenicity

Conclusion/Summary : Not available.

Classification

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA
Gasoline	A3	2B	-	-	-	-
Toluene	A4	3	D	-	-	-
Benzene	A1	1	A	+	Proven.	+
Ethanol	A3	-	-	-	-	-

Mutagenicity

Conclusion/Summary : Not available.

Teratogenicity

Conclusion/Summary : There is a wealth of information about the teratogenic hazards of Toluene in the literature; however, based upon professional judgement regarding the body of evidence, WHMIS classification as a teratogen is not warranted.

Reproductive toxicity

Conclusion/Summary : Not available.

12 . Ecological information

Environmental effects : No known significant effects or critical hazards.

Aquatic ecotoxicity

Conclusion/Summary : Not available.

Biodegradability

Conclusion/Summary : Not available.


13 . Disposal considerations

Waste disposal : The generation of waste should be avoided or minimised wherever possible. Significant quantities of waste product residues should not be disposed of via the foul sewer but processed in a suitable effluent treatment plant. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Vapor from product residues may create a highly flammable or explosive atmosphere inside the container. Do not cut, weld or grind used containers unless they have been cleaned thoroughly internally. Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

14 . Transport information

Regulatory information	UN number	Proper shipping name	Classes	PG*	Label	Additional information
TDG Classification	UN1203	GASOLINE	3	II		-
DOT Classification	Not available.	Not available.	Not available.	-		-

PG* : Packing group

15 . Regulatory information

United States

HCS Classification : Flammable liquid
Irritating material
Carcinogen

Canada

WHMIS (Canada) : Class B-2: Flammable liquid
Class D-2A: Material causing other toxic effects (Very toxic).
Class D-2B: Material causing other toxic effects (Toxic).

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

International regulations

Canada inventory : All components are listed or exempted.

United States inventory (TSCA 8b) : All components are listed or exempted.

Europe inventory : All components are listed or exempted.

16 . Other information

Label requirements : FLAMMABLE LIQUID AND VAPOUR. CAUSES RESPIRATORY TRACT, EYE AND SKIN IRRITATION. CANCER HAZARD - CONTAINS MATERIAL WHICH CAN CAUSE CANCER. CONTAINS MATERIAL WHICH MAY CAUSE HERITABLE GENETIC EFFECTS.

Hazardous Material Information System (U.S.A.) :

Health	*	2
Flammability		3
Physical hazards		0
Personal protection		H

National Fire Protection Association (U.S.A.) :



References : Available upon request.
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Date of printing : 10/10/2012.

Date of issue : 10 October 2012

Date of previous issue : 4/9/2010.

Responsible name : **Product Safety - DSR**

▣ Indicates information that has changed from previously issued version.

For Copy of (M)SDS : Internet: www.petro-canada.ca/msds

Canada-wide: telephone: 1-800-668-0220; fax: 1-800-837-1228

For Product Safety Information: (905) 804-4752

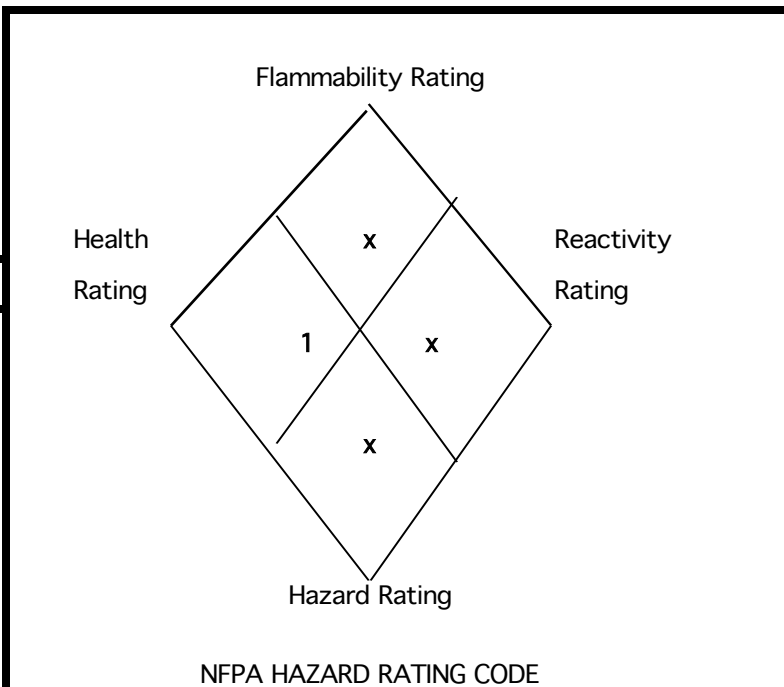
Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

MATERIAL SAFETY DATA SHEET

Used to comply with OSHA's Hazard
Communication Standard, 29 CFR 1910.1200



SECTION I - NAME AND PRODUCT

Flexovit USA Inc.

1305 Eden-Evans Center Rd.

Angola, NY 14006

Phone: 800-777-6225

Fax: 800-690-0144

Updated: 11/1/2011

Product: All Type 27, 28, 29, and Type 1 wheels

SECTION II - COMPOSITION

Ingredient	% By Weight	OSHA Regulate	Cas #	OSHA PEL	ACGIH TLV	Other Limits	Carcinogen
Aluminum Oxide	60 - 80	No	1344-28-1	NA	10mg/m	N/A	No
Silicon Carbide	NA	No	409-21-2	NA	NA	N/A	No
Zirconium Oxide	0 - 12	No	1314-23-4	NA	10mg/m	N/A	No
Calcium Hydroxide	NA	No	N/A	NA	5mg/m	N/A	No
Barium Sulfate	NA	No	N/A	0.5mg/m	10mg/m	N/A	No
Iron Sulfide	NA	No	1317-37-9	NA	NA	N/A	No
Florides	NA	No	16984-48-8	2.5mg/m	2.5mg/m	N/A	No
Phenolic Resin	0 - 15	No	9003-35-4	5 P.P.M.	5 P.P.M.	N/A	No
Fiber Glass	0 - 5	No	N/A	15mg/m	10mg/m	N/A	No
Aluminum or Steel	0.1 - 1	No	N/A	NA	NA	N/A	No
Zinc	NA	No	N/A	NA	NA	N/A	No

SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS

Boiling Point	N/A	Specific Gravity (H2O=1)	2 - 4
Vapor Pressure (mm Hg.)	N/A	Melting Point	N/A
Vapor Density (AIR=1)	N/A	Evaporation Rate (Butyl Acetate=1)	N/A
Solubility in Water	Slight	Appearance/Odor	Dark colored solid. May give off some odor in use.

SECTION IV - FIRE AND EXPLOSION DATA

Means Of Extinction	Water or carbon dioxide.	Lower And Upper Explosion Limits	N/A
Flammable Limits	N/A	Special Fire Fighting Procedures	None
Flash Point	N/A	Unusual Fire or Explosion Hazards	None

SECTION V - REACTIVITY DATA

Stable - Avoid excessive moisture, high relative humidity, temperature extremes and contact with acids or solvents

Not incompatible with any materials

Hazardous Polymerization will not occur

Dust and organic fumes are generated in use. Do not exceed TLV's.

SECTION VI - HEALTH HAZARD DATA

Route(s) of Entry	Signs and Symptoms of Exposure	Emergency and First-Aid procedures
x Dust Inhalation	May cause coughing and shortness of breath during grinding. May affect breathing capacity.	Terminate exposure and remove to fresh air. Obtain medical assistance.
Ingestion	No known adverse effects, but not recommended.	Obtain medical assistance.
Absorption	Not absorbed through skin.	N/A
Skin contact	Grinding wheel may cause abrasions. Dust may cause skin irritation.	Terminate exposure and remove to fresh air. Obtain medical assistance.
Eye	Dust or fumes may cause eye irritation.	Fresh air and medical assistance.
Other	Excessive noise levels may exist in use.	Cease use. Obtain medical assistance.

Medical conditions such as emphysema and asthma may be aggravated during grinding.

SECTION VII- STORAGE HANDLING AND USE PROCEDURES

Handling and storage procedures - Avoid damage to wheel. Do not drop. Do not use a wheel that has been damaged or dropped. Avoid excessive temperatures in storage. Always handle in accordance with ANSI B7.1.

Normal clean up procedures should be used if material is released.

Dispose of waste in a sanitary landfill in accordance with state, local and federal regulations.

Always use in accordance with ANSI Z43.1 and OSHA 1910.215. Do not use dropped or damaged wheels. Do not use without machine guard in place. Do not exceed maximum RPM on wheel.

SECTION VIII- CONTROL MEASURES

Protection	Requirements and Referrals
Respiratory	OSHA or NIOSH approved respirator if TLV's exceeded. See OSHA 29 CFR 1910.134
Ventilation	Local and mechanical exhaust recommended. See ANSI Z43.1. Refer to OSHA 29 CFR 1910.94.
Protective Gloves	Not required but use if desired.
Eye Protection	Required. Refer to OSHA 29 CFR 1910.133.
Hearing Protection	Required. Refer to OSHA 29 CFR 1910.95.
Other	Apron and/or face shield if desired.
Hygienic Practices	Wash with soap and water after handling and grinding.

COMPANY USE

The information and recommendations set forth herein are taken from sources and references believed to be accurate and complete as of the date hereof. However, Flexovit USA Inc makes no expressed or implied warranty with respect to the accuracy of the information or the suitability of the recommendations, and assumes no liability to any user thereof.



**TW100PNA
MATERIAL SAFETY DATA SHEET**

COMPANY IDENTITY: Magic Safety Products
PRODUCT IDENTITY: MAGIC NON ALCOHOL HYGENIC CLEANSING FLUID

DATE: 05/01/13
PAGE: 1 OF 7

PRODUCT NUMBERS: ST100BN (TW100PNA)
MANUFACTURED FOR: CONDOR, EDMONTON, AB T5M 3Z2

SAFETY DATA SHEET

This Safety Data Sheet conforms to ANSI Z400.5, and to the format requirements and the International Chemical Safety Cards of the Global Harmonizing System.

THIS SDS COMPLIES WITH 29 CFR 1910.1200 (HAZARD COMMUNICATION STANDARD)

IMPORTANT: Read this SDS before handling & disposing of this product.

Pass this information on to employees, customers, & users of this product.

SECTION 1. IDENTIFICATION OF THE SUBSTANCE OR MIXTURE AND OF THE SUPPLIER

PRODUCT IDENTITY: MAGIC HYGENIC CLEANSING FLUID
NEW MSDS DATE: 05/01/2013
COMPANY IDENTITY: Magic Safety Products
COMPANY ADDRESS: 4301 B New Brunswick Ave.
COMPANY CITY: SouthPlainfield,NJ 07080
COMPANY PHONE: 1-732-968-0008
EMERGENCY PHONES: CHEMTREC: 1-800-424-9300 (USA)
CANUTEC: 1-613-996-6666 (CANADA)

SECTION 2. HAZARDS IDENTIFICATION

CAUTION

RISK STATEMENTS:

R36/37/38 Irritating to eyes, respiratory system and skin.

SAFETY STATEMENTS:

S24/25 Avoid contact with skin and eyes.

SEE SECTION 11 FOR OTHER TOXICOLOGICAL INFORMATION (ACUTE & CHRONIC HAZARDS)

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

MATERIAL	CAS#	EINECS#	WT%	TWA (OSHA)	TLV (ACGIH)
Water	7732-18-5	231-791-2	80-85	None Known	None Known
Methoxypropoxypropanol	34590-94-8	252-104-2	0-10	100 ppm	100 ppm
N-Alkyl(C12-18)-N,N-Dimethyl-N-Benzyl-Ammonium Chloride	68391-01-5	-	0- 5	None Known	None Known
Alkyl Dimethyl Ethylbenzene Ammonium Chloride	68956-79-6	-	0- 5	None Known	None Known
Sodium Metasilicate	6834-92-0	-	0- 5	None Known	None Known
Nonylphenol Ethoxylate	9016-45-9	-	0- 5	None Known	None Known

This product contains no EPA Hazardous Air Pollutants (HAP) in amounts > 0.1%.



COMPANY IDENTITY: Magic Safety Products
PRODUCT IDENTITY: MAGIC HYGENIC CLEANSING FLUID

DATE: 05/01/13
PAGE: 2 OF 7

SECTION 4. FIRST AID MEASURES

EYE CONTACT:

For eyes, flush with plenty of water for 15 minutes & get medical attention.

SKIN CONTACT:

In case of contact with skin immediately remove contaminated clothing.
Wash thoroughly with soap & water. Wash contaminated clothing before reuse.

INHALATION:

After high vapor exposure, remove to fresh air. If breathing is difficult, give oxygen. If breathing has stopped, trained personnel should immediately begin artificial respiration. If the heart has stopped, trained personnel should immediately begin cardiopulmonary resuscitation (CPR).

SWALLOWING:

Rinse mouth. GET MEDICAL ATTENTION IMMEDIATELY. Do NOT give liquids to an unconscious or convulsing person.

SECTION 5. FIRE FIGHTING MEASURES

FIRE & EXPLOSION PREVENTIVE MEASURES

NO open flames. (Not expected to be a hazard under normal operating conditions.)

EXTINGUISHING MEDIA

Use appropriate extinguishing media for surrounding fires.

SPECIAL FIRE FIGHTING PROCEDURES

Water spray may be ineffective on fire but can protect fire-fighters & cool closed containers. Use fog nozzles if water is used.
Do not enter confined fire-space without full bunker gear.
(Helmet with face shield, bunker coats, gloves & rubber boots).
Use NIOSH approved positive-pressure self-contained breathing apparatus.

UNUSUAL EXPLOSION AND FIRE PROCEDURES

Isolate from oxidizers, heat, & open flame.
Closed containers may burst if exposed to extreme heat.
Applying to hot surfaces requires special precautions.
Continue all label precautions!



**TW100PNA
MATERIAL SAFETY DATA SHEET**

COMPANY IDENTITY: Magic Safety Products
PRODUCT IDENTITY: MAGIC HYGENIC CLEANSING FLUID

DATE: 05/01/13
PAGE: 3 OF 7

SECTION 6. ACCIDENTAL RELEASE MEASURES

PERSONAL PROTECTIVE MEASURES:

Keep unprotected personnel away.
Wear appropriate personal protective equipment given in Section 8.

ENVIRONMENTAL PRECAUTIONS:

Keep from entering storm sewers and ditches which lead to waterways.

CONTAINMENT AND CLEAN-UP MEASURES:

Stop spill at source. Dike and contain.
Collect leaking & spilled liquid in sealable containers as far as possible.

SECTION 7. HANDLING AND STORAGE

HANDLING

Isolate from oxidizers, heat, & open flame.
Use only with adequate ventilation. Avoid breathing of vapor or spray mist.
Avoid prolonged or repeated contact with skin.
Wear OSHA Standard goggles or face shield. Consult Safety Equipment Supplier. Wear gloves, apron & footwear impervious to this material. Wash clothing before reuse.
Avoid free fall of liquid. Ground containers when transferring. Do not flame cut, braze, or weld. Continue all label precautions!

STORAGE

Isolate from strong oxidants. Do not store above 49 C/120 F.
Keep container tightly closed & upright when not in use to prevent leakage.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

RESPIRATORY EXPOSURE CONTROLS

A respiratory protection program that meets OSHA 29 CFR 1910.134 and ANSI Z86.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant a respirator's use.

VENTILATION

LOCAL EXHAUST:	Necessary	MECHANICAL (GENERAL):	Acceptable
SPECIAL:	None	OTHER:	None

Please refer to ACGIH document, "Industrial Ventilation, A Manual of Recommended Practices", most recent edition, for details.

PERSONAL PROTECTIONS:

Wear OSHA Standard goggles or face shield. Consult Safety Equipment Supplier. Wear gloves, apron & footwear impervious to this material. Wash clothing before reuse.



COMPANY IDENTITY: Magic Safety Products
PRODUCT IDENTITY: MAGIC HYGENIC CLEANSING FLUID

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SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION (CONTINUED)

WORK & HYGIENIC PRACTICES:

Provide readily accessible eye wash stations & safety showers.
Wash at end of each workshift & before eating, smoking or using the toilet.
Promptly remove clothing that becomes contaminated. Destroy contaminated leather articles. Launder or discard contaminated clothing.

SECTION 9. PHYSICAL & CHEMICAL PROPERTIES

APPEARANCE:	Liquid, Water-White
ODOR:	None
ODOR THRESHOLD:	Not Available
pH (Neutrality):	11.0
MELTING POINT/FREEZING POINT:	Not Available
BOILING RANGE (IBP, 50%, Dry Point):	100 100 190°C/212 212 375°F(*=End Point)
FLASH POINT (TEST METHOD):	No Flash to Boiling Point
EVAPORATION RATE (n-BUTYL ACETATE=1):	Not Applicable
FLAMMABILITY CLASSIFICATION:	Class IIIB
LOWER FLAMMABLE LIMIT IN AIR (% by vol):	0.95 (Lowest Component)
UPPER FLAMMABLE LIMIT IN AIR (% by vol):	Not Available
VAPOR PRESSURE (mm of Hg)@20 C	17.4
VAPOR DENSITY (air=1):	0.709
GRAVITY @ 68/68 F / 20/20 C:	
SPECIFIC GRAVITY (Water=1):	1.035
POUNDS/GALLON:	8.621
WATER SOLUBILITY:	Complete
PARTITION COEFFICIENT (n-Octane/Water):	Not Available
AUTO IGNITION TEMPERATURE:	398 C / 750 F
DECOMPOSITION TEMPERATURE:	Not Available
VOC'S (>0.44 Lbs/Sq In) :	0.0 Vol% / 0.0 g/L / 0.000 Lbs/Gal
TOTAL VOC'S (TVOC):	6.3 Vol% / 59.8 g/L / 0.4 Lbs/Gal
NONEXEMPT VOC'S (CVOC):	0.0 Vol% / 0.0 g/L / 0.000 Lbs/Gal
HAZARDOUS AIR POLLUTANTS (HAPS):	0.0 Wt% / 0.0 g/L / 0.000 Lbs/Gal
NONEXEMPT VOC PARTIAL PRESSURE (mm of Hg @ 20 C)	0.0

SECTION 10. STABILITY & REACTIVITY

STABILITY

Stable under normal conditions.

CONDITIONS TO AVOID

Isolate from oxidizers, heat, & open flame.

MATERIALS TO AVOID

Reacts with strong oxidants, causing fire & explosion hazard.

HAZARDOUS DECOMPOSITION PRODUCTS

Carbon Monoxide, Carbon Dioxide from burning.

HAZARDOUS POLYMERIZATION

Will not occur.



COMPANY IDENTITY: Magic Safety Products
PRODUCT IDENTITY: MAGIC HYGENIC CLEANSING FLUID

DATE: 05/01/13
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SECTION 11. TOXICOLOGICAL INFORMATION

ACUTE HAZARDS

EYE & SKIN CONTACT:

Primary irritation to skin, defatting, dermatitis.
Absorption thru skin increases exposure.
Primary irritation to eyes, redness, tearing, blurred vision.
Liquid can cause eye irritation. Wash thoroughly after handling.

INHALATION:

Anesthetic. Irritates respiratory tract. Acute overexposure
can cause serious nervous system depression. Vapor harmful.

SWALLOWING:

Swallowing can cause abdominal irritation, nausea, vomiting & diarrhea.

SUBCHRONIC HAZARDS/CONDITIONS AGGRAVATED

CONDITIONS AGGRAVATED

Persons with severe skin, liver or kidney problems should avoid use.

CHRONIC HAZARDS

CANCER, REPRODUCTIVE & OTHER CHRONIC HAZARDS:

This product has no carcinogens listed by IARC, NTP, NIOSH,
OSHA or ACGIH, as of this date, greater or equal to 0.1%.

MAMMALIAN TOXICITY INFORMATION

MATERIAL	CAS#	EINECS#	LOWEST KNOWN LETHAL DOSE DATA LOWEST KNOWN LD50 (ORAL)
Quaternary Ammonium Chloride (Mixture)		-	720.0 mg/kg(Rats)



COMPANY IDENTITY: Magic Safety Products
PRODUCT IDENTITY: MAGIC HYGENIC CLEANSING FLUID

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SECTION 12. ECOLOGICAL INFORMATION

AQUATIC ANIMAL INFORMATION:

The most sensitive known aquatic group to any component of this product is: Daphnia Magna exposed to 1919 ppm or mg/L are adversely affected by components of this product. Keep out of sewers and natural water supplies.

MOBILITY IN SOIL

This material is a mobile liquid.

DEGRADABILITY

This product is completely biodegradable.

ACCUMULATION

Bioaccumulation of this product has not been determined.

SECTION 13. DISPOSAL CONSIDERATIONS

Processing, use or contamination may change the waste management options. Recycle / dispose of observing national, regional, state, provincial and local health, safety & pollution laws. If in doubt, contact appropriate agencies.

SECTION 14. TRANSPORT INFORMATION

DOT SHIPPING NAME: UN3082, None. (When weight of product in container is \geq RQ):
BULK: Environmentally hazardous substances, liquid, n.o.s.
, 9, PG-III
IATA / ICAO: UN3082, None. (When weight of product in container is \geq RQ):
BULK: Environmentally hazardous substances, liquid, n.o.s.
, 9, PG-III, 9, UN3082, PG-III
IMO / IMDG: UN3082, None. (When weight of product in container is \geq RQ):
BULK: Environmentally hazardous substances, liquid, n.o.s.
, 9, PG-III, 9, UN3082, PG-III
EMERGENCY RESPONSE GUIDEBOOK NUMBER: None

SECTION 15. REGULATORY INFORMATION

EPA REGULATION:

SARA SECTION 311/312 HAZARDS: Acute Health

All components of this product are on the TSCA list.

SARA Title III Section 313 Supplier Notification

This product does not contain toxic chemicals subject to the reporting requirements of Section 313 of the Emergency Planning & Community Right-To-Know Act of 1986 & of 40 CFR 372. This information must be included in all MSDSs that are copied and distributed for this material.



COMPANY IDENTITY: Magic Safety Products
PRODUCT IDENTITY: MAGIC HYGENIC CLEANSING FLUID

DATE: 05/01/13
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SECTION 15. REGULATORY INFORMATION (CONTINUED)

INTERNATIONAL REGULATIONS

The components of this product are listed on the chemical inventories of the following countries:
Australia, Canada, China, Europe (EINECS), Japan, Korea, United Kingdom.

CANADA: WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS)
D2B: Irritating to skin / eyes.

SECTION 16. OTHER INFORMATION

HAZARD RATINGS:

HEALTH (NFPA): 1, HEALTH (HMIS): 1, FLAMMABILITY: 1, REACTIVITY: 0
(Personal Protection Rating to be supplied by user based on use conditions.)
This information is intended solely for the use of individuals trained in the NFPA & HMIS hazard rating systems.

EMPLOYEE TRAINING

See Section 2 for Risk & Safety Statements. Employees should be made aware of all hazards of this material (as stated in this SDS) before handling it.

NOTICE

The supplier disclaims all expressed or implied warranties of merchantability or fitness for a specific use, with respect to the product or the information provided herein, except for conformation to contracted specifications. All information appearing herein is based upon data obtained from manufacturers and/or recognized technical sources. While the information is believed to be accurate, we make no representations as to its accuracy or sufficiency.

Conditions of use are beyond our control, and therefore users are responsible for verifying the data under their own operating conditions to determine whether the product is suitable for their particular purposes and they assume all risks of their handling, and disposal of the product. Users also assume all risks in regards to the publication or use of, or reliance upon information contained herein.

This information relates only to the product designated herein, and does not relate to its use in combination with any other material or process.

Unless updated, the Safety Data Sheet is valid until 05/01/2016.

MATERIAL SAFETY DATA SHEET

Section 1 – Product & Company Identification

Product Name.....: RIDGID Nu-Clear Thread Cutting Oil
Product Catalog No.: 41565, 70835, 41575, 41585

Company Name.....: Ridge Tool Company
Address: 400 Clark Street
 : Elyria, Ohio 44035-6001
Telephone: 1-800-519-3456 (USA) (8:00 am – 5:00 pm EST, M-F)
Emergency Telephone: call 9-1-1 or local emergency number
Website: www.RIDGID.com

Issue Date: June 13, 2013

Section 2 – Hazards Identification

EMERGENCY OVERVIEW:

This product is a liquid that is insoluble in water. Direct eye contact may cause minor, short term irritation. Short term skin exposure is not expected to be irritating. Inhalation and ingestion are not anticipated routes of exposure during normal conditions of use.

POTENTIAL HEALTH EFFECTS AND SYMPTOMS FROM SHORT TERM / ACUTE EXPOSURE:

- **Eye**
This product is not expected to cause eye irritation under normal conditions of use. Symptoms of slight eye irritation may result when direct contact occurs, or when exposed to high mist levels in poorly ventilated areas.
- **Skin**
Short term skin contact is not expected to cause skin irritation. Prolonged or repeated direct exposure to the skin may result in symptoms of irritation and redness. In severe cases, prolonged or repeated contact may result in dermatitis accompanied by symptoms of irritation, itching, dryness, cracking and/or inflammation.

Product Name.....: RIDGID Nu-Clear Thread Cutting Oil

- **Inhalation:**
This product has low volatility and so is not expected to cause respiratory tract irritation during normal conditions of use. Exposure to high mist levels in poorly ventilated areas may cause upper respiratory tract irritation and difficulty breathing.
- **Ingestion:**
Ingestion may cause slight stomach irritation and discomfort.
- **Potential Chronic Health Effects**
No further data known.
- **Medical Conditions Aggravated By Exposure:**
No further data known.
- **Carcinogenicity:**
This product is not listed as a known or suspected carcinogen by IARC, OSHA or the NTP.

HMIS RATING:

Health	Flammability	Reactivity	PPE
1	1	0	X

Section 3 – Composition / Information On Ingredients

Components listed in this section may contribute to the potential hazards associated with exposure to the concentrate. The product may contain additional non-hazardous or trade secret components.

<u>Component:</u>	<u>CAS #</u>	<u>% By Weight</u>
Mineral Oil	64742-54-7	> 95
Sulfur Additive Package	Mixture	< 5

This product does not contain silicone.

Product Name.....: RIDGID Nu-Clear Thread Cutting Oil

Section 4 – First Aid Measures

EYE CONTACT:

Upon direct eye contact, hold eyelids open and flush with a steady, gentle stream of water for at least 15 minutes. If irritation is due to exposure to mist or vapors, remove the individual to fresh air. If irritation persists, flush the eyes with clean water until the irritation subsides. If symptoms persist, contact a physician.

SKIN CONTACT:

Remove product from the skin by washing with a mild soap and water. Contaminated clothing should be removed to prevent prolonged exposure. If symptoms of exposure persist, contact a physician.

INHALATION:

Inhalation is not an expected route of exposure. If respiratory irritation or distress occurs, remove the employee to fresh air. Contact a physician or other medical professional if irritation or distress persists.

INGESTION:

If small amounts are ingested, first aid measures are not likely to be necessary. If larger amounts are ingested or if symptoms of ingestion occur, dilute stomach contents with two glasses of water or milk. (NOTE: Do NOT give anything by mouth to an unconscious person.) Do not induce vomiting without medical supervision. If vomiting occurs spontaneously, keep airway clear. If symptoms of ingestion persist, seek medical attention.

Section 5 – Fire Fighting Measures

FIRE AND EXPLOSIVE PROPERTIES:

Flashpoint.....: 385°F Cleveland Open Cup
Flammability Limits.....: LEL - N/A
UEL - N/A

Product Name.....: RIDGID Nu-Clear Thread Cutting Oil

EXTINGUISH MEDIA:

In accordance with NFPA guidance, dry chemical, foam or CO2 fire extinguishers are all acceptable. Note that while water fog extinguishers are also acceptable, do NOT apply a direct stream of water onto burning product because it may cause spreading and increase fire intensity.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

No further data known.

FIRE-FIGHTING PROCEDURES AND EQUIPMENT:

Emergency responders in the danger area should wear bunker gear and self-contained breathing apparatus for fires beyond the incipient stage. See Section 8 of the MSDS for other PPE to be worn as conditions warrant.

Section 6 – Accidental Release Measures

PERSONAL PRECAUTIONS:

Use personal protection recommended in Section 8.

ENVIRONMENTAL:

This material is a water pollutant. Do not let spilled or leaking material enter waterways.

CLEAN-UP MEASURES:

Important: As with any spill or leak, before responding, ensure that you are familiar with the potential hazards and recommendations of the MSDS. Appropriate personal protective equipment must be worn.

If possible, safely contain the spill with dikes or other spill response equipment appropriate for petroleum or organic material releases. Take measures to prevent spreading of product. Note that while product will ignite, it will not readily burn. However, as a precaution, eliminate ignition sources. Prevent from entering sewers or waterways. Large volumes may be transferred to an appropriate container for proper disposal. Small volumes or residues may be soaked up with absorbents. Spill response materials should be collected for proper disposal.

Product Name.....: RIDGID Nu-Clear Thread Cutting Oil

Section 7 – Handling And Storage

HANDLING:

As with any industrial chemical, handle the product in a manner that minimizes exposure to practicable levels. Prior to handling, consult Section 8 of this MSDS to evaluate personal protective equipment needs. Open containers slowly to relieve any pressure. Follow all other standard industrial hygiene practices.

Empty containers may contain product residue. All safety precautions taken when handling this product should also be taken when handling empty drums and containers. Keep containers closed when not in use.

Product residue in empty containers is combustible but will not readily burn. Note, however, that excessive heating or cutting of empty containers may create an ignition source sufficient to start a fire and, in extreme cases, cause an explosion.

STORAGE:

Protect product quality by storing indoors and away from extreme temperatures. Close all containers when not in use.

Section 8 – Exposure Controls / Personal Protection

EXPOSURE GUIDELINES:

Component

Mineral Oil	ACGIH TLV: ACGIH STEL: OSHA PEL:	5 mg / m ³ (as mist) 10 mg / m ³ (as mist) 5 mg / m ³ (as mist)
Sulfur Additive Package	No information	

Product Name.....: RIDGID Nu-Clear Thread Cutting Oil

ENGINEERING CONTROLS:

Normal general ventilation is expected to be adequate. It is recommended that ventilation be designed in all instances to maintain airborne concentrations at lowest practicable levels. Ventilation should, at a minimum, prevent airborne concentrations from exceeding any exposure limits.

The user may wish to refer to 29 CFR 1910.1000(d) (2) and the ACGIH "Threshold Limit Values for Chemical Substances and Physical Agents Biological Exposure Indices" (Appendix C) for the determination of exposure limits of mixtures. An industrial hygienist or similar professional may be consulted to confirm that the calculated exposure limits apply.

PERSONAL PROTECTIVE EQUIPMENT:

Selection of personal protective equipment should be based upon the anticipated exposure and made in accordance with OSHA's Personal Protective Equipment Standard found in 29 CFR 1910 Subpart I. The following information may be used to assist in PPE selection.

- **Eye Protection**
Wear eye protection appropriate to prevent eye exposure. Where splashing is not likely, chemical safety glasses with side shields are recommended. Where splashing may occur, chemical goggles or full face shield is recommended.
- **Skin Protection**
Gloves are not normally needed during normal conditions of use. If health effects are experienced, oil or chemical resistant gloves such as butyl or nitrile are recommended. Where splashing or soaking is likely, wear oil or chemical resistant clothing to prevent exposure.
- **Respiratory Protection**
A respirator may be worn to reduce exposure to vapors, dust or mist. Select a NIOSH/MSHA approved respirator appropriate for the type and physical character of the airborne material. A self-contained breathing apparatus is recommended in all situations where airborne contaminant concentration has not been confirmed to be below safe levels. Respirator use should comply with the OSHA Respirator Protection Standard found in 29 CFR 1910.134.
- **General Hygiene Considerations**
Wash thoroughly after handling.

Product Name.....: RIDGID Nu-Clear Thread Cutting Oil

Section 9 – Physical And Chemical Properties

Physical Appearance.....: Clear Yellow
Odor.....: Mild Petroleum
Physical State.....: Liquid
Water Solubility.....: Insoluble
Specific Gravity.....: .878
VOC.....: 2%

Section 10 – Stability And Reactivity

STABILITY:

This product is stable at room temperature.

CONDITIONS TO AVOID:

Avoid contact with incompatible materials and exposure to extreme temperatures.

INCOMPATIBLE MATERIALS:

This product is incompatible with strong oxidizing agents.

DECOMPOSITION PRODUCTS MAY INCLUDE:

Thermal decomposition products are dependent on combustion conditions. A complex mixture of airborne solid, liquid, particulates and gasses may evolve when the material burns. Combustion by-products may include:

oxides of carbon

oxides of sulfur

incompletely burned hydrocarbons as fumes and smoke

POSSIBILITY OF HAZARDOUS REACTIONS:

This product is not expected to polymerize

Product Name.....: RIDGID Nu-Clear Thread Cutting Oil

Section 11 – Toxicological Information

ACUTE:

Oral LD₅₀: Not determined

Inhalation LC₅₀: Not determined

CHRONIC: No further toxicological data known.

SENSITIZATION: No further toxicological data known.

REPRODUCTIVE EFFECTS: No further toxicological data known.

TERATOGENIC EFFECTS: No further toxicological data known.

MUTAGENICITY: No further toxicological data known.

SYNERGISTIC MATERIALS: No further toxicological data known.

CARCINOGENICITY: This product is not listed as a known or suspected carcinogen by IARC, OSHA or the NTP.

Section 12 – Ecological Information

ECOTOXICOLOGICAL INFORMATION:

This product has not been evaluated for ecotoxicity. As with any industrial chemical, exposure to the environment should be prevented and minimized wherever possible.

ENVIRONMENTAL FATE:

The degree of biodegradability and persistence of this product has not been determined.

VOC CONTENT:

2%

Product Name.....: RIDGID Nu-Clear Thread Cutting Oil

Section 13 – Disposal Consideration

WASTE DISPOSAL:

Ensure that collection, transport, treatment and disposal of waste product and containers complies with all applicable laws and regulations. Note that use, mixture, processing or contamination of the product may cause the material to be classified as a hazardous waste. It is the responsibility of the product user or owner to determine at the time of disposal whether the product is regulated as a hazardous waste.

Section 14 – Transportation Information

U.S. DOT HAZARDOUS MATERIAL INFORMATION:

Not DOT regulated.

CANADA TRANSPORT OF DANGEROUS GOODS:

This material is not TDG regulated.

Section 15 – Regulatory Information

FEDERAL REGULATIONS:**SARA 313:**

This product contains NONE of the substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

CLEAN WATER ACT:

This product contains mineral oil and is subject to regulation by Section 311 of the Clean Water Act and the Oil Pollution Act. Releases of the product into or leading to surface waters must be reported to the National Response Center at 1-800-424-8802.

Product Name.....: RIDGID Nu-Clear Thread Cutting Oil

CERCLA REPORTABLE QUANTITY:

Any components listed below have been assigned a reportable quantity (RQ) by the Federal EPA. Releases of the product into the environment that exceed the RQ for a particular component must be reported to the National Response Center at 1-800-424-8802.

None to report

TOXIC SUBSTANCE CONTROL ACT:

The components of this product are listed on the TSCA Inventory.

OZONE DEPLETING SUBSTANCES:

This product contains no ozone depleting substances as defined by the Clean Air Act.

HAZARDOUS AIR POLLUTANTS:

Any components listed below are defined by the Federal EPA as hazardous air pollutants:

None to report

STATE REGULATIONS

This product contains mineral oil, and as used, may be regulated by state used oil regulations. Check with the appropriate state agency to determine whether such a regulation exists.

CANADA

WHMIS Classification: Not controlled under WHMIS

DSL:

The components of this product are listed on DSL Inventory.



Product Name.....: RIDGID Nu-Clear Thread Cutting Oil

Section 16 – Other Information

Prepared by: Ridge Tool Company

Issue Date: June 13, 2013

Last Revision Date: September 30, 2009

RIDGE TOOL BELIEVES THE STATEMENTS, TECHNICAL INFORMATION AND RECOMMENDATIONS CONTAINED HEREIN ARE RELIABLE BUT THEY ARE GIVEN WITHOUT WARRANTY OR GUARANTEE OF ANY KIND, EXPRESSED OR IMPLIED, AND WE ASSUME NO RESPONSIBILITY FOR ANY LOSS, DAMAGE OR EXPENSE, DIRECT OR CONSEQUENTIAL, ARISING OUT OF THEIR USE.

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===== SECTION I - PRODUCT IDENTIFICATION =====

PRODUCT NAME: RUSTEX H.S. LOW VOC PRIMER GREY HMIS CODES: H F R P
 PRODUCT IDENTIFIER: 71044 2 2 0 G
 *
 PRODUCT USE: General purpose coating.
 PRODUCT IDENTIFICATION NUMBER: UN1263
 WHMIS INFO: B2, D2B,D2A

MANUFACTURER'S NAME: Cloverdale Paint Inc
 ADDRESS : 6950 King George Boulevard
 Surrey, BC,
 EMERGENCY PHONE : 613-996-6666 REVISION DATE: 10-Dec-13
 INFORMATION PHONE : 604-596-6261
 ABBREVIATIONS : N/AP - NOT APPLICABLE N/AV - NOT AVAILABLE

===== SECTION II - HAZARDOUS INGREDIENTS =====

REPORTABLE COMPONENTS	CAS NUMBER	WEIGHT PERCENT	O.E.L.
*XYLENE	1330-20-7	7-13	ACGIH TLV: 100 ppm LD50: ORAL:4g/kg rat, LC50: 6500 ppm/4H(RAT) LD50: SKIN:5000 mg/kg(RABBIT)
Tert-Butyl Acetate	540-88-5	1-5	US (ACGIH) TWA 100ppm
TITANIUM DIOXIDE	13463-67-7	1-5	TLV (ACGIH): 10 mg/m3, total dust, 8 hr, TWA
ETHYLBENZENE	100-41-4	1-5	TWA: 100ppm LD50 (ORAL-RAT): 3500 mg/kg LD50: SKIN:17000 mg/kg(RABBIT)
*METHYL ETHYL KETONE	78-93-3	1-5	ACGIH TLV: 50 ppm STEL:100 ppm LD50: ORAL:3400 mg/kg(RAT), LC50: 2000 ppm/4H(RAT) LD50 DERMAL:8.0 ml/kg(RABBIT)
METHYL PROPYL KETONE	107-87-9	1-5	ACGIH TLV: 200 ppm TWA & 250 ppm STEL OSHA PEL: 200 ppm & 700 mg/m3
CARBON BLACK PIGMENT	1333-86-4	0.1-1	ACGIH TLV: 3.5 mg/m3 LD50: >15400 mg/kg rat-oral

* Indicates toxic chemical(s) subject to the reporting requirements of section 313 of Title III and of 40 CFR 372.

===== SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS =====

BOILING POINT: 80.0 deg C SPECIFIC GRAVITY (H2O=1): 1.47

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VAPOR DENSITY: Heavier than air. PHYSICAL STATE: Liquid.
 EVAPORATION RATE: Slower than n-Butyl Acetate.
 COATING V.O.C.: 332 g/l (before thinning)
 SOLUBILITY IN WATER: Insoluble.
 APPEARANCE AND ODOR: Moderately thick liquid; Aromatic odor.
 FREEZING POINT: Not available. pH: Not available.
 COEFFICIENT OF WATER/OIL DIST: N/AV ODOR THRESHOLD: 1-30 ppm

===== SECTION IV - FIRE AND EXPLOSION HAZARD DATA =====

FLASH POINT: -7 C METHOD USED: Not available.
 FLAMMABLE LIMITS IN AIR BY VOLUME- LOWER: 1 UPPER: 10

EXTINGUISHING MEDIA:
 Foam, CO2, dry chemical, water fog.

SPECIAL FIREFIGHTING PROCEDURES
 Respiratory equipment should be worn to avoid inhalation of concentrated vapours.
 Water should not be used except as a fog to keep nearby containers cool.

UNUSUAL FIRE AND EXPLOSION HAZARDS
 Handle as a flammable liquid. Vapours form an explosive mixture in air between the
 upper and lower explosive limits, which, can be ignited by many sources such as
 pilot lights, open flames, electrical boxes and switches. Vapour may travel along
 the ground and flashback along vapour trail may occur.

FLAMMABILITY - T.D.G.R. CLASS:
 TDG CLASS 3

SENSITIVITY TO IMPACT: NO

AUTO-IGNITION TEMPERATURE:
 Not available

SENSITIVITY TO STATIC DISCHARGE: Yes

HAZARDOUS COMBUSTION PRODUCTS:
 Carbon Monoxide, Carbon Dioxide and Oxides of Nitrogen.

===== SECTION V - REACTIVITY DATA =====

CHEMICAL STABILITY: STABLE

CONDITIONS TO AVOID:
 Excessive heat, poor ventilation, corrosive atmospheres, excessive aging.

INCOMPATIBILITY (MATERIALS TO AVOID)
 Alkaline materials, strong acids and oxidizing agents.

HAZARDOUS DECOMPOSITION OR BYPRODUCTS: Not available.

HAZARDOUS POLYMERIZATION:
 Will not occur.

===== SECTION VI - TOXICOLOGICAL DATA =====

INHALATION HEALTH RISKS AND SYMPTOMS OF EXPOSURE

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May cause respiratory irritation, dizziness, breathing difficulty, headaches and loss of co-ordination.

SKIN AND EYE CONTACT HEALTH RISKS AND SYMPTOMS OF EXPOSURE

Eye Contact: May cause severe irritation, tearing, redness and blurred vision.

Skin Contact: May cause irritation.

SKIN ABSORPTION HEALTH RISKS AND SYMPTOMS OF EXPOSURE

May dry and defat skin causing cracks, irritation and dermatitis.

INGESTION HEALTH RISKS AND SYMPTOMS OF EXPOSURE

May cause gastrointestinal irritation, vomiting, nausea and diarrhea.

HEALTH HAZARDS (ACUTE AND CHRONIC)

Acute health hazards are as listed above. No chronic health hazards. Chronic: Overexposure to Carbon Black may cause heart and lung damage.

SENSITIZING CAPABILITY: Not available.

CARCINOGENICITY: NTP CARCINOGEN:No IARC MONOGRAPHS:Yes OSHA REGULATED:No

No carcinogenic effects have been found in animals or humans due to exposure to commercial Carbon Black. Carbon Black does contain trace amounts of strongly absorbed polynuclear aromatic compounds (PNA'S). Some PNA'S in the non-absorbed form have been found to be carcinogenic. Ethylbenzene has been classified by the IARC as a Group 2B substance on the basis of sufficient evidence for carcinogenicity in laboratory animals but inadequate evidence for cancer in humans. In a lifetime inhalation study, exposure to 250 mg/m³ titanium dioxide dust resulted in the development of lung tumors in rats. These tumors occurred only at dust levels that overwhelmed the animals' lung clearance mechanisms and were different from common human lung tumors in both type and location. The relevance of these findings to humans is unknown. The International Agency for Research on Cancer (IARC) has classified Titanium Dioxide as possibly carcinogenic to humans (Group 2B) based on inadequate evidence of carcinogenicity in humans and sufficient evidence of carcinogenicity in experimental animals.

TERATOGENICITY AND EMBRYOTOXICITY

High exposures to xylenes in some animal studies have been reported to cause health effects on the developing embryo/fetus. These effects were often at levels toxic to the mother. The significance of these findings to humans has not been determined.

REPRODUCTIVE TOXICITY

Not available.

MUTAGENICITY

Not available.

TOXICOLOGICALLY SYNERGISTIC PRODUCTS

None known.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE

Anesthesia, respiratory tract irritation, dermatitis, nausea, vomiting.

===== SECTION VII - PREVENTIVE MEASURES =====

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED

Eliminate ignition sources. Provide good ventilation or wear appropriate breathing apparatus. Absorb small spills with non-flammable absorbent. Contain spills by diking with non-flammable absorbent. Notify environmental agency.

WASTE DISPOSAL METHOD

Reclaim or dispose of through a licensed waste disposal company according to Federal, Provincial and local regulations.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING

Flammable. Store in a cool, dry, well ventilated area away from heat and ignition sources. Keep containers closed when not in use. Avoid breathing vapours or mist and prolonged or repeated contact with skin. Launder contaminated clothing prior to re-use. Use good personal hygiene. Product is a static accumulator. Transfer equipment should be grounded or bonded.

OTHER PRECAUTIONS: Smoking in the area where this material is used must be strictly prohibited.

RESPIRATORY PROTECTION

NIOSH approved for organic vapours and particulate matter.

VENTILATION

General mechanical ventilation or local exhaust should be suitable to keep vapour concentrations below TLV. Ventilation equipment must be explosion proof. Make up air should be supplied to balance air exhausted.

PROTECTIVE GLOVES

Solvent impervious e.g. Viton, Nitrile, PVC.

EYE PROTECTION

Chemical safety glasses, goggles or face shield.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT

Use impermeable aprons and protective clothing whenever possible to prevent skin contact.

WORK/HYGIENIC PRACTICES

Eye washes and safety showers in the workplace are recommended.

===== SECTION VIII - FIRST AID MEASURES =====

INHALATION OVEREXPOSURE: Move person to fresh air. If breathing stops, apply artificial respiration and seek immediate medical attention.

EYE CONTACT: Flush with water for at least 15 minutes. Seek medical attention.

SKIN CONTACT: Wash thoroughly with mild soap and water.

INGESTION: Do not induce vomiting. Aspiration of solvents in this product can cause inflammation of the lungs.

===== SECTION IX - PREPARATION =====

PREPARED BY: TECHNICAL DEPARTMENT

===== SECTION X - DISCLAIMER =====

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To the best of our knowledge, the information contained herein is accurate, obtained from sources believed by Cloverdale Paint Inc. to be accurate. No warranty concerning the accuracy of these sources is made and Cloverdale Paint Inc. will not be held liable for claims relating to use of this information or recommendations.

MATERIAL SAFETY DATA SHEET

This Material Safety Data Sheet (MSDS) is for welding consumables and related products and may be used to comply with OSHA's Hazard Communication standard, 29 CFR 1910.1200, and Superfund Amendments and Reauthorization Act (SARA) of 1986 Public Law 99-499. The OSHA standard must be consulted for specific requirements. This Safety Data Sheet complies with European Commission Directive 89/106/EEC, 91/155/EEC, ISO 11014-1 and ANSI Z400.1. This document is translated in several languages and available on our website at www.hobartbrothers.com, from your sales representative or by calling customer service at 1 (937) 332-4000.

SECTION 1 – IDENTIFICATION

Manufacturer/Supplier Name: HOBART BROTHERS COMPANY Telephone No: +1 (937) 332-4000
 Address: 101 TRADE SQUARE EAST, TROY, OH 45373 Emergency No: +1 (800) 424-9300
 Website: www.hobartbrothers.com

Product Type: SHIELDED METAL ARC WELDING (SMAW) ELECTRODES

GROUP A: Product For: CARBON STEEL
 AWS Specification: E6010, E6011, E6012, E6013, E6022, E7014, E7024-1

GROUP B: Product For: LOW HYDROGEN CARBON STEEL
 AWS Specification: E7016, E7018, E7018-1, E7018-M

GROUP C: Product For: LOW HYDROGEN, LOW ALLOY STEEL
 AWS Specification: E7018-A1, E7018-G, E8018-B2, E8018-B2L, E8018-B6, E8018-B8, E8018-C1, E8018-C2, E8018-C3, E8018-G, E9015-B9, E9018-B3, E9018-B3L, E9018-M, E10018-D2, E10018-M, E10518-M, E11018-M, E12018-M

GROUP D: Product For: HIGH STRENGTH CELLULOSE CARBON STEEL
 AWS Specification: E7010-P1, E8010-P1, E9010-G, E9010-P1



SECTION 2 – IDENTIFICATION OF HAZARDS

IMPORTANT - This section covers the hazardous materials from which this product is manufactured. The fumes and gases produced during welding with normal use of this product are also addressed in Section 8. The term "hazardous" in this section should be interpreted as a term required and defined in OSHA Hazard Communication Standard (29 CFR Part 1910.1200).

HAZARDOUS INGREDIENT	CAS	EINECS ^Γ	REGULATORY HAZARD CLASSIFICATION/DESIGNATION 67/548/EEC ^Δ	IARC ^E	NTP ^Z	OSHA ^H	65 ^Θ
ALUMINUM OXIDE	1344-28-1	215-691-6	None	---	---	---	---
CALCIUM CARBONATE	1317-65-3	215-279-6	None	---	---	---	---
CELLULOSE	9004-34-6	232-674-9	None	---	---	---	---
CHROMIUM	7440-47-3	231-157-5	O - R9; Carc 1 ^Θ - R45; Muta 2 - R46; Repr 3 - R62; T+ - R26; T - R24/25, R48/23; C - R35, R42/43; N - R50, R53 ^{ΣΣΣ}	1 ^{ΣΣ} , 3 ^Σ	K ^{ΣΣ}	X ^{ΣΣ}	X ^{ΣΣ}
FLUORSPAR	7789-75-5	232-188-7	None	---	---	---	---
IRON	7439-89-6	231-096-4	None	---	---	---	---
MAGNESIUM CARBONATE	546-93-0	208-915-9	None	---	---	---	---
MANGANESE	7439-96-5	231-105-1	Xn - R20/22 ^Y	---	---	---	---
MICA	12001-26-2	None	None	---	---	---	---
MOLYBDENUM	7439-98-7	231-107-2	Xn - R48/20/22; Xi - R36/37 ^X	---	---	---	---
NICKEL	7440-02-0	231-111-4	Carc 3 ^Θ - R40; T - R43, R48/23	1	K	X	X
POTASSIUM OXIDE	12136-45-7	235-227-6	None	---	---	---	---
SILICA	14808-60-7	238-878-4	Xn - R48/20, R40/20	1 ^W	K	X	X
(Amorphous Silica Fume)	69012-64-2	273-761-5	None	3	K	---	X
SILICON	7440-21-3	231-130-8	None	---	---	---	---
SODIUM OXIDE	1313-59-3	215-208-9	None	---	---	---	---
STRONTIUM CARBONATE	1633-05-2	216-643-7	None	---	---	---	---
TITANIUM DIOXIDE	13463-67-7	236-675-5	None	2B	---	---	---

Γ – European Inventory of Existing Chemical Substances Number Δ - European Union Directive 67/548/EEC – Annex 1 E – International Agency for Research on Cancer (1 – Human Carcinogen, 2A – Probably Carcinogenic to Humans, 2B – Possibly Carcinogenic to Humans, 3 – Unclassifiable as to Carcinogenicity in Humans, 4 Probably Not Carcinogenic to Humans) Z – US National Toxicology Program (K – Known Carcinogen, S – Suspected Carcinogen) H – OSHA Known Carcinogen List Θ – California Proposition 65 (X – On Proposition 65 list) --- Dashes indicate the ingredient is not listed with the IARC, NTP, OSHA or 65 Φ – Carcinogen, Mutagen or Reproductive Category per European Council Directive 67/548/EEC Annex I Σ – Metal and Chromium III Compounds ΣΣ – Chromium VI Compounds ΣΣΣ – Chromium (VI) Trioxide EU 67/548/EEC Classification/Designation Y – Manganese Dioxide EU 67/548/EEC Classification/Designation X – Molybdenum Trioxide EU 67/548/EEC Classification/Designation Ψ – Silica Crystalline α-Quartz

The following symbols correspond with the EU 67/548/EEC column above are in European Union Directive 67/548/EEC Annex 1 and EC 1272/2008 Annex VI – Table 3.2:

 Xn – Harmful	 Xi – Irritant	 O – Oxidizer	 C – Corrosive
 N – Dangerous for the Environment	 T – Toxic	 T+ – Extremely Toxic	

WARNING! - Avoid breathing welding fumes and gases, they may be dangerous to your health. Always use adequate ventilation. Always use appropriate personal protective equipment.

PRIMARY ROUTES OF ENTRY: Respiratory System, Eyes and/or Skin. ARC RAYS: The welding arc can injure eyes and burn skin.
 ELECTRIC SHOCK: Arc welding and associated processes can kill. See Section 8. FUMES AND GASES: Can be dangerous to your health.

Welding fumes and gases cannot be classified simply. The composition and quantity of both are dependent upon the metal being welded, the process, procedures and electrodes used. Most fume ingredients are present as complex oxides and compounds and not as pure metals. When the electrode is consumed, the fume and gas decomposition products generated are different in percent and form from the ingredients listed in Section 3. Decomposition products of normal operation include those originating from the volatilization, reaction or oxidation of the materials shown in this section, plus those from the base metal and coating, etc., as noted above. Monitor for the materials identified in the list within this section.
 Fumes from the use of this product may contain complex oxides or compounds of the following elements and molecules: amorphous silica fume, calcium oxide, chromium, fluorspar or fluorides, manganese, nickel, silica and strontium. Other reasonably expected constituents of the fume would also include complex oxides of iron, titanium, silicon and molybdenum. Gaseous reaction products may include carbon monoxide and carbon dioxide. Ozone and nitrogen oxides may be formed by the radiation from the

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arc. Other conditions which also influence the composition and quantity of the fumes and gases to which workers may be exposed include: coatings on the metal being welded (such as paint, plating or galvanizing), the number of welders and the volume of the work area, the quality and amount of ventilation, the position of the welder's head with respect to the fume plume, as well as the presence of contaminants in the atmosphere (such as chlorinated hydrocarbon vapors from cleaning and degreasing activities). One recommended way to determine the composition and quantity of fumes and gases to which workers are exposed is to take an air sample inside the welder's helmet if worn or in the worker's breathing zone. See ANSI/AWS F1.1, available from the "American Welding Society", P.O. Box 351040, Miami, FL 33135. Also, from AWS is F1.3 "Evaluating Contaminants in the Welding Environment - A Sampling Strategy Guide", which gives additional advice on sampling.

SECTION 3 - HAZARDOUS INGREDIENTS

CONTENT PERCENTAGE BY INGREDIENTS

INGREDIENT	CAS	EINECS	GROUP AND %WEIGHT				INGREDIENT	CAS	EINECS	GROUP AND %WEIGHT			
			A	B	C	D				A	B	C	D
ALUMINUM OXIDE	1344-28-1	215-691-6	<5	---	---	---	MOLYBDENUM	7439-98-7	231-107-2	---	---	<2	<1
CALCIUM CARBONATE	1317-65-3	215-279-6	<2	<2	---	---	NICKEL	7440-02-0	231-111-4	---	---	<5	<2
CELLULOSE	9004-34-6	232-674-9	<5	<5	<5	<5	POTASSIUM OXIDE	12136-45-7	235-227-6	<2	<2	<2	<2
CHROMIUM	7440-47-3	231-157-5	---	---	<9	---	SILICA	14808-60-7	238-878-4	<7	<8	<7	<7
FLUORSPAR	7789-75-5	232-188-7	---	1-12	4-15	---	(Amorphous Silica Fume)	69012-64-2	273-761-5	---	---	---	---
IRON	7439-89-6	231-096-4	70-90	60-80	60-90	70-90	SILICON	7440-21-3	231-130-8	---	<2	<5	<2
MAGNESIUM CARBONATE	546-93-0	208-915-9	<2	<5	<1	<1	SODIUM OXIDE	1313-59-3	215-208-9	<2	<2	<2	<2
MANGANESE	7439-96-5	231-105-1	1-5	1-5	1-5	1-5	STRONTIUM CARBONATE	1633-05-2	216-643-7	---	<2	<2	<2
MICA	12001-26-2	None	<5	---	---	---	TITANIUM DIOXIDE	13463-67-7	236-675-5	<14	<10	<5	<5

--- Dashes indicate the ingredient is not present within the group of products

SECTION 4 - FIRST AID MEASURES

INHALATION: If breathing is difficult provide fresh air and contact physician.

EYE/SKIN INJURIES: For radiation burns, see physician.

Section 11 of this MSDS covers the acute effects of overexposure to the various ingredients within the welding consumable. Section 8 of this MSDS lists the exposure limits and covers methods for protecting yourself and your co-workers.

SECTION 5 - FIRE AND EXPLOSION HAZARD DATA

Welding consumables applicable to this sheet as shipped are nonreactive, nonflammable, nonexplosive and essentially nonhazardous until welded. Welding arcs and sparks can ignite combustibles and flammable products. Unused welding consumables may remain hot for a period of time after completion of a welding process. See American National Standard (ANSI) Z49.1 for further general safety information on the use and handling of welding consumables and associated procedures.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Solid objects can be picked up and placed into a container. Wear proper personal protective equipment while handling. Do not discard as general trash.

SECTION 7 - HANDLING AND STORAGE

HANDLING: No specific requirements in the form supplied. Handle with care to avoid cuts. Wear gloves when handling welding consumables. Avoid exposure to dust. Do not ingest. Some individuals can develop an allergic reaction to certain materials. Retain all warning and product labels.

STORAGE: Keep separate from acids and strong bases to prevent possible chemical reactions.

SECTION 8 - EXPOSURE CONTROL AND PERSONAL PROTECTION

Read and understand the instructions and the labels on the packaging. Welding fumes do not have a specific OSHA PEL or ACGIH TLV. The OSHA PEL for Particulate – Not Otherwise Classified (PNOC) is 5 mg/m³ – Respirable Fraction, 15 mg/m³ – Total Dust. The ACGIH TLV for Particles – Not Otherwise Specified (PNOS) is 3 mg/m³ – Respirable Particles, 10 mg/m³ – Inhalable Particles. The individual complex compounds within the fume may have a lower OSHA PEL or ACGIH TLV than the OSHA Particulate – Not Otherwise Classified (PNOC) and ACGIH Particles – Not Otherwise Specified (PNOS). An Industrial Hygienist, the OSHA Permissible Exposure Limits for Air Contaminants (29 CFR 1910.1000), and the ACGIH Threshold Limit Values should be consulted to determine the specific fume constituents present and their respective exposure limits. European Union Occupational Exposure Limits (EU OEL) are listed with the most stringent limit among the EU member nations. All exposure limits are in milligrams per cubic meter (mg/m³).

INGREDIENT	CAS	EINECS	OSHA PEL	ACGIH TLV	EU OEL
ALUMINUM OXIDE##	1344-28-1	215-691-6	5 R*	1 R* {A4}	1.5 R*(Aerosol) - Germany; 2 - Poland
CALCIUM CARBONATE	1317-65-3	215-279-6	5 R*, 5 (as CaO)	3 R*, 2 (as CaO)	3 R* (Aerosol) – Switzerland; 10 I* (Aerosol) – UK
CELLULOSE	9004-34-6	232-674-9	5 R*	10	3 R* (Aerosol) – Switzerland; 10 I* (Aerosol) – UK
CHROMIUM#	7440-47-3	231-157-5	1 (Metal) 0.5 (Cr II & Cr III Cpnds) 0.005 (Cr VI Cpnds)	0.5 (Metal) {A4} 0.5 (Cr III Cpnds) {A4} 0.05 (Cr VI Sol Cpnds) {A1} 0.01 (Cr VI Insol Cpnds) {A1}	0.1 I* (Aerosol) - Switzerland 0.005; 0.01*** - Denmark 0.005 (Total Aerosol); 0.015***{Total Aerosol} - Sweden
FLUORSPAR	7789-75-5	232-188-7	2.5 (as F)	2.5 (as F) {A4}	1 I* (Aerosol as F); 4*** (Aerosol as F) - Germany
IRON+	7439-89-6	231-096-4	5 R*	5 R* (Fe ₂ O ₃) {A4}	3 R* (Aerosol as Fe ₂ O ₃) – Switzerland 7*** (as Fe ₂ O ₃) - Denmark
MAGNESIUM CARBONATE	546-93-0	208-915-9	5 R*	3 R*	3 R* (Aerosol) – Switzerland; 10 I* (Aerosol) – UK
MANGANESE#	7439-96-5	231-105-1	5 CL** (Fume) 1, 3 STEL*** ■	0.1 I* {A4} ♦ 0.02 R* ♦♦	0.02 R*(Aerosol); 0.16 R*** (Aerosol) - Germany 0.2 I*(Aerosol) - Germany 0.2; 0.4*** - Denmark
MICA	12001-26-2	None	3 R*	3 R*	0.8 R*(Aerosol); 10 I* (Aerosol) – UK
MOLYBDENUM	7439-98-7	231-107-2	5 R*	3 R*; 10 I* (Ele and Insol) 0.5 R* (Sol Cpnds) {A3}	3 R* - Spain; 4; 10*** - Poland
NICKEL#	7440-02-0	231-111-4	1 (Metal) 1 (Sol Cpnds) 1 (Insol Cpnds)	1.5 I* (Ele) {A5} 0.1 I* (Sol Cpnds) {A4} 0.2 I* (Insol Cpnds) {A1}	0.05; 0.1*** - Denmark
POTASSIUM OXIDE	12136-45-7	235-227-6	5 R*	3 R*	1.5 R*(Dust NOS - Aerosol) - Germany
SILICA++	14808-60-7	238-878-4	0.1 R*	0.025 R* {A2}	0.1 (Fused, Respirable Dust) - Denmark 0.2*** (Fused, Respirable Dust) - Denmark 2 I*; 4 I*** - Denmark
(Amorphous Silica Fume)	69012-64-2	273-761-5	0.8	3 R*	4 R* (Aerosol); 10 I* (Aerosol) - Denmark
SILICON+	7440-21-3	231-130-8	5 R*	3 R*	1.5 R*(Dust NOS - Aerosol) - Germany
SODIUM OXIDE	1313-59-3	215-208-9	5 R*	3 R*	1.5 R* (as Dust - NOS) - Germany
STRONTIUM CARBONATE+	1633-05-2	216-643-7	5 R*	3 R*	1.5 R* - Germany
TITANIUM DIOXIDE	13463-67-7	236-675-5	15 (Dust)	10 {A4}	

R* - Respirable Fraction R*** - Respirable Fraction - Short Term Exposure Limit I* - Inhalable Fraction I*** - Inhalable Fraction - Short Term Exposure Limit ** - Ceiling Limit *** - Short Term Exposure Limit + - As a nuisance particulate covered under "Particulates Not Otherwise Regulated" by OSHA or "Particulates Not Otherwise Classified" by ACGIH ++ - Crystalline silica is bound within the product as it exists in the package. However, research indicates silica is present in welding fume in the amorphous (noncrystalline) form # - Reportable material under Section 313 of SARA ## - Reportable material under Section 313 of SARA only in fibrous form ■ - NIOSH REL TWA and STEL ♦ - Limit of 0.1 mg/m³ is for Inhalable Mn in 2013 by ACGIH ♦♦ - Limit of 0.02 mg/m³ is for Respirable Mn in 2013 by ACGIH Ele - Element Sol - Soluble Insol - Insoluble Inorg - Inorganic Cpnds - Compounds NOS - Not Otherwise Specified {A1} - Confirmed Human Carcinogen per ACGIH {A2} - Suspected



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Human Carcinogen per ACGIH {A3} - Confirmed Animal Carcinogen with Unknown Relevance to Humans per ACGIH {A4} - Not Classifiable as a Human Carcinogen per ACGIH {A5} - Not Suspected as a Human Carcinogen per ACGIH (noncrystalline) form

VENTILATION: Use enough ventilation, local exhaust at the arc or both to keep the fumes and gases below the PEL/TLV/OELs in the worker's breathing zone and the general area. Train the welder to keep his head out of the fumes.

RESPIRATORY PROTECTION: Use NIOSH approved or equivalent fume respirator or air supplied respirator when welding in confined space or where local exhaust or ventilation does not keep exposure below the regulatory limits.

EYE PROTECTION: Wear helmet or use face shield with filter lens. As a rule of thumb begin with Shade Number 14. Adjust if needed by selecting the next lighter and/or darker shade number. Provide protective screens and flash goggles, if necessary, to shield others from the weld arc flash.

PROTECTIVE CLOTHING: Wear hand, head and body protection which help to prevent injury from radiation, sparks and electrical shock. See ANSI Z49.1. At a minimum this includes welder's gloves and a protective face shield, and may include arm protectors, aprons, hats, shoulder protection as well as dark nonsynthetic clothing. Train the welder not to touch live electrical parts and to insulate himself from work and ground.

PROCEDURE FOR CLEANUP OF SPILLS OR LEAKS: Not applicable

SPECIAL PRECAUTIONS (IMPORTANT): Maintain exposure below the PEL/TLV/OEL. Use industrial hygiene monitoring to ensure that your use of this material does not create exposures which exceed PEL/TLV/OEL. Always use exhaust ventilation. Refer to the following sources for important additional information: American National Standard (ANSI) Z49.1; Safety in Welding and Cutting published by the American Welding Society, P.O. Box 351040, Miami, FL 33135 and OSHA Publication 2206 (29 CFR 1910), U.S. Government Printing Office, Washington, DC 20402.

SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES

Welding consumables applicable to this sheet as shipped are nonreactive, nonflammable, nonexplosive and essentially nonhazardous until welded.

PHYSICAL STATE: Cored Wire

ODOR: N/A

COLOR: Gray

FORM: Coated Rod

SECTION 10 – STABILITY AND REACTIVITY

GENERAL: Welding consumables applicable to this sheet are solid and nonvolatile as shipped. This product is only intended for use per the welding parameters it was designed for. When this product is used for welding, hazardous fumes may be created. Other factors to consider include the base metal, base metal preparation and base metal coatings. All of these factors can contribute to the fume and gases generated during welding. The amount of fume varies with the welding parameters.

STABILITY: This product is stable under normal conditions.

REACTIVITY: Contact with acids or strong bases may cause generation of gas.

SECTION 11 – TOXICOLOGICAL INFORMATION

SHORT-TERM (ACUTE) OVEREXPOSURE EFFECTS: **Welding Fumes** - May result in discomfort such as dizziness, nausea or dryness or irritation of nose, throat or eyes.

Aluminum Oxide - Irritation of the respiratory system. **Calcium Oxide** - Dust or fumes may cause irritation of the respiratory system, skin and eyes. **Chromium** - Inhalation of fume with chromium (VI) compounds can cause irritation of the respiratory tract, lung damage and asthma-like symptoms. Swallowing chromium (VI) salts can cause severe injury or death. Dust on skin can form ulcers. Eyes may be burned by chromium (VI) compounds. Allergic reactions may occur in some people. **Fluorides** - Fluoride compounds evolved may cause skin and eye burns, pulmonary edema and bronchitis. **Iron, Iron Oxide** - None are known. Treat as nuisance dust or fume. **Magnesium, Magnesium Oxide** - Overexposure to the oxide may cause metal fume fever characterized by metallic taste, tightness of chest and fever. Symptoms may last 24 to 48 hours following overexposure. **Manganese** - Metal fume fever characterized by chills, fever, upset stomach, vomiting, irritation of the throat and aching of body. Recovery is generally complete within 48 hours of the overexposure. **Mica** - Dust may cause irritation of the respiratory system, skin and eyes. **Molybdenum** - Irritation of the eyes, nose and throat. **Nickel, Nickel Compounds** - Metallic taste, nausea, tightness in chest, metal fume fever, allergic reaction. **Potassium Oxide** - Dust or fumes may cause irritation of the respiratory system, skin and eyes. **Silica (Amorphous)** - Dust and fumes may cause irritation of the respiratory system, skin and eyes. **Sodium Oxide** - Dust or fumes may cause irritation of the respiratory system, skin and eyes. **Strontium Compounds** - Strontium salts are generally non-toxic and are normally present in the human body. In large oral doses, they may cause gastrointestinal disorders, vomiting and diarrhea. **Titanium Dioxide** - Irritation of respiratory system.

LONG-TERM (CHRONIC) OVEREXPOSURE EFFECTS: **Welding Fumes** - Excess levels may cause bronchial asthma, lung fibrosis, pneumoconiosis or "siderosis." **Aluminum Oxide** - Pulmonary fibrosis and emphysema. **Calcium Oxide** - Prolonged overexposure may cause ulceration of the skin and perforation of the nasal septum, dermatitis and pneumonia. **Chromium** - Ulceration and perforation of nasal septum. Respiratory irritation may occur with symptoms resembling asthma. Studies have shown that chromate production workers exposed to hexavalent chromium compounds have an excess of lung cancers. Chromium (VI) compounds are more readily absorbed through the skin than chromium (III) compounds. Good practice requires the reduction of employee exposure to chromium (III) and (VI) compounds. **Fluorides** - Serious bone erosion (Osteoporosis) and mottling of teeth. **Iron, Iron Oxide Fumes** - Can cause siderosis (deposits of iron in lungs) which some researchers believe may affect pulmonary function. Lungs will clear in time when exposure to iron and its compounds ceases. Iron and magnetite (Fe₃O₄) are not regarded as fibrogenic materials. **Magnesium, Magnesium Oxide** - No adverse long term health effects have been reported in the literature. **Manganese** - Long-term overexposure to manganese compounds may affect the central nervous system. Symptoms may be similar to Parkinson's disease and can include slowness, changes in handwriting, gait impairment, muscle spasms and cramps and less commonly, tremor and behavioral changes. Employees who are overexposed to manganese compounds should be seen by a physician for early detection of neurologic problems. Overexposure to manganese and manganese compounds above safe exposure limits can cause irreversible damage to the central nervous system, including the brain, symptoms of which may include slurred speech, lethargy, tremor, muscular weakness, psychological disturbances and spastic gait. **Mica** - Prolonged overexposure may cause scarring of the lungs and pneumoconiosis characterized by cough, shortness of breath, weakness and weight loss. **Molybdenum** - Prolonged overexposure may result in loss of appetite, weight loss, loss of muscle coordination, difficulty in breathing and anemia. **Nickel, Nickel Compounds** - Lung fibrosis or pneumoconiosis. Studies of nickel refinery workers indicated a higher incidence of lung and nasal cancers. **Potassium Oxide** - Prolonged overexposure may cause ulceration of the skin and perforation of the nasal septum, dermatitis and pneumonia. **Silica (Amorphous)** - Research indicates that silica is present in welding fume in the amorphous form. Long term overexposure may cause pneumoconiosis. Noncrystalline forms of silica (amorphous silica) are considered to have little fibrotic potential. **Sodium Oxide** - Prolonged overexposure may cause ulceration of the skin and perforation of the nasal septum, dermatitis and pneumonia. **Strontium Compounds** - Strontium at high doses is known to concentrate in bone. Major signs of chronic toxicity, which involve the skeleton, have been labeled as "strontium rickets". **Titanium Dioxide** - Pulmonary irritation and slight fibrosis.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Persons with pre-existing impaired lung functions (asthma-like conditions). Persons with a pacemaker should not go near welding and cutting operations until they have consulted their doctor and obtained information from the manufacturer of the device. Respirators are to be worn only after being medically cleared by your company-designated physician.

EMERGENCY AND FIRST AID PROCEDURES: Call for medical aid. Employ first aid techniques recommended by the American Red Cross. If irritation or flash burns develop after exposure, consult a physician.

CARCINOGENICITY: Chromium VI compounds, nickel compounds and silica (crystalline quartz) are classified as IARC Group 1 and NTP Group K carcinogens. Titanium dioxide compounds are classified as IARC Group 2B carcinogens. Chromium VI compounds, nickel compounds, silica (crystalline quartz) and welding fumes must be considered as carcinogens under OSHA (29 CFR 1910.1200).

CALIFORNIA PROPOSITION 65: For Group B, C and D products: WARNING: This product contains or produces a chemical known to the State of California to cause cancer and birth defects (or other reproductive harm). (California Health & Safety Code Section 25249.5 et seq.) For Group A products: WARNING: This product, when used for welding or cutting, produces fumes or gases which contain chemicals known to the State of California to cause birth defects and, in some cases, cancer. (California Health & Safety Code Section 25249.5 et seq.)

EMERGENCY AND FIRST AID PROCEDURES: Call for medical aid. Employ first aid techniques recommended by the American Red Cross. If irritation or flash burns develop after exposure, consult a physician.

CARCINOGENICITY: Chromium VI compounds, nickel compounds and silica (crystalline quartz) are classified as IARC Group 1 and NTP Group K carcinogens. Titanium dioxide compounds are classified as IARC Group 2B carcinogens. Chromium VI compounds, nickel compounds, silica (crystalline quartz) and welding fumes must be considered as carcinogens under OSHA (29 CFR 1910.1200).

CALIFORNIA PROPOSITION 65: For Group B, C and D products: WARNING: This product contains or produces a chemical known to the State of California to cause cancer and birth defects (or other reproductive harm). (California Health & Safety Code Section 25249.5 et seq.) For Group A products: WARNING: This product, when used for welding or cutting, produces fumes or gases which contain chemicals known to the State of California to cause birth defects and, in some cases, cancer. (California Health & Safety Code Section 25249.5 et seq.)

SECTION 12 – ECOLOGICAL INFORMATION

Welding processes can release fumes directly to the environment. Welding wire can degrade if left outside and unprotected. Residues from welding consumables and processes could degrade and accumulate in the soil and groundwater.

SECTION 13 – DISPOSAL CONSIDERATIONS

Use recycling procedures if available. Discard any product, residue, packaging, disposable container or liner in an environmentally acceptable manner, in full compliance with federal, state and local regulations.

SECTION 14 – TRANSPORT INFORMATION

No international regulations or restrictions are applicable. No special precautions are necessary.



MATERIAL SAFETY DATA SHEET

SECTION 15 – REGULATORY INFORMATION

Read and understand the manufacturer’s instructions, your employer’s safety practices and the health and safety instructions on the label and the material safety data sheet. Observe all local and federal rules and regulations. Take all necessary precautions to protect yourself and others.

United States EPA Toxic Substance Control Act: All constituents of these products are on the TSCA inventory list or are excluded from listing.

CERCLA/SARA TITLE III: Reportable Quantities (RQs) and/or Threshold Planning Quantities (TPQs):

Ingredient name	RQ(lb)	TPQ (lb)
Products on this MSDS are a solid solution in the form of a solid article.	--	--

Spills or releases resulting in the loss of any ingredient at or above its RQ require immediate notification to the National Response Center and to your Local Emergency Planning Committee.

Section 311 Hazard Class

As shipped: Immediate	In use: Immediate delayed
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EPCRA/SARA TITLE III 313 TOXIC CHEMICALS: The following metallic components are listed as SARA 313 “Toxic Chemicals” and potentially subject to annual SARA 312 reporting: Chromium, Manganese and Nickel. See Section 3 for weight percentage.

CANADIAN WHMIS CLASSIFICATION: Class D; Division 2, Subdivision A

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA): All constituents of these products are on the Domestic Substance List (DSL).

SECTION 16 – OTHER INFORMATION

The following Risk and Safety Phrase Texts and Hazard Statements correspond with the columns labeled - EU 67/548/EEC within Section 2 of this material safety data sheet. Take appropriate precautions and protective measures to eliminate or limit the associated hazard.

EU Directive 67/548/EEC - Risk Phrase Texts

R9 – Explosive when mixed with combustible material	R46 – May cause heritable genetic damage
R20/22 – Harmful by inhalation and if swallowed	R48/20 – Harmful: danger of serious damage to health by prolonged exposure through inhalation
R24/25 – Toxic in contact with skin and if swallowed	R48/20/22 – Harmful: danger of serious damage to health by prolonged exposure through inhalation and if swallowed
R26 – Very toxic by inhalation	R48/23 – Toxic: danger of serious damage to health by prolonged exposure through inhalation
R35 – Causes severe burns	R50 – Very toxic to aquatic organisms
R36/37 – Irritating to eyes and respiratory system	R53 – May cause long-term adverse effects in the aquatic environment
R40 – Limited evidence of a carcinogenic effect	R62 – Possible risk of impaired fertility
R40/20 – Harmful: possible risk of irreversible effects through inhalation	
R42/43 – May cause sensitization by inhalation and skin contact	
R43 – May cause sensitization by skin contact	
R45 – May cause cancer	

For additional information please refer to the following sources:

- USA: American National Standard (ANSI) Z49.1 “Safety in Welding and Cutting”, ANSI/American Welding Society (AWS) F1.5 “Methods for Sampling and Analyzing Gases from Welding and Allied Processes”, ANSI/AWS F1.1 “Method for Sampling Airborne Particles Generated by Welding and Allied Processes”, AWSF3.2M/F3.2 “Ventilation Guide for Weld Fume”, American Welding Society, 550 North Le Jeune Road, Miami, Florida, 33135. Safety and Health Fact Sheets available from AWS at www.aws.org.
- OSHA Publication 2206 (29 C.F.R. 1910), U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954.
- Threshold Limit Values and Biological Exposure Indices, American Conference of Governmental Hygienists (ACGIH), 6500 Glenway Ave., Cincinnati, Ohio 45211, USA.
- NFPA 51B “Standard for Fire Prevention During Welding, Cutting and Other Hot Work” published by the National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169.
- UK: WMA Publication 236 and 237, “Hazards from Welding Fume”, “The arc welder at work, some general aspects of health and safety”.
- Canada: CSA Standard CAN/CSA-W117.2-01 “Safety in Welding, Cutting and Allied Processes”.

Hobart Brothers Company strongly recommends the users of this product study this MSDS, the product label information and become aware of all hazards associated with welding. Hobart Brothers Company believes this data to be accurate and to reflect qualified expert opinion regarding current research. However, Hobart Brothers Company cannot make any expressed or implied warranty as to this information.

**SCS1001
Silicone Construction Sealant****1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION**

Manufacturer Name: Momentive performance material
260 Hudson River Rd
Waterford NY 12188

Revised: 07/11/2012
Prepared by Product Regulatory Compliance
CHEMTREC 1-800-424-9300
MSDS Contact 1-888-443-9466
Information 4information@momentive.com

Chemical Family/Use: Sealant

Formula: Mixture

HMIS

Health: 0 Flammability: 1 Reactivity: 0

NFPA

Health: 1 Flammability: 1 Reactivity: 0

2. HAZARDS IDENTIFICATION**WHMIS CLASSIFICATION**

Very Toxic Material Causing Other Toxic Effects
Toxic Material Causing Other Toxic Effects

EMERGENCY OVERVIEW

WARNING! Irritating to eyes, respiratory system and skin. May be harmful if swallowed. Adverse liver and reproductive effects reported in animals.

Form: Solid

Color: Colorless

Odor: Acetic acid.

Potential Health Effects**INGESTION**

May be harmful if swallowed.

SKIN

Uncured product contact will irritate lips, gums and tongue. Skin irritation is possible after contact with the uncured product.

**SCS1001
Silicone Construction Sealant****INHALATION**

Applies in uncured state.

EYES

Eye irritation is possible after contact with the uncured product.

MEDICAL CONDITIONS AGGRAVATED

None known.

SUBCHRONIC (TARGET ORGAN)

Liver; Reproductive hazard.

CHRONIC EFFECTS / CARCINOGENICITY

This product or one of its ingredients present at 0.1% or more is NOT listed as a carcinogen or suspected carcinogen by NTP, IARC, or OSHA.

ROUTES OF EXPOSURE

Dermal

3. COMPOSITION/INFORMATION ON INGREDIENTS**HAZARDOUS COMPONENT(S)**

PRODUCT COMPOSITION	CAS-NO.	WGT. %
Methyltriacetoxysilane	4253-34-3	1 - 5 %
Octamethylcyclotetrasiloxane	556-67-2	1 - 5 %

Note(s): See Section 15 for HMIRC information.

4. FIRST AID MEASURES**INGESTION**

If swallowed, do NOT induce vomiting. Give a glass of water.

SKIN

To clean from skin, remove completely with a dry cloth or paper towel, before washing with detergent and water. If skin irritation occurs: Get medical advice/attention.

**SCS1001
Silicone Construction Sealant****INHALATION**

If inhaled, remove to fresh air. If not breathing give artificial respiration using a barrier device. If breathing is difficult give oxygen. Get medical attention.

EYES

In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

NOTE TO PHYSICIAN

Treatment is symptomatic and supportive.

5. FIRE-FIGHTING MEASURES

FLASH POINT:	> 93 °C; 199 °F
METHOD	Estimated
Autoignition Temperature:	<u>None</u>
FLAMMABLE LIMITS LEL:	Not applicable
FLAMMABLE LIMITS UEL:	Not applicable

SENSITIVITY TO MECHANICAL IMPACT: No

SENSITIVITY TO STATIC DISCHARGE

Sensitivity to static discharge is not expected.

EXTINGUISHING MEDIA

All standard extinguishing agents are suitable.

SPECIAL FIRE FIGHTING PROCEDURES

Firefighters must wear NIOSH/MSHA approved positive pressure self-contained breathing apparatus with full face mask and full protective clothing.

6. ACCIDENTAL RELEASE MEASURES**ACTION TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED**

Wipe, scrape or soak up in an inert material and put in a container for disposal. Wash walking surfaces with detergent and water to reduce slipping hazard. Wear proper protective equipment as specified in the protective equipment section.

**SCS1001
Silicone Construction Sealant****7. HANDLING AND STORAGE****PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE**

Product releases acetic acid during application and curing. Use only in well-ventilated areas. Avoid contact with skin and eyes. Remove contact lenses before using sealant. Do not handle lenses until all sealant has been cleaned from the finger and hands. May generate formaldehyde at temperatures greater than 150 C(300 F). See Section 8 of the MSDS for Personal Protective Equipment.

STORAGE

Keep out of the reach of children. Keep container tightly closed.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION**ENGINEERING CONTROLS**

Eye wash facilities and emergency shower must be available when handling this product.

RESPIRATORY PROTECTION

If exposure limits are exceeded or respiratory irritation is experienced, NIOSH/MSHA approved respiratory protection should be worn. Supplied air respirators may be required for non-routine or emergency situations. Respiratory protection must be provided in accordance with OSHA regulations (see 29CFR 1910.134).

PROTECTIVE GLOVES

Chemical resistant gloves

EYE AND FACE PROTECTION

Safety glasses with side shields

OTHER PROTECTIVE EQUIPMENT

Wear suitable protective clothing and eye/face protection.

Exposure Guidelines

Component	CAS-No.	Source	Value
Octamethylcyclotetrasiloxane	556-67-2	Z_INTL_OEL, REL	5 ppm

Consult local authorities for acceptable provincial values.

Absence of values indicates none found

PEL - OSHA Permissible Exposure Limit; TLV - ACGIH Threshold Limit Value; TWA - Time Weighted Average

OSHA revoked the Final Rule Limits of January 19, 1989 in response to the 11th Circuit Court of Appeals decision (AFL-CIO v. OSHA) effective June 30, 1993. See 29 CFR 1910.1000 (58 FR 35338).

**SCS1001
Silicone Construction Sealant****9. PHYSICAL AND CHEMICAL PROPERTIES**

BOILING POINT (°C) :	<u>No data available.</u>
VAPOR PRESSURE (20 C) (MM HG):	<u>No data available.</u>
VAPOR DENSITY (AIR=1):	<u>No data available.</u>
FREEZING POINT:	<u>No data available.</u>
PHYSICAL STATE:	Solid
ODOR:	Acetic acid.
ODOR THRESHOLD:	No data available.
COLOR:	Colorless
EVAPORATION RATE (BUTYL ACETATE=1):	<u>No data available.</u>
SPECIFIC GRAVITY:	<u>No data available.</u>
DENSITY:	ca. 1.06 g/cm ³
pH:	<u>No data available.</u>
VOLATILE ORGANIC CONTENT:	1.5 %(m)
SOLUBILITY IN WATER (20 C):	Insoluble
SOLUBILITY IN ORGANIC SOLVENT (STATE SOLVENT):	Soluble in toluene
Partition Coefficient: n-octanol/water:	No data available.

10. STABILITY AND REACTIVITY**Stability**

Stable

HAZARDOUS POLYMERIZATION.

Hazardous polymerisation does not occur.

HAZARDOUS THERMAL DECOMPOSITION / COMBUSTION PRODUCTS

Carbon dioxide; Acetic acid.; Silicon dioxide.; Formaldehyde.; This product contains methylpolysiloxanes which will likely generate formaldehyde at approximately 300 degrees Fahrenheit (150°C) and above, in atmospheres which contain oxygen. Formaldehyde is a skin and respiratory sensitizer, eye and throat irritant, acute toxicant, and has been classified by the National Toxicology Program as a known human carcinogen. A MSDS for formaldehyde is available from Momentive. See Section 11 for additional information on formaldehyde.

**SCS1001
Silicone Construction Sealant**

INCOMPATIBLE MATERIALS

None

CONDITIONS TO AVOID

None known.

11. TOXICOLOGICAL INFORMATION**ACUTE ORAL**

Remarks: No data available.

Repeated dose toxicity

None

ACUTE DERMAL

Remarks: No data available.

ACUTE INHALATION

Remarks: None known.

OTHER

Octamethylcyclotetrasiloxane

Ingestion: Rodents given large doses via oral gavages of Octamethylcyclotetrasiloxane (1600 mg/kg day, 14 days) developed increased liver weights relative to unexposed control animals due to hepatocellular hyperplasia (increased number of liver cells which appear normal) as well as hypertrophy (increased cell size).

Inhalation: In inhalation studies, laboratory rodents exposed to Octamethylcyclotetrasiloxane (300 ppm five days week, 90 days) developed increased liver weights in female animals relative to unexposed control animals. When the exposure was stopped, liver weights returned to normal. Microscopic examination of the liver cells did not show any evidence of pathology. Inhalation studies utilizing laboratory rabbits and guinea pigs showed no effects on liver weights. Inhalation exposures typical of industrial usage (5-10 ppm) showed no toxic effects in rodents.

Range finding reproductive studies were conducted (whole body inhalation, 70 days prior to mating, through mating, gestation and lactation) with Octamethylcyclotetrasiloxane (D4). Rats were exposed to 70 and 700 ppm. In the 700 ppm group, there was a statistically significant reduction in mean litter size and in implantation sites. No D4 related clinical signs were observed in the pups and no exposure related pathological findings were found.

Interim results from a two generation reproductive study in rats exposed to 500 and 700 ppm D4 (whole body inhalation, 70 days prior to mating, through mating, gestation and lactation) resulted in a statistically significant decrease in live mean litter size as well as extended periods of off-spring delivery (dystocia). These results were not observed at the 70 and 300ppm dosing levels.

Preliminary results from an ongoing 24-month combined chronic/oncogenicity study in rats exposed to

**SCS1001
Silicone Construction Sealant**

10, 30, 150, or 700 ppm D4 showed test-article related effects in the kidney (male and female) and uterus of rats exposed for 12 to 24 months. These effects include increased kidney weight and severity of chronic nephropathy, increased uterine weight, increased incidence of endometrial cell hyperplasia, and an increased incidence of endometrial adenomas. All of these effects are limited to the 700 ppm exposure group.

These results have been shown to be rat-specific. Further studies are ongoing.

In developmental toxicity studies, rats and rabbits were exposed to Octamethylcyclotetrasiloxane at concentrations up to 700 ppm and 500 ppm respectively. No teratogenic effects (birth defects) were observed in either study.

GENETIC TOXICITY IN VITRO

None

GENETIC TOXICITY IN VIVO

None

SENSITIZATION

No data available.

SKIN IRRITATION.

No data available.

EYE IRRITATION

No data available.

MUTAGENICITY

No data available.

OTHER EFFECTS OF OVEREXPOSURE

Acetic acid released during curing.

12. ECOLOGICAL INFORMATION**ECOTOXICITY**

No data available.

DISTRIBUTION

No data available.

CHEMICAL FATE

No data available.

**SCS1001
Silicone Construction Sealant****13. DISPOSAL CONSIDERATIONS****DISPOSAL METHODS**

Disposal should be made in accordance with federal, state and local regulations.

14. TRANSPORT INFORMATION**Further Information:**

This product is not regarded as dangerous goods according to the national and international regulations on the transport of dangerous goods.

15. REGULATORY INFORMATION**Inventories**

Australia Inventory of Chemical Substances (AICS)	y (positive listing)
Canada DSL Inventory	q (quantity restricted)
EU list of existing chemical substances	y (positive listing)
Japan Inventory of Existing & New Chemical Substances (ENCS)	y (positive listing)
China Inventory of Existing Chemical Substances	y (positive listing)
Korea Existing Chemicals Inventory (KECI)	y (positive listing)
Canada NDSL Inventory	n (Negative listing)
Philippines Inventory of Chemicals and Chemical Substances (PICCS)	y (positive listing)
TSCA list	y (positive listing)
New Zealand Inventory of Chemicals	y (positive listing)
Japan Industrial Safety & Health Law (ISHL) Listing	n (Negative listing)

For inventories that are marked as quantity restricted or special cases, please contact Momentive.

Canadian Regulatory Information**WHMIS CLASSIFICATION**

Very Toxic Material Causing Other Toxic Effects, Toxic Material Causing Other Toxic Effects

**SCS1001
Silicone Construction Sealant**

CPR Compliance

This product has been classified according to the hazard criteria of the CPR and the MSDS contains all of the information required by the CPR.

US Regulatory Information**SARA (311,312) HAZARD CLASS**

Acute Health Hazard

CALIFORNIA PROPOSITION 65

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION**OTHER**

These data are offered in good faith as typical values and not as product specifications. No warranty, either expressed or implied, is made. The recommended industrial hygiene and safe handling procedures are believed to be generally applicable. However, each user should review these recommendations in the specific context of the intended use and determine whether they are appropriate.

,C = ceiling limit NEGL = negligible
EST = estimated NF = none found
NA = not applicable UNKN = unknown
NE = none established REC = recommended
ND = none determined V = recommended by vendor
SKN = skin TS = trade secret
R = recommended MST = mist
NT = not tested STEL = short term exposure limit
ppm = parts per million ppb = parts per billion

By-product= reaction by-product, TSCA inventory status not required under 40 CFR part 720.30(h-2).



Code: S100-WSF
Date: 1 JAN 2001
Revised: 1 JAN 2013
Printed: 1 JAN 2013

WOLVERINE JOINING TECHNOLOGIES, LLC.

MATERIAL SAFETY DATA SHEET

Product: SILVABRITE 100 WATER SOLUBLE PASTE FLUX

SECTION 1: CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Common Name : SILVABRITE 100 WATER SOLUBLE PASTE FLUX
Chemical Name : CHEMICAL MIXTURE
Formula : CHEMICAL MIXTURE
Product CAS No.: CHEMICAL MIXTURE
Product Use : Welding/Brazing/Soldering

Supplier : WOLVERINE JOINING TECHNOLOGIES, LLC.
Address : 235 KILVERT STREET
City, St, Zip : WARWICK, RI 02886
Phone : 1-401-739-9550

FOR CHEMICAL EMERGENCY CALL CHEMTREC (24 HOURS):
1-800-424-9300 (US, Canada, Puerto Rico, Virgin Islands)
1-703-527-3887 (Outside Above Area)

SECTION 2: COMPOSITION/INFORMATION ON INGREDIENTS

INGREDIENT	CAS NO.	% Wt.
AMMONIUM CHLORIDE	12125-02-9	1-10
GLYCERINE	56-81-5	15-40
HYDROBROMIC ACID	10035-10-6	3-10

INGREDIENT NOTES

NOTE: The percentage by weight values reported for the ingredients in this product represent approximate formulation values. See Section 8 for Exposure Limits and Section 11 for Toxicological Information.

SECTION 3: HAZARDS IDENTIFICATION

TARGET ORGAN

STATEMENT: WARNING: May cause irritation to skin, eyes, and respiratory system. May be harmful if swallowed or inhaled.

ROUTES OF ENTRY

Eyes? YES Skin? YES Inhalation? YES Ingestion? YES

POTENTIAL HEALTH EFFECTS

EYE CONTACT: May cause irritation to eyes

SKIN CONTACT: Dermatitis possible may cause irritation to skin. Existing disorders may be aggravated.

INHALATION: May cause irritation to respiratory system. Existing lung disorders may be aggravated.

INGESTION: May cause damage to digestive system. Avoid contact to mucous membranes.

CARCINOGENICITY

NTP? NO IARC? NO OSHA? NO

CHRONIC HEALTH

HAZARDS: May cause irritation to skin, eyes, and respiratory system.

SECTION 4: FIRST AID MEASURES

EYE CONTACT: Immediately flush eyes with plenty of water for at least 15 minutes. Hold eyelids open during this flushing with water. Call a physician immediately.

SKIN CONTACT: Flush area with water while removing contaminated clothing and shoes. Follow by washing with soap and large amounts of water until no evidence of chemical remains (15-20 minutes). Get medical attention if needed.

INHALATION: Remove to fresh air. If not breathing, give artificial Respiration, Call a physician immediately.

INGESTION: If swallowed, "DO NOT INDUCE VOMITING", give 3-4 glasses of water. Do not give anything by mouth to an unconscious or convulsing person. Get immediate medical attention.

NOTE: See Section 8 for Exposure Limits, Section 11 for Toxicological Information and Section 12 for Ecological Information.

SECTION 5: FIRE-FIGHTING MEASURES

Flash Point: Not Applicable
Auto-Ignition: Not Applicable
LEL: Not Applicable
UEL: Not Applicable

NFPA HAZARD CLASSIFICATION

Health: 2 Flammable: 0 Reactivity: 0

HMIS HAZARD CLASSIFICATION

Health: 2 Flammable: 0 Reactivity: 0 Special: 0

EXTINGUISHING MEDIA

Use water spray, dry chemical, alcohol foam, or carbon dioxide. Use water to keep fire-exposed containers cool.

SPECIAL FIRE FIGHTING PROCEDURES

Wear NIOSH/MSHA approved positive-pressure self-contained breathing apparatus and protective clothing as specified in 29 CFR 1910.156. May release ammonia and HCL fumes. Toxic metal halide fumes may be Produced.

UNUSUAL FIRE AND EXPLOSION HAZARDS

Not a fire or explosion hazard. Product will emit toxic and corrosive gases on thermal decomposition.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Wearing full protective clothing, control spill source, contain by diking and ventilate area. Soak up spill using an absorbent. Scoop into container. Notification of the National Response Center (800/424-8802) may be required. Refer to EPA, DOT and applicable state and local regulations for current response information.

It is recommended that each user establish a spill prevention, control and countermeasure plan (SPCC). Such plan should include procedures applicable to proper storage, control and clean-up of spills, including reuse or disposal as appropriate (see Section 13: Disposal Considerations).

****NOTE**** In the event of an accidental release of this material, the above procedures should be followed. Additionally, proper exposure controls and personal protection equipment should be used (see Section 8: Exposure Control/Personal Protection), and disposal of the material should be in accordance with Section 13: Disposal Considerations.

SECTION 7: HANDLING AND STORAGE

Wash thoroughly after handling.

Keep container closed.

Store in a cool, dry location away from incompatible materials.

Avoid breathing any dust, mist or fumes resulting from the use of this product. Existing lung disorders will have increased toxic susceptibility.

Avoid contact with eyes, skin and clothing.

Use with adequate ventilation.

Provide a safety shower and eyewash close to where this material is being used.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

EXPOSURE LIMITS

INGREDIENT	PEL-OSHA	TLV-ACGIH
AMMONIUM CHLORIDE CAS NO.: 121125-02-9	-	10 mg/m ³ (Fume) 20 mg/m ³ (STEL)
GLYCERINE CAS NO.: 56-81-5	15 mg/m ³ (Total) 5 mg/m ³ (Resp)	10 mg/m ³ (Mist)
HYDROBROMIC ACID CAS NO.: 10035-10-6	10 mg/m ³	10 mg/m ³

Unless otherwise noted, all values are reported as 8-hour Time-Weighted Averages (TWAs) and total dust (particulates only). All ACGIH TLVs refer to the 2000 Standards. All OSHA PELs refer to 29 CFR Part 1910 Air Contaminants: Final Rule, January 19, 1989.

RESPIRATORY PROTECTION

If there is a potential to exceed the TLV, NIOSH approved respiratory protection is required. For airborne levels up to 10 times the appropriate TLV's, an air purifying acid gas cartridge respirator would be suitable. If used in a manner that generates a mist, a dust/mist cartridge as well as the acid gas cartridge would be necessary. Above 10 times the TLV, an air supplied full facepiece respirator would be required. If respiratory protection is used, follow all the requirements for respirator programs set forth in the OSHA regulations (29 CFR 1910.139).

VENTILATION

General; local exhaust ventilation as necessary to control any air contaminants to within their PELs or TLVs during the use of this product.

PROTECTIVE EQUIPMENT

Chemical goggles.

Rubber or neoprene gloves.

Body protection as necessary to prevent skin contact.

Refer to ANSI/ASC Z49.1-94 (Safety in Welding, Cutting and Allied Processes), published by the American Welding Society, for further information on the selection of personal protective equipment.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Opaque white to yellowish paste

Odor: Odorless

Boiling Point: 220 F

Specific Gravity (H₂O=1): 1.014 - 1.33

Melting Point: Not Established

Vapor Pressure (mm Hg): Not Applicable

Vapor Density (Air=1): Not Applicable

Evaporation Rate: < 1

% Solubility In Water: 100 %

pH: Not Determined

SECTION 10: STABILITY AND REACTIVITY

Stability: Generally considered stable.

Avoid: None

INCOMPATIBILITY (Materials to Avoid)

Strong nitric, sulfuric acids, cyanides.

Combustible materials.

HAZARDOUS DECOMPOSITION OR BY-PRODUCTS

Thermal decomposition may produce hydrogen chloride, hydrogen bromide and ammonia.

Polymerization: Polymerization is not expected to occur.

Avoid: None.

SECTION 11: TOXICOLOGICAL INFORMATION

CHEMICAL NAME	% Wt. LD50	LC50
No data available		

NOTE: See Sections 3, 8 and 12 for additional information.

SECTION 12: ECOLOGICAL INFORMATION

ECOTOXICITY

No data available.

ENVIRONMENTAL FATE

No data available.

SECTION 13: DISPOSAL CONSIDERATIONS

US EPA Waste Number: None

Federal, state and local disposal laws and regulations will determine the proper waste disposal/recycling/reclamation procedure. All waste material should be reviewed to determine the applicable hazards (testing may be necessary). Any waste solution with a pH of ≤ 2 or ≥ 12.5 is considered a hazardous waste under EPA hazardous waste regulations. Disposal requirements are dependent on the hazard classification and will vary by location and the type of disposal selected.

****NOTE**** Chemical additions, processing or otherwise altering this material may make the waste management information presented above incomplete, inaccurate or otherwise inappropriate.

As local regulations may vary; all waste must be disposed/recycled/reclaimed in accordance with federal, state, and local environmental control regulations.

SECTION 14: TRANSPORT INFORMATION

INTERNATIONAL

Non Regulated

UNITED STATES

EPA Waste Number: None

DOT Classification: Non Regulated

DOT Proper Shipping Name: Non Regulated

Packing Group: NA

CANADA

PIN Number: NA

TDG Class: NA

EC

DGL: Not Determined

SECTION 15: REGULATORY INFORMATION

US FEDERAL REGULATIONS

TSCA: IN TSCA

SARA 311 AND 312 HAZARD CATEGORIES

IMMEDIATE (Acute) Health Hazard: NA

DELAYED (Chronic) Health Hazard: NA

FIRE Hazard: NO

REACTIVITY Hazard: NO

Sudden Release of PRESSURE: NO

SARA SECTION 313 NOTIFICATION

This product does not contain a toxic chemical (or chemicals) subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

CHEMICAL NAME	CAS Number	% Wt.
None		

OZONE DEPLETING SUBSTANCES (ODS)

This product neither contains nor is manufactured with an ozone depleting substance subject to the labeling requirements of the Clean Air Act Amendments 1990 and 40 CFR Part 82.

VOLATILE ORGANIC COMPOUNDS (VOC)

Not Determined

US STATE REGULATIONS

PENNSYLVANIA: This product contains ammonium chloride and hydrobromic acid, which are listed in PA Code Title 34, Hazardous Substance List.

VOLATILE ORGANIC COMPOUND (CARB): Not Determined

CANADIAN REGULATIONS

"This product has been classified in accordance with the hazard criteria of the *Controlled Products Regulations* and the MSDS contains all the information required by the *Controlled Products Regulations*."

DSL/NDSL: NA

WHMIS Classification: Uncontrolled Product

EUROPEAN REGULATIONS

EINECS: Not Determined

OTHER REGULATIONS

MITI (Japan): NA

AICS (Australia): NA

SECTION 16: OTHER INFORMATION

REVISIONS

Revision Number: 7

PREPARATION INFORMATION

Prepared By: Wolverine Joining Technologies, and Wolverine Tube Inc.
Corporate Environmental, Health and Safety Group.

Phone Number/Address: See Section 1

This Material Data Sheet is offered pursuant to OSHA's Hazard Communication Standard (29 CFR 1910.1200). Other government regulations must be reviewed for applicability to these products. The information in this Material Safety Data Sheet should be provided to all who will use, handle, store, transport, or otherwise be exposed to this product. This information has been prepared for the guidance of plant engineering, operations, and management and for persons working with or handling these products. The information presented in the MSDS is premised upon proper handling and anticipated uses and is for the material without chemical additions/alterations. We believe this information to be reliable and up-to-date as of the date of publication, but make no warranty that it is. Additionally, if this Material Safety Data Sheet is more than three years old, please contact the supplier at the phone number listed in Section 1 to make certain that this sheet is the most current. Copyright Wolverine Joining Technologies, LLC. License granted to make unlimited copies for internal use only.

Silver-Copper-Phosphorus Alloys

Safety Data Sheet

1. Product and Company Identification

Manufacturers and Suppliers

Lucas Milhaupt, Inc.
5656 South Pennsylvania Avenue
Cudahy, WI 53110 USA
Telephone: 414-769-6000
www.lucasmilhaupt.com

Lucas-Milhaupt Toronto
290 Carlingview Drive
Rexdale, ON M9W 5G1 Canada
Telephone: 416-675-1860
www.lucasmilhaupt.com

Emergency Phone Number

Chemtrec: 800-424-9300

Issue Date: 05/01/2013

Product Name: Silver-Copper-Phosphorus Alloys

SDS Number: 77

Product Codes: 15-996; 21-015; 24-863; 67-150; 71-017; 71-020; 71-050; 71-052;
71-060; 71-061; 71-062; 71-063; 71-100; 71-150; 71-180; 71-181

2. Composition/Information on Ingredients

Ingredient Name	CAS Number	%
Copper	7440-50-8	<1-93
Phosphorus	7723-14-0	<0.1-8
Silver	7440-22-4	<1-99.8

3. Hazards Identification

Primary Routes(s) of Entry

Ingestion; inhalation

Eye Hazards

Eye contact with these products in finely-divided forms may cause irritation, conjunctivitis, ulceration of the cornea, and/or argyria, a permanent gray discoloration of the eyes, skin, mucous membranes, and respiratory tract.

Skin Hazards

Skin contact with these products, particularly in finely-divided forms, may cause irritation, argyria, discoloration, and/or contact dermatitis.

Ingestion Hazards

Ingestion of these products in finely-divided forms may cause nausea, vomiting, and gastrointestinal irritation.

Inhalation Hazards

Inhalation of the components of these products is not known to present a significant risk to health when used according to instructions and with appropriate protective measures (see Section #8). Inhalation of component elements has been reported to cause one or more of the following symptoms and effects upon excessively high or prolonged exposure:

COPPER: Acute exposure may cause respiratory tract irritation, fever, muscle ache, chills, cough, weakness, and a metallic taste. Chronic exposure may damage the liver, kidney, spleen, pancreas, and brain.

PHOSPHORUS: The red form of phosphorus is stable and relatively non-toxic at room temperature. When heated in the presence of air, it is converted to phosphorus pentoxide, which is corrosive and irritating to the eyes, nose, throat, and mucous membranes.

SILVER: Chronic exposure via inhalation may cause argyria.

4. First Aid Measures

Eye

Flush affected areas with water for at least fifteen minutes. Seek medical assistance if necessary.

Skin

Remove contaminated clothing. Wash affected area with large quantities of water for at least five minutes. Seek medical attention if necessary. Launder or dry-clean clothing before reuse.

Ingestion

If subject is conscious, induce vomiting. If unconscious or convulsive, seek immediate medical assistance.

Inhalation

If signs and symptoms of toxicity are observed, remove subject from area, administer oxygen, and seek medical attention. Keep the subject warm and at rest. Perform artificial respiration if breathing has stopped.

Note to Physician

None of the components are acutely toxic by ingestion, nor are they absorbed through the skin. Prolonged skin contact may cause dermatitis and/or argyria.

5. Fire Fighting Measures

Flash Point: Not Applicable (N/Appl.)

Autoignition Point: N/Appl.

Flammability Class: N/Appl.

Lower Explosive Limit: N/Appl.

Upper Explosive Limit: N/Appl.

Fire and Explosion Hazards

In finely-divided form, these products may ignite when exposed to flame or by reaction with incompatible materials (see Section #10). If present in a fire or explosion, they may emit fumes of the constituent metals, metal oxides, and/or phosphorus pentoxide.

Extinguishing Media

Use dry chemical. Do not use water.

Fire Fighting Instructions

If fighting a fire in which these products are present, wear a self-contained

breathing apparatus with full facepiece operated in pressure-demand or other positive pressure mode.

6. Accidental Release Measures

If a finely-divided form of product is spilled, clean up spillage so as to minimize dispersion of dust. Wet sweeping or vacuuming using HEPA filtration are recommended.

7. Handling and Storage

Handling Precautions

No special handling precautions are required.

Storage Precautions

Do not store in proximity to incompatible materials (see Section #10).

Work/Hygienic Practices

To minimize ingestion, wash hands and face before eating, drinking, applying cosmetics, or using tobacco.

8. Exposure Controls/Personal Protection

Engineering Controls

Use appropriate ventilation (e.g., dilution, local exhaust) adequate to maintain concentrations of all components to within their applicable standards.

Eye/Face Protection

Wear eye protection adequate to prevent eye contact with finely-divided product and eye injury if products are used with a flame. Plastic-frame spectacles with side shields and filter lenses (shade #3/#4) are recommended.

Skin Protection

Wear appropriate protective gloves and clothing to prevent skin injury if these products are used with a flame and/or for prolonged or repeated contact with finely-divided forms of product. Avoid flammable fabrics.

Respiratory Protection

If an exposure level exceeds an applicable exposure standard, use a NIOSH-approved respirator having a configuration (type of facepiece, filter media, assigned protection factor, etc.) appropriate to the concentration of the contaminant(s) generated. For guidance on selection and use of respirators, consult American National Standard Z88.2 (ANSI, New York, NY 10036 USA).

Ingredient(s) - Exposure Limits

Copper

ACGIH TLVs: 0.2 mg/m³ TWA (fume); 1 mg/m³ TWA (dusts and mists)

OSHA PELs: 0.1 mg/m³ TWA (fume); 1 mg/m³ TWA (dusts and mists)

Phosphorus

No applicable ACGIH TLV(s)

No applicable OSHA PEL(s)

Silver

ACGIH TLV: 0.1 mg/m³ TWA (metal)

OSHA PEL: 0.01 mg/m³ TWA

9. Physical and Chemical Properties

Appearance: light-copper metals, various forms.
Odor: no odor
Chemical Type: alloy
Physical State: solid
Melting Point: >1190oF./645oC.
Specific Gravity: 7.8-10.5
Solubility: insoluble

Other physical properties (odor threshold, evaporation rate, vapor pressure, vapor density, evaporation rate, boiling point, freezing point, pH, oil-water distribution coefficient, percent volatiles, percent VOCs) are not applicable to these products.

10. Stability and Reactivity

Stability: stable
Hazardous Polymerization: will not occur

Conditions to Avoid

Silver and copper can form unstable acetylides if in contact with acetylene gas.

Incompatible Materials

Strong oxidizers; ammonia; azides; nitric acid; ethylene imine; sulfuric acid; chlorine trifluoride; inorganic and organic peroxides; peroxyformic acid; oxalic acid; bromates, chlorates, and iodates of alkali and alkali earth metals; tartaric acid; 1-bromo-2-propyne; permonosulfuric acid; alkaline hydroxides.

Hazardous Decomposition Products

Heating to elevated temperatures may liberate metal/metal oxide fumes and/or phosphorus pentoxide.

11. Toxicological Information

Carcinogenicity

These products contain no chemicals classified as potential or demonstrated carcinogens by IARC, NTP, or OSHA.

Conditions Aggravated by Overexposure

Pre-existing pulmonary diseases (e.g., bronchitis, asthma) may be aggravated by inhalation overexposure, particularly as fume. Chronic overexposure by inhalation and/or ingestion may aggravate pre-existing diseases of the liver, kidneys, gastrointestinal system, and nervous system.

Ingredient(s) - Toxicological Data

Copper

LD50: No data available LC50: No data available

Phosphorus

LD50: >15,000 mg/kg (oral/rat) LC50: 4,300 mg/m³ for 1 hr (rat)

Silver

LD50: >2,000 mg/kg (oral/rat) LC50: No data available

12. Ecological Information

In their intended manner of use, these products should not be released into the

environment, and adverse effects on ecosystems are not anticipated under recommended conditions of use, storage, and disposal.

13. Disposal Considerations

Dispose of unused or unusable product in accordance with applicable Federal, State/Provincial, and local regulations.

14. Transport Information

These products are not Hazardous Substances or Dangerous Goods per USDOT, TDG (Canada), IATA, or IMO regulations.

15. Regulatory Information

TSCA Information

All components of these products are listed on the EPA's TSCA registry.

SARA Hazard Classes

Acute Health Hazard; Chronic Health Hazard

Ingredient(s) - U.S. Regulatory Information

These products contain the following components subject to the requirements of Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986 and of 40CFR, Part 372:

1. Copper (CASRN 7440-50-8)
2. Phosphorus (CASRN 7723-14-0)
3. Silver (CASRN 7440-22-4)

Canadian Regulatory Information

All components of these products are listed on either the Domestic Substances List (DSL) or the Nondomestic Substances List (NDSL).

WHMIS Class(es) and Division(s): none applicable

Components on Ingredients Disclosure List:

1. Copper, elemental (CASRN 7440-50-8)
2. Phosphorus (CASRN 7723-14-0)
3. Silver, elemental (CASRN 7440-22-4)

16. Other Information

HMIS Ratings

Health - 2* Flammability - 1 Physical Hazard - 0 PPE - see Note

Note: Lucas-Milhaupt, Inc. and Lucas-Milhaupt Toronto recommend use of protective eyewear and gloves (Personal Protection Index "B") as standard PPE. HMIS recommends that its ratings be used only in conjunction with a fully implemented HMIS program, and that specific PPE codes be created by the user, who is familiar with the actual conditions under which the product is used. We cannot anticipate every condition of the product's use, and it is the user's responsibility to evaluate the hazards pertinent to its specific operations, and to determine the specific PPE required.

NFPA Ratings

Health - 2 Flammability - 1 Reactivity - 0

Revision Information

This MSDS supersedes a previous MSDS dated 05/10/2010.

Disclaimer

Although reasonable care has been taken in the preparation of this document, we extend no warranties and make no representations as to the accuracy or completeness of the information contained therein, and assume no responsibility regarding the suitability of this information for the user's intended purposes or for the consequences of its use. Each individual should make a determination as to the suitability of the information for their particular purpose(s).

Lucas Milhaupt, Inc.

Lucas-Milhaupt Toronto

SILVER METAL MATERIAL SAFETY DATA SHEET

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product Identity: Silver Metal.

NOTE: In the form in which it is sold this product is not regulated. This MSDS is provided for information purposes only.

Manufacturer:

Teck Metals Ltd.
Trail Operations
Trail, British Columbia
V1R 4L8

Emergency Telephone: 250-364-4214

Supplier:

Teck Metals Ltd.
#1700 – 11 King Street West
Toronto, Ontario
M5H 4C7

MSDS Preparer:

Teck Metals Ltd.
Suite 3300 - 550 Burrard Street
Vancouver, British Columbia
V6C 0B3

Date of MSDS Last Review: January 23, 2013.

Date of MSDS Last Edit: January 23, 2013.

Product Use: Silver is used in the manufacture of photographic film, coins, electronics, tableware, mirrors, jewelry, ornaments, special batteries and vessels and equipment used to manufacture medicinal chemicals, process foods and beverages, and handle organic acids; for electroplating; as a catalyst in hydrogenation and oxidation processes, and as an ingredient in dental alloys.

SECTION 2. COMPOSITION / INFORMATION ON INGREDIENTS

Ingredient	Approximate Percent by Weight	CAS Number	Occupational Exposure Limits (OELs)	LD ₅₀ / LC ₅₀ Species and Route
Silver	99.99%	7440-22-4	OSHA PEL 0.01 mg/m ³ NIOSH REL 0.01 mg/m ³ ACGIH TLV 0.1 mg/m ³	LD ₅₀ , mouse, oral >10,000 mg/kg LD ₅₀ , rat, oral >5,000 mg/kg

NOTE: OELs for individual jurisdictions may differ from OSHA PELs. Check with local authorities for the applicable OELs in your jurisdiction. OSHA - Occupational Safety and Health Administration; ACGIH - American Conference of Governmental Industrial Hygienists; NIOSH - National Institute for Occupational Safety and Health. OEL – Occupational Exposure Limit, PEL – Permissible Exposure Limit, TLV – Threshold Limit Value, REL – Recommended Exposure Limit.

Trade Names and Synonyms: Argentum; TADANAC® Silver; C.I. 77820.

SECTION 3. HAZARDS IDENTIFICATION

Emergency Overview: A lustrous white metal that does not burn in bulk but may form explosive mixtures if dispersed in air as a fine powder. This product is relatively non-toxic and poses little immediate hazard to the health of emergency response personnel or to the environment in an emergency situation.

Potential Health Effects: Metallic silver is relatively non-toxic to humans. This product may cause mild local irritation to eyes, nose, throat and upper airways, particularly if the product is heated to the point of fuming. Prolonged exposure to silver dust may cause a bluish or grayish pigmentation to the skin, eyes and mucous membranes. Silver is not listed as a carcinogen by OSHA, NTP, IARC, ACGIH or the EU (see Toxicological Information, Section 11).

Potential Environmental Effects: In the form in which this product is sold, it has low bioavailability and does not pose any significant environmental risks. Releases of the product to water and soil should, nevertheless, be prevented (see Ecological Information, Section 12).

EU GHS CLP Classification: Silver metal is not classified.

SECTION 4. FIRST AID MEASURES

Eye Contact: Do not allow victim to rub eye(s). Let the eye(s) water naturally for a few minutes. If particle/dust does not dislodge, flush with lukewarm, gently flowing water for 5 minutes or until particle/dust is removed, while holding eyelid(s) open. If irritation persists, immediately obtain medical attention. DO NOT attempt to manually remove anything stuck to the eye.

Skin Contact: No health effects expected. If irritation does occur, flush with lukewarm, gently flowing water for 5 minutes. If irritation persists, obtain medical advice.

Inhalation: If symptoms are experienced remove source of contamination or move victim from exposure area to fresh air immediately and obtain medical advice.

Ingestion: If swallowed, no specific intervention is indicated as this material is not likely to be hazardous by ingestion. However, if irritation or discomfort occurs, obtain medical advice.

SECTION 5. FIRE FIGHTING MEASURES

Fire and Explosion Hazards: Massive metal is difficult to ignite and is not considered a serious fire hazard. Finely-divided silver metal dust or powder may form flammable or explosive dust clouds when dispersed in the air at high concentrations and exposed to heat, flame, or other sources of ignition. Explosions may also occur upon contact with certain incompatible materials (see Stability and Reactivity, Section 10).

Extinguishing Media: Use any means of extinction appropriate for surrounding fire conditions such as water spray, carbon dioxide, dry chemical, or foam. Do not use direct water streams on fires where molten metal is present.

Fire Fighting: Fire fighters should be fully trained and wear full protective clothing including an approved, self-contained breathing apparatus which supplies a positive air pressure within a full face-piece mask.

Flashpoint and Method: Not Applicable.

Upper and Lower Flammable Limit: Not Applicable.

Autoignition Temperature: Not Applicable.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Procedures for Cleanup: Control source of spillage if possible to do so safely. Clean up spilled material immediately, observing precautions in Section 8, Personal Protection. Molten metal should be allowed to cool and harden before cleanup. Once solidified wear gloves, pick up and return to process. Powder or dust should be cleaned up by carefully sweeping. Return uncontaminated spilled material to the process if possible. Place contaminated material in clean, dry, suitably labelled containers for later recovery in view of the economic value of silver. Treat or dispose of waste material in accordance with all local, regional, and national requirements.

Personal Precautions: Protective clothing, gloves, and a respirator are recommended for persons responding to an accidental release, especially of molten silver metal. Close-fitting safety goggles may be necessary in some circumstances to prevent eye contact with dust or fume. Where molten metal is involved, heat-resistant gloves and suitable clothing for protection from hot-metal splash should be worn.

Environmental Precautions: Silver metal has relatively low bioavailability and is not considered to pose immediate ecological risks. However, good management practices should always be applied in the storage and use of silver and its compounds. Releases of the product to water and soil should be prevented.

SECTION 7. HANDLING AND STORAGE

Store silver in a secure, covered area away from incompatible materials. Solid metal suspected of containing moisture should be THOROUGHLY DRIED before being added to a molten bath. Otherwise, entrained moisture could expand explosively and spatter molten metal out of the bath. Always practice good personal hygiene. Refrain from eating, drinking, or smoking in work areas. Thoroughly wash hands before eating, drinking, or smoking in appropriate, designated areas. No special packaging materials are required.

EU GHS CLP Precautionary Statements: Silver metal is not classified.

SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Protective Clothing: Gloves and coveralls or other work clothing are recommended to prevent prolonged or repeated direct skin contact when silver is processed. Appropriate eye protection should be worn where fume or dust is generated. Where hot or molten metal is handled, heat-resistant gloves, goggles or face-shield, and clothing to protect from hot metal splash should be worn. Safety type boots are recommended.

Ventilation: Use adequate local or general ventilation to maintain the concentration of silver fumes in the working environment well below recommended occupational exposure limits. Supply sufficient replacement air to make up for air removed by the exhaust system. Local exhaust is recommended for melting, casting, grinding and polishing, etching, or use of powders.

Respirators: Where silver dust or fumes are generated and cannot be controlled to within acceptable levels by engineering means, use appropriate NIOSH-approved respiratory protection equipment (a 42CFR84 Class N, R or P-95 particulate filter cartridge or better).

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Ductile lustrous white metal	Odour: None	Physical State: Solid	pH: Not Applicable
Vapour Pressure: Negligible @ 20°C	Vapour Density: Not Applicable	Boiling Point/Range: 2212°C	Melting Point/Range: 961°C
Specific Gravity: 10.49	Evaporation Rate: Not Applicable	Coefficient of Water/Oil Distribution: Not Applicable	Odour Threshold: None
Solubility: Insoluble in water			

SECTION 10. STABILITY AND REACTIVITY

Stability & Reactivity: Massive metal is stable and not considered reactive under normal temperatures and pressures. Hazardous polymerization or runaway reactions will not occur. Ozone, sulfur, and hydrogen sulfide blacken silver. Most silver salts are light sensitive.

Incompatibilities: Silver reacts with acetylene, acetylene compounds and ammonia to form explosive and shock sensitive compounds. Contact with strong hydrogen peroxide solutions will cause violent decomposition of the peroxide, releasing oxygen gas and increasing the fire and explosion potential. Silver is incompatible with bromine azide, chlorine trifluoride, ethyleneimine, oxalic and tartaric acids and with nitric acid in the presence of ethanol.

Hazardous Decomposition Products: High temperature operations such as oxy-acetylene cutting, electric arc welding or overheating a molten bath will generate silver oxide fume. The particle size of metal fumes is largely within the respirable size range, which increases the likelihood of inhalation and deposition of the fume within the body.

SECTION 11. TOXICOLOGICAL INFORMATION

General: Solid silver presents few health hazards. Repeated long-term exposure to silver dust can cause permanent blue-grey staining of eyes, nose, mouth, throat, and skin.

Acute:

Skin/Eyes: Direct contact may cause mild local skin or eye irritation. There have been limited reports of allergic contact dermatitis following exposure to powdered silver, silver solutions, and dental amalgams.

Inhalation: Inhalation of silver fume or dust may be irritating to mucous membranes and the upper respiratory tract. Extremely high exposures have caused lung damage with pulmonary edema.

Ingestion: Ingestion of silver compounds may cause irritation of the stomach. However, ingestion is not a typical route of occupational exposure.

Chronic:

Prolonged exposure to silver dust may cause a bluish or greyish pigmentation to the skin, eyes and mucous membranes. This occurs slowly and may take years to develop. Once present, it does not go away and, in the most severe cases, may be quite disfiguring but is not considered to be a toxic effect. Silver is not listed as a human carcinogen by the Occupational Safety and

Health Administration (OSHA), the National Toxicology Program (NTP), the International Agency for Research on Cancer (IARC), the American Conference of Governmental Industrial Hygienists (ACGIH) or the European Union (EU).

SECTION 12. ECOLOGICAL INFORMATION

Silver metal is relatively insoluble, and therefore poses minimal ecological risks. However, its processing, use or extended exposure in aquatic and terrestrial environments may result in conversion of the metal to more bioavailable forms. In particular, silver compounds can be highly toxic to aquatic organisms.

SECTION 13. DISPOSAL CONSIDERATIONS

In view of the economic value of silver metal, every effort should be made to recover and reuse all spilled material. If material cannot be returned to process or recovered for its economic value, dispose of only in accordance with applicable regulations.

SECTION 14. TRANSPORT INFORMATION

No special shipping or transportation requirements.

SECTION 15. REGULATORY INFORMATION

U.S.:

Listed on TSCA Inventory Yes

Hazardous Under Hazard Communication Standard Yes (due to OSHA PEL for silver)

CERCLA Section 103 Hazardous Substance Yes RQ 1,000lbs. (454 kg.)*
*reporting not required if the diameter of the metal pieces released is equal to or exceeds 100 micrometers (0.004 inches)

EPCRA Section 302 Extremely Hazardous Substance No

EPCRA Section 311/312 Hazard Categories No Hazard Categories Apply

EPCRA Section 313 Toxic Release Inventory: Silver - CAS Number 7440-22-4
Percent by Weight 99.99%

CANADIAN:

Listed on Domestic Substances List: Yes

WHMIS Classification Not applicable. Silver is not a controlled product under WHMIS. This Material Safety Data Sheet is provided for information purposes only.

EUROPEAN UNION:

Listed on the European Inventory of Existing
Commercial Chemical Substances (EINECS): Yes

EU GHS CLP Classification: Silver metal is not classified.

SECTION 16. OTHER INFORMATION

The information in this Material Safety Data Sheet is based on the following references:

- American Conference of Governmental Industrial Hygienists, 2004, Documentation of the Threshold Limit Values and Biological Indices, 7th Edition plus updates.
- American Conference of Governmental Industrial Hygienists, Guide to Occupational Exposure Values - 2012.
- American Conference of Governmental Industrial Hygienists, 2012, Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices.
- Bretherick's Handbook of Reactive Chemical Hazards, 20th Anniversary Edition. (P. G. Urban Ed.) 1995.
- Canadian Centre for Occupational Health and Safety (CCOHS) CHEMINFO Chemical Substance Data Base.
- Commission de la santé et la sécurité du travail, Service du Répertoire toxicologique, – Argent Métal.
- European Economic Community, Commission Directives 91/155/EEC and 67/548/EEC.
- Industry Canada, SOR/88-66, Controlled Products Regulations, as amended.

- Merck & Co., Inc., 2001, The Merck Index, An Encyclopedia of Chemicals, Drugs, and Biologicals, 13th Edition.
- National Library of Medicine, National Toxicology Information Program, Hazardous Substance Data Bank (on-line version).
- Patty's Toxicology, 5th Edition, 2001: E. Bingham, B. Cofrssen & C.H. Powell, Ed.
- U.S. Dept. of Health and Human Services, National Institute for Occupational Safety and Health, NIOSH Pocket Guide to Chemical Hazards (on-line version).
- U.S. EPA, Prevention, Pesticides, & Toxic Substances, Reregistration Eligibility Decision (RED) for Silver, Revised July 1993.
- U.S. Occupational Safety and Health Administration, 1989, Code of Federal Regulations, Title 29, Part 1910.

Notice to Reader

Although reasonable precautions have been taken in the preparation of the data contained herein, it is offered solely for your information, consideration and investigation. Teck Metals Ltd. extends no warranty and assumes no responsibility for the accuracy of the content and expressly disclaims all liability for reliance thereon. This material safety data sheet provides guidelines for the safe handling and processing of this product; it does not and cannot advise on all possible situations. Therefore, your specific use of this product should be evaluated to determine if additional precautions are required. Individuals exposed to this product should read and understand this information and be provided pertinent training prior to working with this product.

Sodium Metal

MSDS # 682.00

Section 1: Product and Company Identification**Sodium Metal****Synonyms/General Names:** Natrium**Product Use:** For educational use only**Manufacturer:** Columbus Chemical Industries, Inc., Columbus, WI 53925.**24 Hour Emergency Information Telephone Numbers****CHEMTREC (USA): 800-424-9300****CANUTEC (Canada): 613-424-6666**

Scholar Chemistry; 5100 W. Henrietta Rd, Rochester, NY 14586; (866) 260-0501; www.Scholarchemistry.com

Section 2: Hazards Identification

Silvery-white metal cubes, sticks or lumps, no odor

WARNING! Flammable solid, dangerous when wet. Flammable solid, keep away from all ignition sources.

Contact with water produces flammable gas. Corrosive

Target organs: None available

HMIS (0 to 4)

Health	2
Fire Hazard	3
Reactivity	3

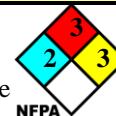
This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Section 3: Composition / Information on Ingredients

Sodium (7440-23-5), >99%

Section 4: First Aid Measures**Always seek professional medical attention after first aid measures are provided.****Eyes:** Immediately flush eyes with excess water for 15 minutes, lifting lower and upper eyelids occasionally.**Skin:** Immediately flush skin with excess water for 15 minutes while removing contaminated clothing.**Ingestion:** Call Poison Control immediately. Rinse mouth with cold water. Give victim 1-2 tbs of activated charcoal mixed with 8 oz water.**Inhalation:** Remove to fresh air. If not breathing, give artificial respiration.**Section 5: Fire Fighting Measures**Flammable solid. When heated to decomposition, emits acrid fumes of NaO₂.**Protective equipment and precautions for firefighters:** Do Not Use carbon dioxide, foam, water or halogenated extinguishing agents. Use class D extinguisher or smother with soda ash, dry sand, dry clay, dry sodium chloride or dry graphite. Firefighters should wear full fire fighting turn-out gear and respiratory protection (SCBA).

Material is not sensitive to mechanical impact or static discharge.

**Section 6: Accidental Release Measures**

Use personal protection recommended in Section 8. Isolate the hazard area and deny entry to unnecessary and unprotected personnel. Remove all ignition sources and ventilate area. Sweep up spill and place material in a dry container and cover completely with pure mineral oil for disposal.

See Section 13 for disposal information.

Section 7: Handling and Storage**Red****Handling:** Use with adequate ventilation and do not breathe dust or vapor. Avoid contact with skins, eyes, or clothing. Wash hands thoroughly after handling.**Storage:** Store in Flammable Area [Red Storage] with other flammable materials and away from any strong oxidizers. Store in a dedicated flammables cabinet. Store in a cool, dry, well-ventilated, locked store room away from incompatible materials. Keep sodium metal immersed in mineral oil.**Section 8: Exposure Controls / Personal Protection**

Use ventilation to keep airborne concentrations below exposure limits. Have approved eyewash facility, safety shower, and fire extinguishers readily available. Wear chemical splash goggles and chemical resistant clothing such as gloves and aprons. Wash hands thoroughly after handling material and before eating or drinking. Use NIOSH-approved respirator with a dust cartridge.

Exposure guidelines: Sodium: OSHA PEL: N/A and ACGIH TLV: N/A, STEL: N/A.

Section 9: Physical and Chemical Properties

Molecular formula	Na.	Appearance	Silvery-white metal cubes, or lumps.
Molecular weight	22.99.	Odor	No odor.
Specific Gravity	0.97 g/mL @ 20°C.	Odor Threshold	N/A.
Vapor Density (air=1)	N/A.	Solubility	Reacts violently.
Melting Point	98°C.	Evaporation rate	N/A. (Butyl acetate = 1).
Boiling Point/Range	883°C.	Partition Coefficient	N/A. (log P _{ow}).
Vapor Pressure (20°C)	N/A.	pH	N/A.
Flash Point:	N/A.	LEL	N/A.
Autoignition Temp.:	473°C (883°F).	UEL	N/A.

N/A = Not available or applicable

Section 10: Stability and Reactivity

Avoid heat and ignition sources. Contact with water produces flammable hydrogen gas.

Stability: Stable under normal conditions of use.

Incompatibility: Water, acids, oxidizing agents, oxygen, nitrogen and carbon dioxide.

Shelf life: Indefinite if stored properly.

Section 11: Toxicology Information

Acute Symptoms/Signs of exposure: **Eyes:** Stinging pain, burns, watering of eyes, inflammation of eyelids and conjunctivitis. Avoid looking at burning magnesium. **Skin:** Irritation, redness, burns. Powdered metal ignites readily on skin causing burns.

Ingestion: Nausea, vomiting and headache. **Inhalation:** Rapid irregular breathing, headache, burns to mucous membranes. Inhalation of dust or fumes causes metal fume fever.

Chronic Effects: Repeated/prolonged skin contact may cause dryness or rashes.

Sensitization: none expected

Magnesium: LD50 [oral, rat]; Not Available; LC50 [rat]; Not Available; LD50 Dermal [rabbit]; Not Available

Material has not been found to be a carcinogen nor produce genetic, reproductive, or developmental effects.

Section 12: Ecological Information

Ecotoxicity (aquatic and terrestrial):

Ecological impact has not been determined.

Section 13: Disposal Considerations

Check with all applicable local, regional, and national laws and regulations. Local regulations may be more stringent than regional or national regulations. Use a licensed chemical waste disposal firm for proper disposal.

Section 14: Transport Information

DOT Shipping Name:	Sodium.	Canada TDG:	Sodium .
DOT Hazard Class:	4.3, pg I.	Hazard Class:	4.3, pg I.
Identification Number:	UN1428.	UN Number:	UN1428.

Section 15: Regulatory Information

EINECS: Listed (231-132-9) .

WHMIS Canada: B6, E: Reactive flammable material, Corrosive.

TSCA: All components are listed or are exempt.

California Proposition 65: Not listed.

The product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

Section 16: Other Information

Current Issue Date: January 4, 2012

Disclaimer: Scholar Chemistry and Columbus Chemical Industries, Inc., ("S&C") believes that the information herein is factual but is not intended to be all inclusive. The information relates only to the specific material designated and does not relate to its use in combination with other materials or its use as to any particular process. Because safety standards and regulations are subject to change and because S&C has no continuing control over the material, those handling, storing or using the material should satisfy themselves that they have current information regarding the particular way the material is handled, stored or used and that the same is done in accordance with federal, state and local law. S&C makes no warranty, expressed or implied, including (without limitation) warranties with respect to the completeness or continuing accuracy of the information contained herein or with respect to fitness for any particular use.

SAFETY DATA SHEET

Section 1: Product and Company Identification

Product Name: Regular Soldering Flux Paste

Product Use: Soldering flux for copper, brass, galvanized iron, lead, zinc, tin, silver, nickel, mild steel, terne plate and malleable iron.


Manufacturer: LA-CO Industries, Inc.
1201 Pratt Boulevard
Elk Grove Village, IL.
60007-5746

Phone Number: (847) 956-7600
Fax: (847) 956-9885

24-hour Emergency: CHEMTREC: (800) 424-9300



Section 2: Hazards Identification

Protective Clothing	NFPA Rating (USA)	EU Classification	WHMIS (Canada)	Transportation
		Not classified as dangerous	 Not controlled	Not Regulated

Emergency Overview:

Exposure to hazardous substances is not expected when handling this product for its intended use.

Appearance, Color and Odor: White paste; faint odor.

USA: This material is not considered hazardous by the OSHA hazard Communication Standard (29 CFR 1910.1200).

Canada: This is not a controlled product under WHMIS.

European Union (EU): This product is not classified as dangerous according to Directive 1999/45/EC and its amendments.

Potential Health Effects

ACUTE (short term): see Section 8 for exposure controls

Relevant Route(s) of Exposure:

Skin contact, Inhalation.

- Inhalation:** Inhalation of vapors is not expected with normal use. Over exposure to high vapor concentrations may cause nasal and respiratory irritation, sore throat, coughing and difficulty breathing. High concentrations may also cause dizziness, headache, nausea, vomiting or in extreme cases, unconsciousness or asphyxiation.
- Ingestion:** Not an expected route of occupational exposure. Low oral toxicity. Swallowing large quantities may cause abdominal and chest pain, nausea, vomiting, diarrhea or dizziness. Aspiration into the lungs may occur during swallowing or from vomiting, resulting in lung injury.
- Skin:** This product has been tested and found to be non-irritating to skin.
- Eye:** This product has been tested and found to be non-irritating to eyes. Solids may cause temporary irritation as a foreign object in the eye.

CHRONIC (long term): see Section 11 for additional toxicological data

Chronic effects are not expected with normal use. Prolonged or repeated over exposure to high vapor concentrations may cause damage to the respiratory tract or lungs.

Medical Conditions Aggravated by Exposure: Not available

Interactions With Other Chemicals: Not available

Potential Environmental Effects: Not available

SAFETY DATA SHEET

Section 3: Composition / Information on Ingredients

Hazardous Ingredients:

<u>Chemical Name</u>	<u>CAS No.</u>	<u>Wt. %</u>	<u>EINECS / ELINCS</u>	<u>Symbol</u>	<u>Risk Phrases</u>
Ammonium Chloride	12125-02-9	7 – 13	235-186-4	Xn, Xi	R22, R36
2-hydroxyethylammonium chloride	2002-24-6	7 - 10	217-900-6	Not classified	Not classified
Stearic Acid	57-11-4	1 – 5	200-313-4	None	None

Note: See Section 16 for the full text of the R-phrases above.

Section 4: First Aid Measures

- Inhalation:** If symptoms are experienced remove source of contamination or move victim to fresh air and obtain medical advice.
- Eye Contact:** If material becomes lodged in the eye, do not allow victim to rub eye(s). Let the eye(s) water naturally for a few minutes. Have victim look right and left, and then up and down. If particle/dust does not dislodge, flush with lukewarm, gently flowing water for 5 minutes or until particle/dust is removed, while holding the eyelid(s) open. If irritation persists, obtain medical attention. DO NOT attempt to manually remove anything stuck to eye(s).
- Skin Contact:** Quickly and gently, blot or brush away excess paste. Wash gently and thoroughly with lukewarm, gently flowing water and non-abrasive soap for 5 minutes. If irritation develops, obtain medical advice.
- Ingestion:** If swallowed in large amounts or if irritation or discomfort occurs, obtain medical advice immediately.

Section 5: Fire Fighting Measures

- Flammable Properties:** Product will burn if involved in a fire but does not ignite readily.
- Suitable extinguishing Media:** Use water spray, dry chemical, carbon dioxide, or an appropriate foam. Use water spray to cool fire-exposed containers.
- Unsuitable extinguishing Media:** Not applicable
- Explosion Data:**
- Sensitivity to Mechanical Impact:** Not applicable
- Sensitivity to Static Discharge:** Not applicable
- Specific Hazards arising from the Chemical:** During a fire, products of combustion may include Carbon dioxide, carbon monoxide, ammonia, hydrogen chloride, smoke and irritating and toxic fumes may be formed.
- Protective Equipment and precautions for firefighters:** Self-contained breathing apparatus and protective clothing should be worn. Remove all unprotected personnel.
- NFPA**
- | | |
|----------------------|---|
| Health: | 0 |
| Flammability: | 0 |
| Instability: | 0 |

Section 6: Accidental Release Measures

- Personal Precautions:** Wear protective gloves. Spilled product may pose a slipping hazard.
- Environmental Precautions:** Prevent the product from entering sewers or waterways.
- Methods for Containment:** Stop the spill if it is safe to do so. Contain spilled flux with earth, sand, or absorbent material which does not react with spilled material.
- Methods for Clean-up:** Scrape or scoop up the spilled product and collect for re-use or proper disposal. Dispose of any contaminated, unusable product as described in Section 13 of this SDS.

SAFETY DATA SHEET

Section 7: Handling and Storage

- Handling:** Avoid contact with eyes and skin; do not breathe fumes. Do not ingest. Keep out of reach of children. Use this material with adequate ventilation. Keep container closed when not in use. Wash thoroughly with detergent and water after handling, before eating, drinking, smoking or using the toilet.
- Storage:** Store in a cool, dry area, away from incompatible materials (see Section 10).

Section 8: Exposure Controls/Personal Protection

Exposure Guidelines

<u>Ingredient</u>	<u>ACGIH TLV (8-hr. TWA)</u>	<u>U.S. OSHA PEL (8-hr. TWA)</u>	<u>Ontario (Canada) TWA EV</u>	<u>UK OEL (8-hr. TWA)</u>
Ammonium Chloride	10 mg/m ³ (fume); 20 mg/m ³ STEL	10 mg/m ³ (fume); 20 mg/m ³ STEL	10 mg/m ³ ; 20 mg/m ³ STEV	10 mg/m ³ (fume); 20 mg/m ³ STEL
Stearic Acid	Not established	Not established	Not established	Not established

STEV = Short Term Exposure Value
 STEL = Short Term Exposure Limit

Exposure Controls

- Engineering Controls:** Provide adequate ventilation/local exhaust to keep vapor concentrations below the exposure limits listed above.
- Personal Protection:** Workers must comply with the Personal Protective Equipment requirements of the workplace in which this product is handled. For welding operations, refer to the appropriate occupational safety standard. For operations requiring specific protection for mechanical hazards and heat protection refer to the appropriate occupational safety standard.
- Eye/Face Protection:** Wear eye/face protection (e.g. goggles/face shield) appropriate for the workplace where this material is handled and the conditions of use.
- Skin Protection:** Wear appropriate protective gloves and clean, body-covering clothing, when workplace conditions warrant their use.
- Respiratory Protection:** Not required for normal use. If ventilation and other engineering controls and work practices are not effective in controlling exposure to this material, then wear suitable personal protective equipment including approved respiratory protective equipment (RPE). Where occupational exposure limits are exceeded, workers must wear an approved respirator. In workplaces where respiratory protection is required, institute a complete respiratory protection program including selection, fit testing, training, maintenance and inspection. Consult with respirator manufacturer to determine respirator selection, use and limitations. A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements, European Standard EN529 or Canadian Standards Association (CSA) Standard Z94.4-2002 must be followed whenever workplace conditions warrant a respirator's use.
- General Hygiene Measures:** Do not ingest. Avoid contact with skin and eyes. Keep out of reach of children. Wash hands after handling.

SAFETY DATA SHEET

Section 9: Physical and Chemical Properties

Physical State:	Paste	Vapor Pressure (mm Hg @ 25°C):	Not available
Appearance:	White	Vapor Density (Air = 1):	Not available
pH:	6.5 – 7	Solubility in Water:	Water soluble Fat insoluble
Relative Density (water = 1):	1.1	Water / Oil distribution coefficient:	Not available
Boiling Point:	Not available	Odor Type:	Low odor
Freezing Point:	Not available	Odor Threshold:	Not available
Viscosity:	Not available	Evaporation Rate (n-Butyl Acetate = 1):	Not available
Oxidizing Properties:	Not available	Auto Ignition Temperature (°C):	Not available
Flash Point and Method:	>204°C (400°F) TOC	Flammability Limits (%):	Not available

Section 10: Stability and Reactivity

Chemical Stability:	Stable at normal room temperature.
Conditions to Avoid:	Not available
Incompatible Materials:	Incompatible with strong oxidizing agents, strong acids, bases, amines, carbonates, aldehydes, acid chlorides and anhydrides, aluminum, cellulose nitrate, cyanides, sulfides, and potassium chlorate.
Hazardous Decomposition Products:	Not available
Possibility of Hazardous Reactions:	Hazardous polymerization will not occur.

Section 11: Toxicological Information

Acute Toxicity Data for the mixture:	Regular Soldering Flux Paste: LD ₅₀ Oral: > 5 gm/kg (rat) (Tested by Rosner-Hixson Laboratories; August 30, 1962)
<u>Chronic Toxicity Data</u>	
Carcinogenicity:	Normal use of this product will not result in exposure to any component that is considered a human carcinogen by IARC (International Agency for Research on Cancer), ACGIH (American Conference of Governmental Industrial Hygienists, OSHA or NTP (National Toxicology Program).
Irritation:	The product is essentially non-irritating to the eyes and skin. Application of the product to areas of intact and abraded rabbit skin produced no signs of skin irritation (Rosner-Hixson Laboratories; Aug 30, 1962).
Corrosivity:	Not applicable
Sensitization:	Not applicable
Neurological Effects:	Not available
Genetic Effects:	Not available
Reproductive Effects:	Not available
Developmental Effects:	Not available
Target Organ Effects:	Not available

SAFETY DATA SHEET

Section 12: Ecological Information

Ecotoxicity:	Not available
Persistence/Degradability:	Not available
Bioaccumulation/Accumulation:	Product is not readily biodegradeable.
Mobility:	Not available

Section 13: Disposal Considerations

Waste Disposal Method:	Do NOT discard into any sewers, on the ground or into any body of water. Store material for disposal as indicated in Section 7 Handling and Storage. The conditions of use, storage and disposal of this product are beyond our control and may be beyond our knowledge. For this and other reasons, the supplier does not assume responsibility and expressly disclaim liability for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of this product.
USA:	Dispose of in accordance with local, state and federal laws and regulations.
Canada:	Dispose of in accordance with local, provincial and federal laws and regulations.
EU:	Waste must be disposed of in accordance with relevant EU Directives and national, regional and local environmental control regulations.

Section 14: Transport Information:

U.S. Hazardous Materials Regulation (DOT 49CFR):	Not regulated
Canadian Transportation of Dangerous Goods (TDG):	Not regulated
ADR/RID:	Not regulated
IMDG:	Not regulated
Marine Pollutants:	Not applicable
ICAO/IATA:	Not regulated

Section 15: Regulatory Information

USA	<p>TSCA Status: All ingredients in the product are listed on the TSCA inventory.</p> <p>SARA Title III Sec. 302/304: None Sec: 311/312: Not applicable Sec. 313: Not applicable CERCLA RQ: Not applicable</p> <p>California Prop 65: This product is not known to contain chemicals known to the State of California to cause cancer or reproductive harm.</p> <p>State Right-to-Know Lists : Ammonium chloride can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.</p>
Canada	<p>This product has been classified in accordance with the hazard criteria of the <i>Controlled Products Regulations</i> and the MSDS contains all the information required by the <i>Controlled Products Regulations</i>.</p> <p>WHMIS Classification: Not controlled</p> <p>DSL: All component substances are listed on Canada's Domestic Substances List (DSL).</p>

SAFETY DATA SHEET**Section 15: Regulatory Information, continued****EU Classification for the
Substance/Preparation****Symbol:** This product is not classified as dangerous according to Directive 1999/45/EC and its amendments.**Safety Phrases:** S1/2: Keep locked up and out of the reach of children.**Section 16: Other Information****Full Text of R-phrases
appearing in Section 3:**R22: Harmful if swallowed
R36: Irritating to eyes**Preparation Information:****Revision Date:**

May 26, 2011

Manufacturer Disclaimer:

The information contained herein is based on data available to us and is accurate and reliable to the best of our knowledge and belief. However, LA-CO Industries, Inc. makes no representations as to its completeness or accuracy. Information is supplied on condition that persons receiving such information will make their own determination as to its suitability for their purposes prior to use. In no event will LA-CO Industries, Inc. be responsible for damages of any nature whatsoever resulting from the use of or reliance upon the information contained herein.

Prepared by:LEHDER Environmental Services Limited (519) 336-4101
www.lehder.com**Disclaimer:**

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Material Safety Data Sheet

Issue No.: SMC-11.07

Date: September 16, 2011

1.1 PRODUCT INFORMATION:

This MSDS covers the following Special Metals Corporation alloy families and individual products identified as:

INCONEL®, INCOLOY®, INCOCLAD®, MONEL®, UDIMET®, UDIMAR®, NILO®, NILOMAG®, NIMONIC®, NIMOLOY, NI-SPAN-C®, BRIGHTRAY®, KOTHERM® & NIOOTHERM® alloys; Nitinol, Nickel, DEPOLARIZED & DURVANIC nickel, Electroformed nickel foil, Cupro 107; Miscellaneous designations, Mixed nickel alloy revert.

These are corrosion or heat resisting alloys, or alloys with special physical properties, which are primarily used in process, industrial, aerospace, automotive, marine, electrical or electronic equipment. Alloys not described in this document may be proprietary; contact one of the SMC locations below for more information.

1.2 COMPANY INFORMATION

The products are supplied by the main manufacturing companies in the Special Metals Corporation Group and/or their subsidiaries*:

USA
Special Metals Corporation
3200 Riverside Drive
Huntington, WV, USA 25705
EMERGENCY TELEPHONE NUMBER: +1(304) 526-5780
GENERAL INFORMATION: +1(304) 526-5100

EUROPE
Special Metals Wiggin Ltd.
Holmer Road
Hereford, HR4 9SL, UK
EMERGENCY TELEPHONE NUMBER: +44 (0)1432 382200
GENERAL INFORMATION: +44 (0) 1432 382200
FAX: +44 (0) 1432 264030

Special Metals Corporation
4317 Middle Settlement Road
New Hartford, NY, USA 13413-5392
EMERGENCY TELEPHONE NUMBER: +1(315) 798-2900
GENERAL INFORMATION: +1(314) 798-2900

This document does not cover Welding Products.

For Welding Products MSDS, contact:

Special Metals Welding Products Company
1401 Burris Road
Newton, NC, USA 28658
Tel: +1(828) 465-0352
www.specialmetalswelding.com

*For a full list of subsidiary companies, please refer to our website www.specialmetals.com or call +1(304) 526-5100 or toll-free in the USA +1(800) 334-4626.

2. COMPONENT INFORMATION:

The compositions of individual products in the alloy families or categories listed under 1.1 are given in the product composition tables in APPENDIX 1. Please refer to the appropriate alloy name or designation.

3. HAZARDS IDENTIFICATION:

Description of hazards:

As shipped, these complex alloys in massive form have no known toxicological properties other than causing allergic reactions in individuals sensitive to the metals contained in the alloys. Nickel, Cobalt, and some forms of Chromium are known skin sensitizers. Nickel and Cobalt also are classified as suspected carcinogens (EU Category 3). Absent specific test data for the alloy, mixtures (including alloys) that contain more than 1% of a substance are classified in the same manner as that substance.

Hazardous fume or dust emissions may be released during remelting, grinding, cutting or welding. In addition to Nickel and Cobalt, Hexavalent Chromium (a known human inhalation carcinogen – EU Category 2) may be generated during processing activities. If airborne emissions are excessive, inhalation may affect worker health. Further information is given in Section 8 – Exposure Controls / Personal Protection.

In addition, individual products in the above alloy families may contain one or more of the following ingredients, which may be considered hazardous under the legislation indicated:

Special Metals Corporation Material Safety Data Sheet

USA: SARA SECTION 313 SUPPLIER NOTIFICATION: Emergency Planning and Community Right-To-Know Act of 1986 and of 40 CFR 372.

Aluminum	CAS No. 7429-90-5
Chromium	CAS No. 7440-47-3
Cobalt	CAS No. 7440-48-4
Copper	CAS No. 7440-50-8
Iron	CAS No. 7439-89-6
Manganese	CAS No. 7439-96-5
Molybdenum	CAS No. 7439-98-7
Nickel	CAS No. 7440-02-0
Niobium	CAS No. 7440-03-1
Tantalum	CAS No. 7440-25-7
Titanium	CAS No. 7440-32-6
Tungsten	CAS No. 7440-33-7
Yttrium Oxide	CAS No. 1314-36-9

EUROPE

Nickel EC Label No. 231-111-4
Index No. 028-002-00-7
Designation: Xn Harmful
Risk Phrases: R40 Possible risk of irreversible effects.
R43 May cause sensitization by skin contact.

Cobalt EC Label No. 231-158-0
Index No. 027-001-00-9
Designation: Xn Harmful
Risk Phrases: R42/43 May cause sensitization by inhalation and skin contact.
R53 May cause long-term adverse effects in the aquatic environment.

Refer to APPENDIX 1 of this MSDS for the individual alloy name and the percent by weight of the various ingredients in each alloy.
Refer to APPENDIX 2 for detailed information on the toxicological properties of these ingredients.

4. FIRST AID MEASURES:

Eye contact: Flush particles from the eyes with clean water for at least 15 minutes. If irritation persists, seek medical help.
Skin contact: Wash skin with soap and water to remove any metallic particles. If a rash develops, seek medical attention.
Inhalation: Remove from exposure. If respiratory irritation persists, seek medical help.
Ingestion: If symptoms of ingestion arise, seek medical help.

5. FIRE or EXPLOSION HAZARD: Nonflammable, however sparks from welding or grinding in user operations could ignite flammable or combustible liquids, vapors and solids.

6. ACCIDENTAL RELEASE MEASURES:

Vacuum or shovel any spilled material into a suitable container. Alloy wastes are normally collected to recover metal values.

7. HANDLING AND STORAGE:

Under normal circumstances the materials do not produce any hazardous products and as such do not require any special precautions. However, see Section 10, "STABILITY AND REACTIVITY". The transient handling of the materials would not be expected to produce any sensitization but it is good practice to use gloves for handling. The normal precautions for handling heavy objects with possible sharp edges should also be observed.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION:

Respiratory Protection: Respiratory protection is necessary when exposure limits for airborne contaminants are exceeded during cutting, grinding or welding on these alloys. Use air-supplied respirator in confined spaces. In the USA, use only NIOSH-approved respirators in accordance with 29 CFR 1910.134, or other nationally approved respirators. In the EU if required use protection to EN136 (full face respirators), EN140 (half mask respirators), EN149 (filtered half masks (disposable)) or other appropriate EN standard. In the rest of the world use respiratory protection to the appropriate national standard.

Ventilation: Use local exhaust ventilation when cutting, grinding or welding. Maintain exposures below published exposure limits. Confined spaces require special attention to provision of adequate ventilation and/or air-supplied respirators.

Special Metals Corporation Material Safety Data Sheet

Eye Protection and Protective Clothing: Eye protection is recommended when cutting, grinding and welding. Wear gloves, face protection and flame retardant clothing. Do not expose skin or eyes to the heat and radiation from welding operations.

IMPORTANT

Maintain exposures below the published exposure levels. Use industrial hygiene air monitoring to ensure that your use of this material does not create exposures that exceed the recommended exposure limits. Always use exhaust ventilation in user operations such as high temperature cutting, welding and grinding. Refer to the following sources for important additional information:

In U.S.A.: 29 CFR 1910, ANSI Z49.1, American Welding Society, OSHA, U.S. Dept of Labor
In Canada: Canadian Standards Association, CAN/CSA – W17.2-M87
In UK: Current exposure limits under Health & Safety Executive EH40 are given in Appendix 2.

9. PHYSICAL AND CHEMICAL PROPERTIES:

Physical State: Solid Specific Gravity: 8-9 gm/cc Melting Point: >1260° C Odor: Odorless
Appearance: Silver-colored metal shaped as plate, bar, wire, tube, rod, strip, sheet or some intermediate form.

Other physical and chemical properties, e.g. as described in 91/155/EEC and in the Approved Code of Practice, ref. 11 (viscosity, flash point, auto flammability, vapor pressure, solubility and partition coefficient), have no safety implications in relation to these materials.

10. STABILITY AND REACTIVITY:

These alloys are very stable and no hazardous decomposition products are formed upon exposure to water or the atmosphere. Nickel can react with carbon monoxide in reducing atmospheres to form nickel carbonyl, an extremely toxic gas.

11. TOXICOLOGICAL PROPERTIES:

Nickel and cobalt are classified as Category 3 carcinogens. The exposure route of concern is inhalation. Hexavalent Chromium (a known human inhalation carcinogen – EU Category 2) may be generated during processing activities.

As shipped, these complex alloys in massive form have no known toxicological properties other than causing allergic reactions in individuals sensitive to the metal(s) contained in the alloys. However, user-generated dusts and fumes may on contact with the skin or eyes produce mechanical irritation. Chronic exposures coupled with sweat could cause dermatitis (skin) or conjunctivitis (eyes). Excessive inhalation of user-generated fumes from high temperature cutting, remelting or welding of these alloys may, depending on the specific features of the process used, pose a long-term health hazard. The International Agency for Research on Cancer (IARC) has concluded that welding fumes are possibly carcinogenic to humans.

The ingredients of fumes and gases generated in user welding, grind and high temperature cutting operations will depend on the base metal, electrode, flux and the specific process being used. Ingredients may include metals, metal oxides, chromates, fluorides, carbon monoxide, ozone, and oxides of nitrogen. Phosgene can be produced if chlorinated solvent vapors are present in user operations.

More detailed toxicological information is given in APPENDIX 2.

12. ECOLOGICAL EFFECTS:

These alloys are not soluble in water and react only very slowly with natural environments. No special precautions are necessary.

13. DISPOSAL:

Alloy wastes are normally collected to recover metal values. However, if disposal is necessary, dispose of in accordance with national, federal, state or local regulations. In the UK, most alloy material would be classified as special waste.

14. TRANSPORTATION:

No special precautions are necessary for the transport of these materials.

15. REGULATORY INFORMATION:

Classification and labeling requirements

Alloys containing less than 1% of nickel or cobalt are not classified as “dangerous for supply”. Alloys containing more than 1% of either metal are classified as the metals themselves (see Section 3). However, in recognition of their essentially non-hazardous nature, these alloys in the massive form are not required to be labeled as hazardous.

16. OTHER INFORMATION:

Bibliography:

1. U.S. National Toxicology Program – 10th Report On carcinogens
2. Health and Safety Executive UK – EH40 – Occupational exposure limits; EH42 – Monitoring Strategies for toxic substances; EH44 – Dust the Workplace – general principles of protection; EH54 – Assessment of Exposure to Fume from Welding and Allied Processes; EH55 – The Control of Exposure to Fume from Welding, Brazing and Similar Processes; EH60 – Nickel and its inorganic compounds.
3. EH Health and Safety Executive's publications (www.hse.gov.uk)
4. HSC. Information approved for the classification, packaging and labeling of dangerous substances for supply and conveyance by road
5. European Commission Directive 5/3/91 – 91/155/EEC
6. European Commission Directive 10/12/93 – 93/112/EEC
7. Twelfth adaptation of Council Directive 67/548/EEC – 91/325/EEC
8. Sixth amendment of Council Directive 67/548/EEC – 79/831/EEC
9. The Chemicals (Hazard Information and Packaging for Supply) Regulations 2002 No. 1689
10. International Agency for Research on Cancer. Monographs on the evaluation of carcinogenic risks to humans. Vol. 49 Chromium Nickel and Welding, 1990.
11. Approved Code of Practice ISBN 0 7176 0859X
12. European Norm – EN 1811

17. PREPARATION INFORMATION: Prepared By: Health & Environmental Safety Department
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It is Special Metals' belief that information set forth in this Material Safety Data Sheet is accurate. Special Metals makes no warranty, expressed or implied, with respect thereto and disclaims any liability from reliance thereon. Users should make their own assessment of workplace risks as required by other health and safety legislation.

APPENDIX 1 – HAZARDOUS INGREDIENTS

The nominal compositions of individual alloys are given in the tables below. The MSDS covers all products thus identified.

Table 1. INCONEL® alloys
Tradename and Nominal Composition (% weight)

Alloy Designation	Aluminum	Chromium	Cobalt	Copper	Iron	Manganese	Molybdenum	Nickel	Niobium	Silicon	Tantalum	Titanium	Tungsten	Yttrium Oxide
INCONEL® alloy 050		20	3		18		9	50	1					
INCONEL® alloy 22	0.2	22			2.5		14	58					3	
INCONEL® alloy 600 & 600T		16			8			76						
INCONEL® alloy 600SP		15			8			77						
INCONEL® alloy 601	1	24			14			61						
INCONEL® alloy 601GC	1	24			14			61						
INCONEL® alloy 603XL		22					3	73		2				
INCONEL® alloy 604		16			8			72	2					
INCONEL® alloy 606		20			1	3		73	3					
INCONEL® alloy 613	1	16			6	1		76						
INCONEL® alloy 617	1	22	13		1		10	53						
INCONEL® alloy 618		23			16			55					6	
INCONEL® alloy 622	0.2	22			2.5		14	58					3	
INCONEL® alloy 625		22			4		9	61	4					
INCONEL® alloy 625LCF		22			4		9	61	4					
INCONEL® alloy 672		45						54			1			
INCONEL® alloy 673	1	37	1		1			58	1			0.5		
INCONEL® alloy 686		21			1		16	58					4	
INCONEL® alloy 690 & 690T		29			9			62						
INCONEL® alloy 691	1	30			9			59			1			
INCONEL® alloy 692	1	30			9	1		57				1		
INCONEL® alloy 693	3	30			5			60	2					
INCONEL® alloy 702	3	16			1			79				1		
INCONEL® alloy 706		16			37			42	3			2		
INCONEL® alloy 718	1	18			18		3	54	5			1		
INCONEL® alloy 718SPF	1	18			18		3	54	5			1		
INCONEL® alloy 721		16			7	2		71				3		
INCONEL® alloy 722	1	16			7			74				3		
INCONEL® alloy 725		21			9		8	58	3			1		
INCONEL® alloy 725HS		21			9		8	58	3			1		
INCONEL® alloy 740	1	25	20		1			49	2			2		
INCONEL® alloy 740H	1.5	25	20		1			49	1.5			1.5		
INCONEL® alloy X-750	1	16			7			72	1			3		
INCONEL® alloy 751	1	15			7			73	1			3		
INCONEL® alloy 783	6	3	35		25			28	3					
INCONEL® alloy C-276		16			6	1	16	57					4	
INCONEL® alloy G		22	1	2	20	1	7	44	2					
INCONEL® alloy G-3		22	3	2	20	1	7	44					1	
INCONEL® alloy HX		22	2		18		9	48					1	
INCONEL® alloy MA754		20						78				1		1
INCONEL® alloy MA758		30						68				1		1
INCONEL® alloy MA6000	5	15					2	69		2	3	4		1
INCONEL® alloy N06230	0.3	22	1		1	0.5	2	60					14	
INCOTHERM® alloy TD		22					3	73			2			

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Table 2. INCOLOY®, NILO® and NI-SPAN-C® alloys
Tradename and Nominal Composition (% weight)

Alloy Designation	Aluminum	Chromium	Cobalt	Copper	Iron	Manganese	Molybdenum	Nickel	Niobium	Silicon	Titanium	Yttrium Oxide	Nitrogen
INCOLOY® alloy 20		20		4	38		3	34	1				
INCOLOY® alloy 28		27			37		4	32					
INCOLOY® alloy 25-6HN		20		0.3	45	0.5	6	25					0.2
INCOLOY® alloy 25-6MO		20		1	45	0.5	6	25					
INCOLOY® alloy 27-7MO		22		1	41	1	7	27					0.35
INCOLOY® alloy 330		19			44			36		1			
INCOLOY® alloy 330Cb		19			42			36	1	1			
INCOLOY® alloy 330HC		19			48			34		1			
INCOLOY® alloy 800		20			45	1		33		1			
INCOLOY® alloy 800H		20			45			33			1		
INCOLOY® alloy 800HT		20			45			33			1		
INCOLOY® alloy 801		20			46	1		32			1		
INCOLOY® alloy 802		21			44	1		33			1		
INCOLOY® alloy 803		27			36	1		35			1		
INCOLOY® alloy 805		8			55	1	1	36			1		
INCOLOY® alloy 825		22		2	29	1	3	42			1		
INCOLOY® alloy 832		20			65			14		1			
INCOLOY® alloy 840		20			59			20		1			
INCOLOY® alloy 864		21			40		4	34		1			
INCOLOY® alloy 865		24			52	0.8	2	21		1.2			0.2
INCOLOY® alloy 890		25			27	1	2	43		2			
INCOLOY® alloy 901		13			36		6	42			3		
INCOLOY® alloy 903	1		15		42			38	3		1		
INCOLOY® alloy 904			15		51			33			2		
INCOLOY® alloy 907			13		42			38	5		2		
INCOLOY® alloy 908	1	4			41			49	3		2		
INCOLOY® alloy 909			13		42			38	5		2		
INCOLOY® alloy 925		21		2	28		3	44			2		
INCOLOY® alloy 945	0.5	21		2	18	0.5	3	50	3		1.5		
INCOLOY® alloy 945X	0.5	21		2	14	0.5	3	53	4		1.5		
INCOLOY® alloy A-286		14			58		1	25			2		
INCOLOY® alloy DS		18			42	1		37		2			
INCOLOY® alloy MA956	5	20			74							1	
INCOLOY® alloy MA957		14			85						1		
NI-SPAN-C® alloy 902		5			49			43		1	2		
NILO® alloy 36					64			36					
NILO® alloy 42					58			42					
NILO® alloy 45					55			45					
NILO® alloy 475		5			48			47					
NILO® alloy 48					52			51					
NILO® alloy 51					49			51					
NILO® alloy 55					44			5					
NILO® alloy K			17		53			30					
NILO® alloy 365					50			44	3.5		1.5		
NILOMAG® alloy 77				5	14		4	77					

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Table 3. NIMONIC® and NIMOLOY alloys
Tradename and Nominal Composition (% weight)

Alloy Designation	Aluminum	Chromium	Cobalt	Iron	Manganese	Molybdenum	Nickel	Niobium	Titanium
NIMONIC® alloy 70	1	20		25			51	2	1
NIMONIC® alloy 75		20		4	1		75		
NIMONIC® alloy 80a	1	20					76		2
NIMONIC® alloy 81	1	30		1			66		2
NIMONIC® alloy 86		25				10	65		
NIMONIC® alloy 90	2	20	16	1			58		3
NIMONIC® alloy 91	1	29	20				48		2
NIMONIC® alloy 101	1	24	20			2	49	1	3
NIMONIC® alloy 105		15	20			5	54		1
NIMONIC® alloy 108	5	15	20			5	53		1
NIMONIC® alloy 115	5	15	13			4	59		4
NIMONIC® alloy 263	1	20	20			6	51		2
NIMONIC® alloy 901		13		35		6	43		3
NIMONIC® alloy PE11	1	18		35		5	38		2
NIMONIC® alloy PE16	1	17		34		3	44		1
NIMONIC® alloy PK31		20	14			5	53	5	2
NIMONIC® alloy PK33	2	19	14	1		7	55		2
NIMOLOY alloy PK37	1	19	17				60		2

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Table 4. BRIGHTRAY®, KOTHERM® and NIOOTHERM® alloys
Tradename and Nominal Composition (% weight)

Alloy Designation	Chromium	Iron	Nickel	Silicon	Manganese	Copper
BRIGHTRAY® alloy B	16	24	59	1		
BRIGHTRAY® alloy C	20		78	2		
BRIGHTRAY® alloy F	18	42	37	2	1	
BRIGHTRAY® alloy S	20		78	1	1	
BRIGHTRAY® alloy 35	20	42	36	2		
KOTHERM® Positive	10		90			
KOTHERM® Negative			94	3		2
NIOOTHERM® Positive	14		85	1		
NIOOTHERM® Negative			96	4		

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Table 5A. Miscellaneous Designations
Tradename and Nominal Composition (% weight)

Alloy Designation	Aluminum	Chromium	Cobalt	Iron	Manganese	Molybdenum	Nickel	Niobium	Rhenium	Tantalum	Titanium	Tungsten	Calcium	Silicon
JBK		15		52		1	30				2			
Nickel 200							99							
Nickel 201							99							
Nickel 205							99							
Nickel 208							96				3			
Nickel 209							95				4			
Nickel 211					4.7		95							
Nickel 212					2		97							
Nickel 213					1		97							
Nickel 222							99							
Nickel 229							99							
Nickel 240		2			2		96							
Nickel 243		2			2		96							
Nickel 270							99							
Nickel-Iron 258	0.3			40	0.5		60				0.3			0.3
Electroformed nickel							99							
DEPOLARIZED nickel							99							
DURVANIC nickel							99							
Mixed nickel alloy revert	0-3	0-20	0-5	20-40	0-1	0-5	30-60	0-1		0-0.5	1-4	0-1	1-4	

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Table 5B. Miscellaneous Designations
Tradename and Nominal Composition (% weight)

Alloy Designation	Aluminum	Chromium	Cobalt	Iron	Manganese	Molybdenum	Nickel	Niobium	Tantalum	Titanium	Tungsten	Copper	Nitrogen
13-8	1	13		76		2	8						
304SS		19		71	1		9						
713C	6	14				5	73	2		1			
B300			9	67		5	19						
C1023	4	15	10			8	60			4			
Crutonite	2	16		45			32	2		2			
G255		24		13		7	52				2	1	
GMR235	4	15		4		5	70			3			
GTD222	1	23	19				51		1	2	2		
IN738LC	4	16	8			2	62		2	3	3		
IN738	3	16	9			2	61	1	2	4	3		
M252	1	19	10			10	57			3			
MERC76	5	13	19			3	55	1		4			
NICOCRALY	13	22	23				43						
NiTiFe				2			54			45			
Rene 220		19	12			3	56	5	3				
Rene 77	4	15	15			4	58	5	3				
SR50A		22		50		6	21						0.25
Waspaloy	2	19	13			4	59			3			
X40		26	54				11			8			

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Table 6. MONEL® alloys, FERRY® alloy and Cupro 107
Tradename and Nominal Composition (% weight)

Alloy Designation	Aluminum	Copper	Iron	Manganese	Nickel	Silicon	Titanium
MONEL® alloy 400		32	1	1	66		
MONEL® alloy 401		55	1	2	43		
MONEL® alloy 404		46			54		
MONEL® alloy R-405		32	1	1	66		
MONEL® alloy 413		67	1	1	31		
MONEL® alloy 416	1	30		1		2	
MONEL® alloy 418		27		4	66	1	2
MONEL® alloy 450		67	1	1	31		
MONEL® alloy K-500	3	30	1	1	65		1
FERRY® alloy		54			44		
Cupro 107		67	1	1	31		

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Table 7. UDIMET® and UDIMAR® alloys
Tradename and Nominal Composition (% weight)

Alloy Designation	Aluminum	Chromium	Cobalt	Iron	Manganese	Molybdenum	Nickel	Niobium	Titanium	Tungsten
UDIMET® alloy R41	2	19	11			10	55		3	
UDIMET® alloy 188		22	40		1		23			14
UDIMET® alloy 500	3	19	18			4	53		3	
UDIMET® alloy 520	2	19	12			6	57		3	1
UDIMET® alloy 700	5	15	19			5	53		4	
UDIMET® alloy 713	6	14				5	73	2		
UDIMET® alloy 718		18		19		3	54	5	1	
UDIMET® alloy 720	3	18	15			3	56		5	1
UDIMET® alloy 706		16		37			42	3	2	
UDIMET® alloy L-605		20	53		2		10			15
UDIMET® alloy D301	5						95			
UDIMET® alloy D979	1	15		28		4	45		3	4
UDIMAR® alloy 250	0.1		8	Bal		5	18		0.5	
UDIMAR® alloy 300	0.1		9	Bal		5	18		0.7	

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Table 8. Nitinol alloys
Tradename and Nominal Composition (% weight)

Alloy Designation	Chromium	Cobalt	Copper	Iron	Nickel	Niobium	Titanium
Nickel-Titanium					54-57		43-46
Ni-Ti-Fe				1-7	48-50		43-51
Ni-Ti-Cu			5-10		43-45		46-52
Ni-Ti-Cr	0.2-0.3				54-57		43-46
Ni-Ti-Nb					45-51	13-15	34-42
Ni-Ti-Co		1-2			54-57		41-45

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Table 9. INCOCLAD® products

(N.B. these are products containing more than one alloy or component. Nominal compositions are given for each component.)
 Tradename and Nominal Composition (% weight)

Alloy Designation	Chromium	Cobalt	Copper	Iron	Molybdenum	Nickel	Niobium	Titanium
INCOCLAD® 625/steel	22			4 95	9	61	4	
INCOCLAD® 671/800H/HT	49 20			45		51 33		

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APPENDIX 2

TOXICOLOGICAL AND EXPOSURE LIMIT INFORMATION

The following information is primarily directed to the ingredients of the complex alloys listed in APPENDIX 1. Although it is the user's responsibility to assess end products, intermediates or fugitive emissions arising out of the use of these alloys, information is also provided for common fume ingredients. *UK EH40 limits for the ingredients are shown in italics at the end of each section.*

Aluminum (Al)

Exposure Limits⁽¹⁾: **TVL: 10 mg/m³ (Metal dust); 5 mg/m³ (Welding fumes)**
PEL: 15 mg/m³ (Total metal dust); 5 mg/m³ (Metal dust – respirable fraction)
CAS No.⁽²⁾: 7429-90-5
LD₅₀: Not Available

Aluminum is not readily absorbed through the skin or the GI tract and only poorly through the lungs. Foreign literature between 1958 and 1962 reported cases of severe and sometimes fatal pulmonary fibrosis in workers exposed to aluminum dust. In one of the fatal cases, the worker developed fibrosis and encephalopathy after 13.5 years of exposure to aluminum dust.

In rodent studies and currently in US industry, no fibrosis or encephalopathy have been reported from the inhalation of aluminum powder. Acute exposure to alumina fume may cause bronchial irritation, however reports of pulmonary fibrosis and emphysema in alumina abrasive workers are no longer seen, owing to improved environmental control.

EH40- Aluminum metal:

Total inhalable dust OES 10 mg/m³ (8 hours TWA) Total respirable dust OES 4 mg/m³ (8 hours TWA)

Chromium (Cr)

Exposure Limits⁽¹⁾: **TLV: 0.5 mg/m³**
PEL: 1.0 mg/m³ (Metal as CR); 5 µg/m³ (8 hours TWA) (Chromium VI compounds)
CAS No.⁽²⁾: 7440-47-3
LD₅₀: Not Available

Chromium metal is relatively nontoxic. Chromium metal and insoluble salts are said to be involved in fibrosis of the lungs. When the metal is heated to a high temperature, fumes produced may be damaging to the lungs if inhaled. The International Agency for Research on Cancer has concluded that the evidence for carcinogenicity in humans and animals is inadequate for chromium metal and trivalent chromium compounds, but sufficient for hexavalent chromium compounds. Fumes from welding chromium-containing stainless steel or certain chromium-containing rods can trigger eczematous eruptions on the palms of the hands of chromium-sensitized individuals.

EH40 – Chromium:

Chromium VI compounds (as Chrome) MEL 0.05 mg/m³ (8 hours TWA)

Chromium II compounds (as Chrome) OES 0.5 mg/m³ (8 hours TWA)

Chromium III compounds (as Chrome) OES 0.5 mg/m³ (8 hours TWA)

Chromium OES 0.5 mg/m³ (8 hours TWA)

Cobalt (Co)

Exposure Limits: **TVL: 0.02 mg/m³ (Dust & fume as Co)**
PEL: 0.1 mg/m³ (As Co metal)
CAS No.⁽²⁾: 7440-48-4
LD₅₀: 6,170 mg/kg, rat, oral

Asthmatic symptoms and pulmonary fibrosis occurring in the tungsten carbide industry may be related to the inhalation of metallic cobalt dust. Evidence of polycythemia (an increase in the total red cell mass of the blood in the body) and altered thyroid, kidney and liver function have also been found. Excessive inhalation of metallic cobalt have produced cardiac changes in miniature swine. Eye contact may cause conjunctivitis. Symptoms of excessive ingestion may be a sensation of hotness with vomiting, diarrhea and nausea along with the potential for causing damage to blood, heart, thyroid and pancreas. Repeated skin contact can cause sensitivity and allergic skin rashes. Cobalt powders have caused tumors at the site of injection in rodents. However, studies of cobalt-containing prostheses do not suggest a significant risk for humans.

EH40 – MEL 0.1 mg/m³ (8 hours TWA)

Copper (Cu)

Exposure Limits⁽¹⁾: TLV: 1 mg/m³ (Dusts & mists, as Cu), 0.2 mg/m³ (Fume)
 PEL: 1 mg/m³ (Dusts & mists, as Cu); 0.1mg/m³ (Fume as Cu)
 CAS No. ⁽²⁾: 7440-50-8
 LD₅₀: 35 mg/kg, mouse, intraperitoneal

Copper metal dust and fume may be irritating to the respiratory tract. In user operations where copper fume is generated, inhalation of the fume can result in symptoms of "Metal Fume Fever" such as chills, fever and sweating. A few instances of allergic skin rashes have been reported in workers with skin exposure to metallic copper. In the eyes, copper metal as foreign body can provoke an inflammatory reaction resulting in pus formation in the conjunctiva, cornea or sclera. Ingestion of copper metal may cause gastrointestinal upset. Wilson's disease can occur in certain individuals with a rare, inherited metabolic disorder characterized by retention of excessive amounts of copper in the liver, brain, kidneys and corneas. These deposits eventually lead to tissue necrosis and fibrosis, causing a variety of clinical effects, especially liver disease and neurological changes. Wilson's disease is progressive and, if untreated, leads to fatal liver failure.

EH40: Fume OES 0.2 mg/m³ (8 hours TWA)

Dusts & mists (as Cu) 1.0 mg/m³ (8hours TWA, 2.0 mg/m³ (15 minute reference period)

Iron (Fe)

Exposure Limits⁽¹⁾: TLV: No limit set (For Fe₂O₃ fume the TLV is 5 mg/m³ as Fe)
 PEL: No limit set (For Fe₂O₃ dust & fume the PEL is 10 mg/m³ as Fe)
 CAS No. ⁽²⁾: 7439-89-6
 LD₅₀: Not Available

Inhalation of the excessive oxide fumes or dusts can lead to irritation of the respiratory tract. Prolonged inhalation of iron oxide for periods of 6 to 10 years is known to cause siderosis which appears to be a benign pneumonconiosis. Prolonged eye contact with the metal dust could cause rust brown colored spots forming around the particles and if left for several years, permanent damage could result.

EH40 – Iron Oxide, fume (as Fe) OES 5.0 mg/m³ (8 hours TWA), 10 mg/m³ (15 minute reference period)

Manganese (Mn)

Exposure Limits⁽¹⁾: TLV: 0.2 mg/m³ elemental and inorganic compounds, as Mn
 PEL: 5 mg/m³ (Ceiling, as Mn compounds); 5 mg/m³ (Fume, as Mn)
 CAS No. ⁽²⁾: 7439-96-5
 LD₅₀: 9,000 mg/kg, rat, oral

Excessive inhalation or ingestion of manganese can produce manganese poisoning. Chronic exposures can lead to neurological problems such as apathy, drowsiness, weakness, spastic gait, paralysis, and other neurological problems resembling Parkinsonism. These symptoms can become progressive and permanent if not treated. Excessive inhalation of fumes may cause "Metal Fume Fever" with its flu-like symptoms, such as chills, fever, body aches, vomiting, sweating, etc.

EH40 – Fume (as Mn) OES 1.0 mg/m³ (8hours TWA, 3.0 mg/m³ (15 minute reference period)

Manganese and compounds (as Mn) OES 5.0 mg/m³ (8 hours TWA)

Molybdenum (Mo)

Exposure Limits⁽¹⁾: TLV: 10 mg/m³ (Insoluble and metal compounds, as Mo)
 PEL: 15 mg/m³ (Insoluble compounds, total dust as Mo)
 CAS No. ⁽²⁾: 7439-98-7
 LD₅₀: Not Available

Molybdenum and its insoluble compounds are reported to have low toxicity. High dietary intake may produce a gout-like disease and high blood uric acid. Inhalation of fumes has caused kidney damage, respiratory irritation and liver damage in animals. Skin and eye contact may cause irritation.

EH40 – Molybdenum compounds (as Mo):

Soluble – OES 5.0 mg/m³ (8 hours TWA), 10 mg/m³ (15 minute reference period)

Insoluble – OES 10 mg/m³ (8 hours TWA), 20 mg/m³ (15 minute reference period)

Nickel (Ni)

Exposure Limits⁽¹⁾: TLV: 1.5 mg/m³ as metal (Inhalable Fraction)
 PEL: 1 mg/m³ for metal and insoluble compounds as Ni

CAS No. ⁽²⁾: 7440-02-0**LD₅₀: >9,000 mg/kg, rat, oral**

The U.S. National Toxicology Program (NTP) 10th Report on Carcinogens has listed "metallic nickel" as "reasonably anticipated to be a human carcinogen" and "nickel compounds" as "known human carcinogens". "Nickel Alloys" were reviewed but not listed. The International Agency for Research on Cancer (IARC) concluded that nickel compounds were carcinogenic to humans and that metallic nickel is possibly carcinogenic to humans. Epidemiological studies of workers exposed to nickel powder and to dust and fume generated in the production of nickel alloys and of stainless steel have not indicated the presence of a significant respiratory cancer hazard.

The inhalation of nickel powder has not resulted in an increased incidence of malignant tumors in rodents. Repeated intratracheal instillation of nickel powder produced an increased incidence of malignant lung tumors in rats, but did not produce an increased incidence in hamsters when administered at the maximum tolerated dose. However, single intratracheal instillations of nickel powder in hamsters at doses near the LD₅₀ have produced an increased incidence of fibrosarcomas, mesotheliomas and rhabdomyosarcomas. Inhalation of nickel powder at concentrations 15 times the PEL irritated the respiratory tract in rodents. Nickel is a known sensitizer and may produce allergic reactions.

EH40 – Nickel and its inorganic compounds (except nickel carbonyl)

Water soluble nickel compounds (as nickel) MEL 0.1 mg/m³ (8 hours TWA)

Niobium (Nb)**Exposure Limits⁽¹⁾:****TLV: No limit set****PEL: No limit set****CAS No. ⁽²⁾: 7440-03-1****LD₅₀: Not Available**

Also known as Columbium (Cb), there is almost no information on the toxicity of this metal or its fumes. Russian medical literature has described early chest x-ray changes in welders and chemical workers handling niobium and tantalum, but no specific data has been found. It is expected that the metal dust and fumes could cause irritation to the skin, eyes and respiratory tract upon acute exposure.

EH40-40: No limit set.

Tantalum (Ta)**Exposure Limits⁽¹⁾:****TLV: 5 mg/m³ (Metal & oxide dusts)****PEL: 5 mg/m³ (Metal & oxide dusts)****CAS No. ⁽²⁾: 7440-25-7****LD₅₀: Not Available**

There are no reports of adverse health effects in industrially exposed workers. Massive doses of tantalum given by the intratracheal route to rats have produced respiratory tract lesions. In contact with tissue, metallic tantalum is inert. Tantalum pentoxide has an LD₅₀ of >8 g/kg, orally in rats.

EH40 – OES 0.5 mg/m³ (8 hours TWA), 10 mg/m³ (15 minute reference period)

Titanium (Ti)**Exposure Limits⁽¹⁾:****TLV: No limit set; 10 mg/m³ (8 hours TWA) (titanium dioxide)****PEL: No limit set; 15 mg/m³ (8 hours TWA) (titanium dioxide)****CAS No. ⁽²⁾: 7440-32-6****LD₅₀: Not Available**

Inhalation of titanium could cause mild irritation to the respiratory tract. Inhalation of titanium dioxide dust or fume could produce lung fibrosis and chronic bronchitis.

EH40 – As Titanium dioxide:

Total inhalable dust OES 10 mg/m³ (8 hours TWA), Total respirable dust OES 4 mg/m³ (8 hours TWA)

Tungsten (W)**Exposure Limits⁽¹⁾:****TLV: 5 mg/m³ insoluble compounds, as W****STEL: 10 mg/m³ for insoluble compounds, as W****PEL: No limit set****CAS No. ⁽²⁾: 7440-33-7****LD₅₀: 2,000 mg/kg, rat, unreported route**

Inhalation of tungsten dust may cause irritation of the respiratory tract. Skin or eye contact could cause abrasion or irritation of the respective surfaces. No hazards have been identified for tungsten fume except that it may aggravate an existing chronic respiratory disease.

EH40 – No limit set.

Yttrium Oxide (Y₂O₃)

Exposure Limits⁽¹⁾:

TLV: 1 mg/m³ (as Y)

PEL: 1 mg/m³

CAS No. ⁽²⁾: 1314-36-9

LD₅₀: 230 mg/kg, rat, intraperitoneal

Short term inhalation in large amounts could cause discomfort, coughing and nasal discharge similar to the symptoms of a bad cold. Drying of the mucous membranes might be experienced. After intratracheal administration in rats, emphysema and diffused modular fibrosis in the lungs have been reported. The oral toxicity of this material is low as it is poorly absorbed from the gastrointestinal tract. Skin and eye contact should produce no problems other than mechanical irritation.

EH40 – No limit set.

Silicon (Si)

Exposure Limits⁽¹⁾:

PEL: 15 mg/m³ (Total inhalable dust); 5 mg/m³ (Total respirable dust)

Eh40 – Total inhalable dust OES 10 mg/m³ (8 hours TWA). Total respirable dust OES 4 mg/m³ (8 hours TWA).

Rhenium (Rh)

EH4 – No limit set.

Calcium (Ca)

EH40 – As oxide OES 2 mg/m³ (8 hours TWA).

- Notes: (1) TLV = Threshold Limit Values – American Conference of Governmental Industrial Hygienists
 PEL = Permissible Exposure Limit – OSHA 29 CFR 1910.1000
 C = Ceiling value
 STEL = Short Term Exposure Limit – a time-weighted 15-minute exposure limit, not to be exceeded at any time during a workday
 (2) CAS No. = Chemical Abstracts Services Number



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Affiliated Companies

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+1 (800) 624-3411
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Western Australian Specialty Alloys Pty. Ltd. (WASA)
2-4 Hopewell Street,
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Western Australia 6155 Australia
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Material Safety Data Sheet

Issue Date: 09-JAN-2012
Supersedes: 13-JUN-2011

SPECTRUS BD1550

1 Identification

Identification of substance or preparation
SPECTRUS BD1550

Product Application Area
Water-based deposit control agent.

Company/Undertaking Identification
GE Water & Process Technologies Canada
3239 Dundas Street West
Oakville, Ontario, L6M 4B2
T 905-465-3030

Emergency Telephone
(800) 877-1940

Prepared by Product Stewardship Group: T 215-355-3300 Prepared on: 09-JAN-2012

2 Hazard(s) identification

EMERGENCY OVERVIEW

May cause moderate irritation to the skin. Severe irritant to the eyes. Mists/aerosols may cause irritation to upper respiratory tract.

Odor: Slight; Appearance: Colorless To Light Yellow, Liquid

Fire fighters should wear positive pressure self-contained breathing apparatus(full face-piece type). Proper fire-extinguishing media: dry chemical, carbon dioxide, foam or water

POTENTIAL HEALTH EFFECTS

ACUTE SKIN EFFECTS:

Primary route of exposure; May cause moderate irritation to the skin.

ACUTE EYE EFFECTS:

Severe irritant to the eyes.

ACUTE RESPIRATORY EFFECTS:

Mists/aerosols may cause irritation to upper respiratory tract.

INGESTION EFFECTS:

May cause gastrointestinal irritation.

TARGET ORGANS:

No evidence of potential chronic effects.

MEDICAL CONDITIONS AGGRAVATED:

Not known.

SYMPTOMS OF EXPOSURE:

May cause redness or itching of skin, irritation, and/or tearing of eyes (direct contact).

3 Composition / information on ingredients

Information for specific product ingredients as required by the WHMIS Regulations is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation.

HAZARDOUS INGREDIENTS:

Cas#	Chemical Name	Range (w/w%)
PROPRIETARY	ANIONIC SURFACTANT	40-70
	ORAL	
	DERMAL	
	INHL.	

4 First-aid measures

SKIN CONTACT:

Wash thoroughly with soap and water. Remove contaminated clothing. Thoroughly wash clothing before reuse. Get medical attention if irritation develops or persists.

EYE CONTACT:

Remove contact lenses. Hold eyelids apart. Immediately flush eyes with plenty of low-pressure water for at least 15 minutes. Get immediate medical attention.

INHALATION:

If nasal, throat or lung irritation develops - remove to fresh air and get medical attention.

INGESTION:

Do not feed anything by mouth to an unconscious or convulsive victim. Do not induce vomiting. Immediately contact physician. Dilute contents of stomach using 2-8 fluid ounces (60-240 mL) of milk or water.

NOTES TO PHYSICIANS:

No special instructions

5 Fire-fighting measures

FIRE FIGHTING INSTRUCTIONS:

Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).

EXTINGUISHING MEDIA:

dry chemical, carbon dioxide, foam or water

HAZARDOUS DECOMPOSITION PRODUCTS:

oxides of carbon

FLASH POINT:

> 200F > 93C P-M(CC)

6 Accidental release measures

PROTECTION AND SPILL CONTAINMENT:

Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container. Flush area with water. Wet area may be slippery. Spread sand/grit.

DISPOSAL INSTRUCTIONS:

The waste characteristics of the absorbed material, or any contaminated soil, should be determined in accordance with provincial regulations. Water contaminated with this product may be sent to a sanitary sewer treatment facility, in accordance with any local agreement or discharged under provincial regulations. Incinerate or land dispose in an approved landfill.

7 Handling and storage

HANDLING:

Normal chemical handling.

STORAGE:

Keep containers closed when not in use. Store in cool ventilated location. Store away from oxidizers.

8 Exposure controls / personal protection

EXPOSURE LIMITS

Consult local authorities for acceptable provincial values.

CHEMICAL NAME

ANIONIC SURFACTANT

PEL (OSHA): Not determined

TLV (ACGIH): Not determined

ENGINEERING CONTROLS:

adequate ventilation

RESPIRATORY PROTECTION:

If air-purifying respirator use is appropriate, use any of the following particulate respirators: N95, N99, N100, R95, R99, R100, P95, P99 or P100.

SKIN PROTECTION:

rubber, butyl or viton gloves -- Wash off after each use. Replace as necessary.

EYE PROTECTION:

splash proof chemical goggles

9 Physical and chemical properties

Spec. Grav. (70F,21C)	1.060	Vapor Pressure (mmHG)	< 1.0
Freeze Point (F)	14	Vapor Density (air=1)	> 1.00
Freeze Point (C)	-10		
Viscosity(cps 70F,21C)	50	% Solubility (water)	100.0

Odor		Slight
Appearance		Colorless To Light Yellow
Physical State		Liquid
Flash Point	P-M(CC)	> 200F > 93C
pH As Is (approx.)		9.8
Evaporation Rate (Ether=1)		< 1.00
Percent VOC:		0.0

NA = not applicable ND = not determined

10 Stability and reactivity

CHEMICAL STABILITY:

Stable under normal storage conditions.

POSSIBILITY OF HAZARDOUS REACTIONS:

Contact with water reactive compounds may cause fire or explosion.

INCOMPATIBILITIES:

May react with strong oxidizers.

DECOMPOSITION PRODUCTS:

oxides of carbon

11 Toxicological information

No Data Available.

12 Ecological information

AQUATIC TOXICOLOGY

Daphnia magna 48 Hour Static Renewal Bioassay
LC50= 8.9; No Effect Level= 1.6 mg/L
Fathead Minnow 96 Hour Static Renewal Bioassay
LC50= 5; No Effect Level= 2.7 mg/L
Rainbow Trout 96 Hour Static Renewal Bioassay
LC50= 9.5; No Effect Level= 6.25 mg/L

BIODEGRADATION

BOD-28 (mg/g): 235
BOD-5 (mg/g): 33
COD (mg/g): 1070
TOC (mg/g): 250

13 Disposal considerations

Incinerate or bury in approved landfill. Please be advised that there may be additional local or provincial requirements relating to the disposal of waste. Consult provincial and local regulations regarding the proper disposal of this material.

14 Transport information

Transportation of Dangerous Goods:

Not Regulated

DOT EMERGENCY RESPONSE GUIDE #: Not applicable

15 Regulatory information

This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

CEPA:

All components of this product comply with substance notification requirements under CEPA.

WHMIS CLASSIFICATION:

D2B

16 Other information

HMIS vII		CODE TRANSLATION
Health	2	Moderate Hazard
Fire	1	Slight Hazard
Reactivity	0	Minimal Hazard
Special	NONE	No special Hazard
(1) Protective Equipment	B	Goggles,Gloves

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

CHANGE LOG

	EFFECTIVE DATE	REVISIONS TO SECTION:	SUPERCEDES
	-----	-----	-----
MSDS status:	12-JAN-2001		** NEW **
	20-MAR-2001	10	12-JAN-2001
	29-JUL-2002	12	20-MAR-2001
	30-JUN-2005	16	29-JUL-2002
	25-JUN-2007	5,8,10	30-JUN-2005
	28-JUN-2010	3,4,8,10	25-JUN-2007
	13-JUN-2011	10	28-JUN-2010
	09-JAN-2012	12	13-JUN-2011



Material Safety Data Sheet

Issue Date: 17-SEP-2013
Supersedes: 16-SEP-2013

SPECTRUS OX1203

1 Identification

Identification of substance or preparation
SPECTRUS OX1203

Product Application Area
Solid microbial control agent.

Company/Undertaking Identification
GE Water & Process Technologies Canada
3239 Dundas Street West
Oakville, Ontario, L6M 4B2
T 905-465-3030

Emergency Telephone
(800) 877-1940

Prepared by Product Stewardship Group: T 215-355-3300 Prepared on: 17-SEP-2013

2 Hazard(s) identification

EMERGENCY OVERVIEW

Corrosive to skin. Corrosive to the eyes. Dusts cause irritation to the upper respiratory tract.

Odor: Halogen; Appearance: White, Tablets

Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type). Proper fire-extinguishing media: Flood with water. Use of CO2 or foam may not be effective.

POTENTIAL HEALTH EFFECTS

ACUTE SKIN EFFECTS:
Primary route of exposure; Corrosive to skin.

ACUTE EYE EFFECTS:
Corrosive to the eyes.

ACUTE RESPIRATORY EFFECTS:
Dusts cause irritation to the upper respiratory tract.

INGESTION EFFECTS:
May cause severe irritation or burning of the gastrointestinal

tract.

TARGET ORGANS:

Repeated skin contact may cause sensitization.

MEDICAL CONDITIONS AGGRAVATED:

Pre-existing skin disorders.

SYMPTOMS OF EXPOSURE:

May cause redness or itching of skin, irritation, and/or tearing of eyes (direct contact).

3 Composition / information on ingredients

Information for specific product ingredients as required by the WHMIS Regulations is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation.

HAZARDOUS INGREDIENTS:

Cas#	Chemical Name	Range (w/w%)
32718-18-6	BROMO-CHLORO, 5,5-DIMETHYL HYDANTOIN Oxidizer; Skin corrosive ORAL LD50-RAT: 929 MG/KG DERMAL LD50-RABBIT: >2000 MG/KG INHL. LC50-RAT: .168 MG/L/4HR	60-100

4 First-aid measures

SKIN CONTACT:

URGENT! Wash thoroughly with soap and water for at least 30 minutes. Remove contaminated clothing. Get immediate medical attention. Thoroughly wash clothing before reuse.

EYE CONTACT:

URGENT! Immediately flush eyes with water for 30 minutes while removing contact lenses. Hold eyelids apart. Get immediate medical attention.

INHALATION:

Remove to fresh air. If breathing is difficult, give oxygen. If breathing has stopped, give artificial respiration. Get immediate medical attention.

INGESTION:

Do not feed anything by mouth to an unconscious or convulsive victim. Do not induce vomiting. Immediately contact physician. If vomiting occurs naturally have victim lean forward to reduce risk of aspiration.

NOTES TO PHYSICIANS:

Material is corrosive. It may not be advisable to induce vomiting. Possible mucosal damage may contraindicate the use of gastric lavage.

5 Fire-fighting measures

FIRE FIGHTING INSTRUCTIONS:

Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).

EXTINGUISHING MEDIA:

Flood with water. Use of CO2 or foam may not be effective.

HAZARDOUS DECOMPOSITION PRODUCTS:

oxides of carbon and hydrogen bromide

FLASH POINT:

> 200F > 93C P-M(CC)

6 Accidental release measures

PROTECTION AND SPILL CONTAINMENT:

Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container. Product releases chlorine when wet. Spill residue may be neutralized with 3% hydrogen peroxide solution.

DISPOSAL INSTRUCTIONS:

The waste characteristics of the absorbed material, or any contaminated soil, should be determined in accordance with provincial regulations. Water contaminated with this product may be sent to a sanitary sewer treatment facility, in accordance with any local agreement or discharged under provincial regulations. Dispose of in approved pesticide facility or according to label instructions.

7 Handling and storage

HANDLING:

Oxidizer. Avoid all contact with reducing agents, oils, greases, organics and acids.

STORAGE:

Keep containers closed when not in use. Keep dry. Do not store at high temperature or near oxidizables or combustibles. Shelf life 270 days.

8 Exposure controls / personal protection

EXPOSURE LIMITS

Consult local authorities for acceptable provincial values.

CHEMICAL NAME

BROMO-CHLORO, 5,5-DIMETHYL HYDANTOIN

PEL (OSHA): LIMITS HAVE NOT BEEN ESTABLISHED BY US OSHA.

TLV (ACGIH): LIMITS HAVE NOT BEEN ESTABLISHED BY ACGIH.

ENGINEERING CONTROLS:

Adequate ventilation to maintain air contaminants below exposure limits.

RESPIRATORY PROTECTION:

If air-purifying respirator use is appropriate, use a respirator with acid gas cartridges and any of the following particulate respirators: N95, N99, N100, R95, R99, R100, P95, P99 or P100.

SKIN PROTECTION:

gauntlet-type butyl or rubber gloves, chemical resistant apron--

Wash off after each use. Replace as necessary.

EYE PROTECTION:

splash proof chemical goggles

9 Physical and chemical properties

Density	60.000 lb/cu.ft	Vapor Pressure (mmHG)	< 1.0
Freeze Point (F)	NA	Vapor Density (air=1)	< 1.00
Freeze Point (C)	NA		
Viscosity(cps 70F,21C)	NA	% Solubility (water)	0.2
Odor		Halogen	
Appearance		White	
Physical State		Tablets	
Flash Point	P-M(CC)	> 200F > 93C	
pH 5% Disp. (approx.)		4.7	
Evaporation Rate (Ether=1)		< 1.00	
Percent VOC:		0.0	

NA = not applicable ND = not determined

10 Stability and reactivity

CHEMICAL STABILITY:

Stable under normal storage conditions.

POSSIBILITY OF HAZARDOUS REACTIONS:

Heat can cause decomposition releasing toxic fumes.

INCOMPATIBILITIES:

Slowly releases halogen gases when contaminated with moisture. May react with alkalies, acids, organics or reducing agents.

DECOMPOSITION PRODUCTS:

oxides of carbon and hydrogen bromide

11 Toxicological information

Oral LD50 RAT:	970 mg/kg
NOTE - Calculated according to GHS additivity formula (Category 4)	
Dermal LD50 RABBIT:	>2000 mg/kg
NOTE - Calculated according to GHS additivity formula	
Inhalation LC50 RAT:	0.18 mg/L/4hr
NOTE - Calculated according to GHS additivity formula (Category 2)	
Skin Irritation Score RABBIT:	Corrosive
NOTE - GHS Category 1 Skin corrosive	
Eye Irritation Score RABBIT:	Corrosive
NOTE - GHS Category 1 Serious eye damage	

12 Ecological information

AQUATIC TOXICOLOGY

American Oyster 96 Hour Static Acute Bioassay
LC50 Greater Than= 640; No Effect Level= 12 mg/L
Daphnia magna 21 Day Chronic Bioassay
Reproduction NOEL= .06 mg/L

Daphnia magna 48 Hour Static Acute Bioassay
LC50= .49; No Effect Level= .32 mg/L
Fathead Minnow 96 Hour Static Acute Bioassay
LC50= 2.43; No Effect Level= 1.83 mg/L
Grass Shrimp (Palaemonetes pugio) 96 Hour Static Acute Bioassay
LC50= 14; No Effect Level= 6.5 mg/L
Rainbow Trout 96 Hour Static Acute Bioassay
LC50= .94; No Effect Level= .54 mg/L
Sheepshead Minnow 96 Hour Static Acute Bioassay
LC50= 21.6; No Effect Level= 12.1 mg/L

BIODEGRADATION

BOD-28 (mg/g): 11
BOD-5 (mg/g): 6
COD (mg/g): 920
TOC (mg/g): 250

13 Disposal considerations

Incinerate or bury in approved landfill. Please be advised that there may be additional local or provincial requirements relating to the disposal of waste. Consult provincial and local regulations regarding the proper disposal of this material.

14 Transport information

Transportation of Dangerous Goods:

OXIDIZING SOLID, CORROSIVE, N.O.S. (BROMO-3-CHLORO-5,
5-DIMETHYLHYDANTOIN)
5.1(8), UN3085 PG III
DOT EMERGENCY RESPONSE GUIDE #: 140

15 Regulatory information

This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

CEPA:

All components of this product comply with substance notification requirements under CEPA.

WHMIS CLASSIFICATION:

Not applicable

FOOD AND DRUG ADMINISTRATION:

The ingredients in this product are approved by FDA under 21 CFR 176.300.

PEST CONTROL PRODUCTS ACT:

Registry # 21467

16 Other information

HMIS VII		CODE TRANSLATION
Health	2	Moderate Hazard
Fire	1	Slight Hazard
Reactivity	1	Slight Hazard

Special	OXY	DOT or NFPA Oxidizer
(1) Protective Equipment	C	Goggles,Gloves,Apron

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

CHANGE LOG

	EFFECTIVE DATE	REVISIONS TO SECTION:	SUPERCEDES
	-----	-----	-----
MSDS status:	19-DEC-1997		** NEW **
	09-SEP-1998		19-DEC-1997
	10-SEP-1998		09-SEP-1998
	23-SEP-1999	;EDIT:9	10-SEP-1998
	21-APR-2000	4	23-SEP-1999
	22-SEP-2000	8	21-APR-2000
	06-DEC-2000	12	22-SEP-2000
	03-JAN-2001	15	06-DEC-2000
	22-MAR-2001	15	03-JAN-2001
	18-FEB-2002	3,4	22-MAR-2001
	19-FEB-2002	3,4	18-FEB-2002
	20-FEB-2002	3,4	19-FEB-2002
	25-JAN-2005	16	20-FEB-2002
	14-JAN-2008	3,4,8	25-JAN-2005
	08-FEB-2008	7	14-JAN-2008
	17-JUN-2009	10	08-FEB-2008
	07-JUN-2011	3,8	17-JUN-2009
	16-SEP-2013	2,4,10,11,14, 15	07-JUN-2011
	17-SEP-2013	14	16-SEP-2013

MATERIAL SAFETY DATA SHEET

E111
09 00

DATE OF PREPARATION
Oct 28, 2011

SECTION 1 — PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NUMBER

E111

PRODUCT NAME

Spray Paint, Forest Green

MANUFACTURER'S NAME

SHERWIN-WILLIAMS CANADA, INC.
8500 Leslie St., Suite 220
Thornhill, ON L3T 7M8

Telephone Numbers and Websites

Product Information	(905) 761-9185
Regulatory Information	(216) 566-2902 www.paintdocs.com
Medical Emergency	(216) 566-2917
Transportation Emergency*	(800) 424-9300

**for Chemical Emergency ONLY (spill, leak, fire, exposure, or accident)*

SECTION 2 — COMPOSITION/INFORMATION ON INGREDIENTS

% by Weight	CAS Number	Ingredient	Units	Vapor Pressure	
14	74-98-6	Propane	ACGIH TLV	2500 PPM	
			OSHA PEL		1000 PPM
13	106-97-8	Butane	ACGIH TLV	800 PPM	
			OSHA PEL		800 PPM
21	108-88-3	Toluene	ACGIH TLV	20 PPM	
			OSHA PEL		100 ppm (Skin)
			OSHA PEL		150 ppm (Skin) STEL
33	67-64-1	Acetone	ACGIH TLV	500 PPM	
			ACGIH TLV		750 PPM STEL
			OSHA PEL		1000 PPM
2	763-69-9	Ethyl 3-Ethoxypropionate	ACGIH TLV	Not Available	
			OSHA PEL		Not Available
1	13463-67-7	Titanium Dioxide	ACGIH TLV	10 mg/m3 as Dust	
			OSHA PEL		10 mg/m3 Total Dust
			OSHA PEL		5 mg/m3 Respirable Fraction

SECTION 3 — HAZARDS IDENTIFICATION

ROUTES OF EXPOSURE

INHALATION of vapor or spray mist.

EYE or SKIN contact with the product, vapor or spray mist.

EFFECTS OF OVEREXPOSURE

EYES: Irritation.

SKIN: Prolonged or repeated exposure may cause irritation.

INHALATION: Irritation of the upper respiratory system.

May cause nervous system depression. Extreme overexposure may result in unconsciousness and possibly death.

Prolonged overexposure to hazardous ingredients in Section 2 may cause adverse chronic effects to the following organs or systems:

- the liver
- the urinary system
- the cardiovascular system

HMIS Codes

Health	2*
Flammability	3
Reactivity	0

- the reproductive system

SIGNS AND SYMPTOMS OF OVEREXPOSURE

Headache, dizziness, nausea, and loss of coordination are indications of excessive exposure to vapors or spray mists. Redness and itching or burning sensation may indicate eye or excessive skin exposure.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE

None generally recognized.

CANCER INFORMATION

For complete discussion of toxicology data refer to Section 11.

SECTION 4 — FIRST AID MEASURES

EYES: Flush eyes with large amounts of water for 15 minutes. Get medical attention.

SKIN: Wash affected area thoroughly with soap and water.
Remove contaminated clothing and launder before re-use.

INHALATION: If affected, remove from exposure. Restore breathing. Keep warm and quiet.

INGESTION: Do not induce vomiting. Get medical attention immediately.

SECTION 5 — FIRE FIGHTING MEASURES**FLASH POINT**

Propellant < 0 °F

LEL

1.0

UEL

12.8

EXTINGUISHING MEDIA

Carbon Dioxide, Dry Chemical, Foam

UNUSUAL FIRE AND EXPLOSION HAZARDS

Containers may explode when exposed to extreme heat.

Application to hot surfaces requires special precautions.

During emergency conditions overexposure to decomposition products may cause a health hazard. Symptoms may not be immediately apparent. Obtain medical attention.

SPECIAL FIRE FIGHTING PROCEDURES

Full protective equipment including self-contained breathing apparatus should be used.

Water spray may be ineffective. If water is used, fog nozzles are preferable. Water may be used to cool closed containers to prevent pressure build-up and possible autoignition or explosion when exposed to extreme heat.

SECTION 6 — ACCIDENTAL RELEASE MEASURES**STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED**

Remove all sources of ignition. Ventilate the area.

Remove with inert absorbent.

SECTION 7 — HANDLING AND STORAGE**STORAGE CATEGORY**

Not Available

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE

Keep away from heat, sparks, and open flame. Vapors will accumulate readily and may ignite explosively.

During use and until all vapors are gone: Keep area ventilated - Do not smoke - Extinguish all flames, pilot lights, and heaters - Turn off stoves, electric tools and appliances, and any other sources of ignition.

Consult NFPA Code. Use approved Bonding and Grounding procedures.

Contents under pressure. Do not puncture, incinerate, or expose to temperature above 120F. Heat from sunlight, radiators, stoves, hot water, and other heat sources could cause container to burst. Do not take internally. Keep out of the reach of children.

SECTION 8 — EXPOSURE CONTROLS/PERSONAL PROTECTION**PRECAUTIONS TO BE TAKEN IN USE**

Use only with adequate ventilation.

Avoid contact with skin and eyes. Avoid breathing vapor and spray mist.

Wash hands after using.

This coating may contain materials classified as nuisance particulates (listed "as Dust" in Section 2) which may be present at hazardous levels only during sanding or abrading of the dried film. If no specific dusts are listed in Section 2, the applicable limits for nuisance dusts are

ACGIH TLV 10 mg/m³ (total dust), 3 mg/m³ (respirable fraction), OSHA PEL 15 mg/m³ (total dust), 5 mg/m³ (respirable fraction).

VENTILATION

Local exhaust preferable. General exhaust acceptable if the exposure to materials in Section 2 is maintained below applicable exposure limits. Refer to OSHA Standards 1910.94, 1910.107, 1910.108.

RESPIRATORY PROTECTION

If personal exposure cannot be controlled below applicable limits by ventilation, wear a properly fitted organic vapor/particulate respirator approved by NIOSH/MSHA for protection against materials in Section 2.

When sanding or abrading the dried film, wear a dust/mist respirator approved by NIOSH/MSHA for dust which may be generated from this product, underlying paint, or the abrasive.

PROTECTIVE GLOVES

None required for normal application of aerosol products where minimal skin contact is expected. For long or repeated contact, wear chemical resistant gloves.

EYE PROTECTION

Wear safety spectacles with unperforated sideshields.

OTHER PRECAUTIONS

Intentional misuse by deliberately concentrating and inhaling the contents can be harmful or fatal.

SECTION 9 — PHYSICAL AND CHEMICAL PROPERTIES

PRODUCT WEIGHT	6.27 lb/gal	750 g/l
SPECIFIC GRAVITY	0.75	
BOILING POINT	<0 - 342 °F	<-18 - 172 °C
MELTING POINT	Not Available	
VOLATILE VOLUME	90%	
EVAPORATION RATE	Faster than ether	
VAPOR DENSITY	Heavier than air	
SOLUBILITY IN WATER	N.A.	
VOLATILE ORGANIC COMPOUNDS (VOC Theoretical - As Packaged)	Volatile Weight 51.05% Less Water and Federally Exempt Solvents	

SECTION 10 — STABILITY AND REACTIVITY**STABILITY — Stable****CONDITIONS TO AVOID**

None known.

INCOMPATIBILITY

None known.

HAZARDOUS DECOMPOSITION PRODUCTS

By fire: Carbon Dioxide, Carbon Monoxide

HAZARDOUS POLYMERIZATION

Will not occur

SECTION 11 — TOXICOLOGICAL INFORMATION**CHRONIC HEALTH HAZARDS**

Reports have associated repeated and prolonged overexposure to solvents with permanent brain and nervous system damage.

IARC's Monograph No. 93 reports there is sufficient evidence of carcinogenicity in experimental rats exposed to titanium dioxide but inadequate evidence for carcinogenicity in humans and has assigned a Group 2B rating. In addition, the IARC summary concludes, "No significant exposure to titanium dioxide is thought to occur during the use of products in which titanium is bound to other materials, such as paint."

TOXICOLOGY DATA

CAS No.	Ingredient Name			
74-98-6	Propane	LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available
106-97-8	Butane	LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available
108-88-3	Toluene	LC50 RAT	4HR	4000 ppm
		LD50 RAT		5000 mg/kg
67-64-1	Acetone	LC50 RAT	4HR	Not Available
		LD50 RAT		5800 mg/kg
763-69-9	Ethyl 3-Ethoxypropionate	LC50 RAT	4HR	Not Available
		LD50 RAT		5000 mg/kg
13463-67-7	Titanium Dioxide	LC50 RAT	4HR	Not Available
		LD50 RAT		Not Available

SECTION 12 — ECOLOGICAL INFORMATION**ECOTOXICOLOGICAL INFORMATION**

No data available.

SECTION 13 — DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD

Waste from this product may be hazardous as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261.

Waste must be tested for ignitability to determine the applicable EPA hazardous waste numbers.

Do not incinerate. Depressurize container. Dispose of in accordance with Federal, State/Provincial, and Local regulations regarding pollution.

SECTION 14 — TRANSPORT INFORMATION

Multi-modal shipping descriptions are provided for informational purposes and do not consider container sizes. The presence of a shipping description for a particular mode of transport (ocean, air, etc.), does not indicate that the product is packaged suitably for that mode of transport. All packaging must be reviewed for suitability prior to shipment, and compliance with the applicable regulations is the sole responsibility of the person offering the product for transport.

US Ground (DOT)

May be classed as Consumer Commodity, ORM-D

UN1950, AEROSOLS, 2.1, LIMITED QUANTITY, (ERG#126)

Canada (TDG)

May be classed as Consumer Commodity, ORM-D

UN1950, AEROSOLS, CLASS 2.1, LIMITED QUANTITY, (ERG#126)

IMO

May be shipped as Limited Quantity

UN1950, AEROSOLS, CLASS 2.1, LIMITED QUANTITY, EmS F-D, S-U, ADR (D)

IATA/ICAO

UN1950, AEROSOLS, FLAMMABLE, 2.1, LIMITED QUANTITY

SECTION 15 — REGULATORY INFORMATION

SARA 313 (40 CFR 372.65C) SUPPLIER NOTIFICATION

CAS No.	CHEMICAL/COMPOUND	% by WT	% Element
108-88-3	Toluene	21	

TSCA CERTIFICATION

All chemicals in this product are listed, or are exempt from listing, on the TSCA Inventory.

SECTION 16 — OTHER INFORMATION



This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

The above information pertains to this product as currently formulated, and is based on the information available at this time. Addition of reducers or other additives to this product may substantially alter the composition and hazards of the product. Since conditions of use are outside our control, we make no warranties, express or implied, and assume no liability in connection with any use of this information.



GHS SAFETY DATA SHEET

SECTION 1 - IDENTIFICATION	
Manufacturer: Black Swan Mfg. Co. 4540 W. Thomas St. Chicago, IL 60651-3318 Tel.: 800-252-5796 Fax: 773-227-3705 Web Site : www.blackswanmfg.com E-mail : info@blackswanmfg.com	For any Transportation or Medical Chemical Emergencies <p align="center">INFOTRAC</p> (800) 535-5053 OR (352) 323-3500 24 hours per day - 7 days a week
Product Name: Stainless Putty	Recommended Use: Putty used for setting closet bowls, strainers and many other applications.

SECTION 2 – HAZARD(S) IDENTIFICATION			
Labels None	NFPA	GHS Classification	
Signal Word None	HEALTH HAZARD 4 – Deadly 3 – Extreme Danger 2 – Hazardous 1 – Slight Hazardous Not 0 - Normal Material F	Health Acute Toxicity: Not Established Skin Irritation: Not Established Eye Irritation: Not Established Skin Sensitization: NO	
HMIS	SPECIFIC HAZARD Oxidizer OX Acid ACID Alkali ALK Corrosive chemical COR Use NO WATER  Radioactive  heated	FIRE HAZARD Flash Points 4 – Below 73°F 3 – Below 100°F 2 – Above 100°F, exceeding 200° 1 – Above 200°F 0 – Will not burn	Environment Acute Aquatic Toxicity: Not Established Chronic Aquatic Toxicity: Not Established
	REACTIVITY 4 – May detonate 3 – Shock and heat may detonate 2 – Violent change 1 – Unstable if 0 – Stable	Physical Flammability: Not Established	Hazardous Statements None
			Precautionary Statements P102 : Keep out of reach

SECTION 3 – COMPOSITION / INFORMATION ON INGREDIENTS
This product is not classified as hazardous according to OSHA 1910.1200.

SECTION 4 – FIRST-AID MEASURES
Inhalation: None Skin: Wash skin thoroughly with soap and water. Eyes: Flush with water for 15 minutes. If irritation persists, get medical attention. Ingestion: DO NOT INDUCE VOMITING. Contact physician immediately.

SECTION 5 – FIRE-FIGHTING MEASURES
Fire Hazard: None Combustion Products: None Extinguishing Media: Carbon Dioxide Gas, Dry Chemical Powder, Water Unsuitable Extinguishing Media: None Protective Equipment: None Special Fire Fighting Procedures: As appropriate for combustibles in area.

SECTION 6 – ACCIDENTAL RELEASE MEASURES

Personal Precautions: None
Protective Equipment: None
Emergency Procedures: None
Environmental Precautions: None
Methods for Cleaning Up: Clean up by scrapping and put in a container for disposal.

Page 1 of 2

GHS SAFETY DATA SHEET

SECTION 7 – HANDLING AND STORAGE

<u>Handling</u>	<u>Storage</u>
No special precautions.	No special precautions.

SECTION 8 – EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Limits

This product is not classified as hazardous according to OSHA 1910.1200.

Engineering Controls: A source of running water to flush or wash the eyes and skin in case of contact. Use local exhaust as needed.

Ventilation: Local ventilation is adequate.

Personal Protective Equipment – Respiratory: None. **Skin:** None. **Eyes:** None.

SECTION 9 – PHYSICAL & CHEMICAL PROPERTIES

Appearance: Beige Putty	Flash Point: Not Established	Vapor Pressure: Not Established
Odor: Mild Petroleum	Specific Gravity: 2.14	Flammability: Not Established
pH: Not Established	Solubility (H₂O): Insoluble	Flammability Limits: LEL – Not Established
Melting Point: Not Established	Evaporation Rate: Not Established	UEL: Not Established
Freezing Point: Not Established	Vapor Density: Not Established	
Boiling Point: Not Established	VOC: 0 g/l	

SECTION 10 – STABILITY AND REACTIVITY

Stability: Stable

Hazardous polymerization: Will not occur

Conditions to avoid: None

Incompatible materials: Strong oxidizers

Hazardous decomposition products: Carbon Dioxide and Carbon Monoxide may be released on burning.

SECTION 11 – TOXICOLOGICAL INFORMATION

Toxicity

This product is not classified as hazardous according to OSHA 1910.1200.

Likely Routes of Exposure: Skin Contact and Ingestion

Symptoms and Effect - Inhalation: None. **Skin Contact:** None. **Eye Contact:** None. **Ingestion:** None.

Long-Term Effect: None known.

Pre-Existing Conditions: None known.

SECTION 12 – ECOLOGICAL INFORMATION

Ecotoxicity: None known

Persistence & Degradability: None known

Bioaccumulative Potential: None known

Mobility in soil: None known

2

SECTION 13 – DISPOSAL CONSIDERATION

Dispose of product or container in accordance with federal, state or local regulations.

SECTION 14 – TRANSPORTATION INFORMATION

D.O.T. (U.S.) : Not Regulated.

SECTION 15 – REGULATORY INFORMATION

Precautionary Label Information: None

Risk Phrases: None

Safety Phrases: S2-Keep out of reach of children.

SECTION 16 – OTHER INFORMATION


Information on this form is furnished solely for the purpose of compliance with the Occupational Safety and Health Act and shall not be used for any other purpose. Swan Mfg. Co. urges the customers receiving this Material Safety Data Sheet to study it carefully to become aware of the hazards, if any, of the product involved. In the interest of safety, you should notify your employees, agents and contractors of the information on the sheets.

11/01/2013

DAT

Page 2 of 2

STAINLESS STEEL MATERIAL SAFETY DATA SHEET

MATERIAL IDENTIFICATION AND USE MATERIAL NAME: STAINLESS STEEL SYNONYMS: Includes all Sheet products, Plate, Strip, Bar, Slab, Ingot, Structural shapes and Tubular Products. WHMIS CLASS: D2A, D2B		SUPPLIER: RUSSEL METALS INC. ADDRESS: 1900 MINNESOTA COURT, MISSISSAUGA, ONTARIO. CANADA. L5N 3C9. TEL: 905-819-7295 FAX: 905-819-7262 FORM #: MSDS-04-2011. DATE: NOVEMBER 2011
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1. PRODUCT INFORMATION

MATERIAL NAME: STAINLESS STEEL

FORM #: MSDS-04-2011

DATE: NOVEMBER 2011

MATERIAL USE: MANUFACTURE OF ARTICLES

2. HAZARDOUS INGREDIENTS

BASE METAL (ALL VALUES ARE EXPRESSED AS WEIGHT PERCENT AND ARE APPROXIMATES)

A Threshold Limit Value (TLV) has not been established for steel overall. The listing below is a summary of the elements used in the Russel Steel products. The exposure limit for iron-containing fumes has been established at 5 mg/m³ (as iron oxide - respirable) with ACGIH's TLV. The individual complex compounds within the fume may have lower exposure limits than the general fume.

COMPONENT	CAS NUMBER	TLV ACGIH (mg/m ³)	LD ₅₀	ELECTRIC ALLOY STEEL	TOOL STEELS	300/400 SERIES STAINLESS STEEL
IRON	7439-89-6	5.0 (as Iron Oxide - Respirable)	30,000 mg/kg Oral-Rat	95	90	80
CHROMIUM	7440-47-3	0.5 (Metal & Cr+3) 0.05 (Cr +6 Soluble) 0.01 (Cr +6 Insoluble)	U	5	25	30
NICKEL	7440-02-0	1.5 (Metal, Inhalable) 0.2 (Insoluble, Inhalable) 0.1 (Soluble, Inhalable)	>9,000 mg/kg Oral-Rat	5	5	35
MOLYBDENUM	7439-98-7	10.0 (Insoluble, Inhalable) 3.0 (Insoluble, Respirable) 0.5 (Soluble, Respirable)	U	2	5	6
VANADIUM	7440-62-2	0.05 (Inhalable Dust or Fume as V ₂ O ₅)	U	2	5	--
COBALT	7440-48-4	0.02 (Cobalt & Inorganic Compounds as Cobalt)	6,171 mg/kg Oral-Rat	.75	8	1
MANGANESE	7439-96-5	0.2 (as Inorganic Manganese)	9,000 mg/kg Oral-Rat	--	--	2.5
ALUMINUM	7429-90-5	1.0 (Metal & Insoluble Compounds - Respirable)	U	1.5	--	--
SILICON	7440-21-3	10.0 (Inhalable), 3.0 (Respirable-as non fibrous Silicon Carbide)	3,160 mg/kg Oral-Rat	2	2.5	--
COPPER	7440-50-8	1.0 (Dust) 0.2 (Fume)	U	--	--	5

NOTES:

- Threshold Limit Values (TLV) established by the American Conference of Governmental Industrial Hygienists (ACGIH - 2011) are 8-hour Time Weighted Average concentrations unless otherwise noted.
- Ingredients listed as required by the WHMIS Ingredient Disclosure List of the Hazardous Products Act (Canada).
- For exact composition, refer to analysis or specifications.

NON-METALLIC COATINGS

DRY-LUBE	Mixture of Borate and Carbonate Soap lubricants for metal forming.	SLUSHING OIL	Protective coatings containing small quantities of anti-oxidants.
PRE-LUBE	Petroleum based oil coating used for metal forming.	VANISHING OIL	Solvent applied petroleum oil protective coating leaving a wax-like protective coating.
LUBE-OIL	Lubricating protective petroleum based oil.		

NOTE: Individual coating components are present at values below the reporting requirements of the WHMIS Ingredient Disclosure List.

3. HAZARDS IDENTIFICATION

ROUTES OF ENTRY:

None in its natural solid state.
 High concentrations of dust may cause irritation to the eyes. Prolonged skin contact with coated steel may cause skin irritation in sensitive individuals. Inhalation of metal particulate or elemental oxide fumes generated during welding, burning, grinding or machining may pose acute or chronic health effects.

TARGET ORGANS:

Respiratory system.

STAINLESS STEEL MATERIAL SAFETY DATA SHEET

EFFECTS OF ACUTE EXPOSURE TO MATERIAL: MANGANESE & COPPER: Inhalation overexposure to manganese or copper (or zinc coated products) may cause metal fume fever characterized by fever and chills (i.e. flu-like symptoms) which appear 4-6 hours after exposure with no long-term effects.

EFFECTS OF CHRONIC EXPOSURE TO MATERIAL: CHROMIUM: IARC lists certain hexavalent chromium compounds under its Group 1 category - "confirmed human carcinogens" and metallic chromium under its Group 3 category - "not classifiable as to their carcinogenicity to humans". Chromium metal is classified as carcinogenic by NTP.
NICKEL: IARC lists metallic nickel under its Group 2B category - "possibly carcinogenic to humans". Nickel may cause skin sensitivity.
COBALT: Cobalt dust may result in an asthma-like condition (cough, shortness of breath). IARC lists metallic cobalt under its Group 2B category - "possibly carcinogenic to humans".
IRON: Inhalation overexposures may cause a benign pneumoconiosis (siderosis) with few or no symptoms.
MANGANESE: Existing studies are inadequate to assess its carcinogenicity. Susceptible to Parkinson's disease, metal fume fever and kidney damage.

NOTES:

- International Agency for Research on Cancer (IARC) - Summaries & Evaluations (2008).
- 3rd Annual Report on Carcinogens as prepared by the National Toxicology Program (NTP).

4. FIRST AID MEASURES

EYES: FLUSH EYES WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES. SEEK MEDICAL ATTENTION IF EYE IRRITATION PERSISTS.

SKIN: MAINTAIN GOOD PERSONAL HYGIENE. WASH AFFECTED AREA WITH MILD SOAP AND WATER. SEEK MEDICAL ATTENTION IF SKIN IRRITATION PERSISTS.

INHALATION: REMOVE TO FRESH AIR. CHECK FOR CLEAR AIRWAY, BREATHING AND PRESENCE OF PULSE. IF NECESSARY ADMINISTER CPR. CONSULT A PHYSICIAN IMMEDIATELY.

INGESTION: RARE IN INDUSTRY. DUST MAY IRRITATE MOUTH AND GASTROINTESTINAL TRACT. IF INGESTED, SEEK MEDICAL ATTENTION PROMPTLY.

5. FIRE FIGHTING MEASURES

FLAMMABILITY CLASSIFICATION: Non-flammable. Will not support combustion.

MEANS OF EXTINCTION: Not applicable for solid product. Use extinguishers appropriate for surrounding materials.

FLASH POINT (°C): N/A **AUTO-IGNITION TEMP (°C):** N/A

UPPER FLAMMABLE LIMIT % BY VOL: N/A **LOWER FLAMMABLE LIMIT % BY VOL:** N/A

SENSITIVITY TO STATIC DISCHARGE: N/A **EXPLOSION DATA (SENSITIVITY TO IMPACT):** No

HAZARDOUS COMBUSTION PRODUCTS: At temperatures above the melting point, fumes containing metal oxides and other alloying elements may be liberated.

UNUSUAL FIRE HAZARDS: None for this product. Do not use water on molten metal.

SPECIAL FIRE FIGHTING: None for this product.

6. ACCIDENTAL RELEASE MEASURES

LEAK AND SPILL PROCEDURES: Not applicable to steel in solid state. For spills involving fine dusts, remove by vacuuming or wet sweeping methods to prevent spreading of dust. Avoid inhalation of dusts.

7. HANDLING AND STORAGE

HANDLING: Operations with the potential for generating high concentrations of airborne particulates should be evaluated and controlled as necessary. Practice good housekeeping. Avoid breathing metal fumes and/or dust.

STORAGE: Store away from acids and incompatible materials.

8. EXPOSURE CONTROLS

ENGINEERING CONTROLS: (e.g. ventilation, enclosures, specify) General or local exhaust during welding or grinding operations.

PERSONAL PROTECTIVE EQUIPMENT: Dependent upon process being performed on material each operation must be addressed for suitable equipment.

GLOVES (Specify): Wear gloves as required **EYES (Specify):** Safety glasses or goggles as required.

CLOTHING (Specify): N/A **FOOTWEAR (Specify):** N/A

RESPIRATOR (Specify): If concentrations exceed established limits use NIOSH/MSHA approved particulate respirators (dust & fume or high efficiency dust fume) when grinding or welding.

OTHER (Specify): N/A

9. CHEMICAL AND PHYSICAL PROPERTIES

PHYSICAL STATE: Solid	APPEARANCE: Silver Grey Metallic (Steel)	ODOUR: Not Applicable
BOILING POINT: Not Applicable	VAPOUR PRESSURE: Not Applicable	VAPOUR DENSITY: Not Applicable
MELTING POINT: 1530°C (2786°F)	DENSITY: 7.86	pH: Not Applicable
EVAPORATION RATE: Not Applicable	SOLUBILITY: Not Applicable	

STAINLESS STEEL MATERIAL SAFETY DATA SHEET

CHEMICAL NAME	SARA 302 (40 CFR 355, Appendix A)	SARA 304 (40 CFR Table 302.4)	SARA 313 (40 CFR 372.65)	CERCLA Reportable Quantities
Vanadium	No	No	No	None listed

SARA THRESHOLD PLANNING QUANTITY: There are no specific Threshold Planning Quantities for the components of this material. The default Federal MSDS submission and inventory requirement filing threshold of 10,000 lbs. (4,540 kg) therefore applies, per 40 CFR 370.20.

TSCA INVENTORY STATUS: The components of this material are listed on the Toxic Substances Control Act inventory.
CERCLA REPORTABLE QUANTITY (RQ): RQ's for Hazardous Substances in the Comprehensive Environmental Response, Compensation, and Liability Act are: Chromium = 5000 lb. (2270 kg); Copper = 5000 lb. (2270 kg); Nickel = 100 lb. (45 kg).

CALIFORNIA (PROPOSITION 65): The Chromium (VI) component of this material is known in the State of California to cause cancer.
 The Nickel component of this material is known in the State of California to cause cancer.
 The Cobalt component of this material is known in the State of California to cause cancer.

OTHER U.S. FEDERAL REGULATIONS: N/A.

ADDITIONAL EUROPEAN UNION REGULATIONS:

RoHS & WEEE: This MSDS follows the European Union Directive "Restriction on the Use of Certain Hazardous Substances (RoHS) in Electrical and Electronic Equipment" (2002/95/EC) and the "Waste Electrical and Electronic Equipment (WEEE)" Directive (2002/96/EC).

Lead (Pb): Lead is not intentionally added to stainless steel however, it may exist in trace levels. Although not analyzed, lead levels in steel are typically well below the EU Directive limit of 0.1%.

Chromium VI (Cr +6): Note, the EU Directive has a lead exemption limit of up to 0.35% as an alloying element in steel.
 The hexavalent oxidation state of chromium does not normally exist as part of a metal or alloy.

16. OTHER INFORMATION

HAZARD LABEL RATING SYSTEMS:

NFPA CODE: H=0 F=0 R=0

HMIS CODE: H=1* F=0 R=0 PPE: See Section 8

* Denotes possible chronic hazard if airborne dusts or fumes are generated.

PREPARED BY: RUSSEL METALS INC. AND ENVIROTEST INC. **DATE:** NOVEMBER 2011

TELEPHONE: 905-819-7295 **NOTE:** CONTACT SUPPLIER FOR ADDITIONAL PRODUCT INFORMATION

DISCLAIMER: THE INFORMATION CONTAINED HEREIN BASED ON DATA CONSIDERED ACCURATE. HOWEVER, NO WARRANTY IS EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THESE DATA OR THE RESULTS OBTAINED FROM THE USE THEREOF.

Material Safety Data Sheet

Section 1

Product Identification & Use

Material Name	STEEL	Supplier	Samuel, Son & Co. LTD.
Synonyms	Includes all sheet products, plate, strip, bar, slab, ingot, and tubular products	Address	2360 Dixie Road Mississauga, Ontario L4Y 1Z7
WHMIS Class	D2A, D2B	Phone	(905) 279-5460
Material Use	Manufacture of Articles	Toll Free	1-800-26SAMUEL
		Fax	(905) 279-9658

Section 2

Hazardous Ingredients (all values are maximum and expressed as weight percent)

ELEMENT	C.A.S.#	%	T.L.V. (as fume)mg/m	P.E.L. (as fume)mg/m	Ld50/Lc50
Iron	7439-89-6	>99	5	10	30g/kg(ld oral rat)
Manganese	7439-96-5	2.2	0.2	5 (C)	9g/kg(ld oral rat)
Nickel	7440-02-0	2.05	1	1	N/A
Chromium	7440-47-3	1.65	0.5	0.5	N/A

The above ingredient list identifies those components which meet the regulated reporting criteria. Concentrations represent a maximum for all grades within a category of steel products and must not be interpreted as a specification for a particular grade. May have oil coating (max 2.2g/m² per side). Galvanize/Galvanneal hot dipped Zinc coating from 15 to 50g/M² per side may be chemically passivated with a Chromium compound, which leaves a residual level of 1.1 to 40mg/m² per side. Petroleum based rust preventative oils are applied to oiled product. Range 1.1 to 5.4g/mg per side. Tin Plate electroplated with tin coating weights 1g/mg per side. May be coated in edible oil. 02 coating – glass film composed of magnesium Ortho-silicate formed during anneal. 03 coating-Oil modified Polyester resin varnish film. C.5m electrical- an inorganic iron- silicate complex that is heat and oil resistant. Dry lube-mixture of Borate and Carbonate soap lubricants for forming. Pre-lube-Petroleum based oil coating. Lube oil-Lubricating protective petroleum based oil. Vanishing oil-solvent applied petroleum coating leaving a g/m² per side, wax like coating. Precoated- cured paint/resin film applied to sheet galvanized from 0.9 to 15 mils. Zincrometal-protective coating of zinc rich paint primer compound. Coating is applied to one side of product to stop scratching, oil coating range 0.215 to 0.325 g/m².
NOTE: Individual coating components are present at values below reporting requirements.

Section 3

Physical Data

Physical state: Solid Odour: N/a Evaporation Rate: N/a Boiling point: N/a Vapour pressure: N/a
Vapour density: N/a Freezing point: 1530 c Density: 7.86 Coefficient water/oil distribution: N/a
PH: N/a Odour threshold: N/a Boiling point: N/a Appearance: silver grey metallic/blue

Section 4

Fire & Explosion Data

Not applicable

Section 5

Reactivity Data

Not applicable Chemical Stability: yes Incompatibility to other substances: yes
Contact with acids will release Hydrogen gas. Hazardous decomposition products: N/a

Section 6

Toxicological Properties of Material

Route of entry: Prolonged skin contact with coated steel may cause skin irritation in sensitive individuals.
Inhalation of metal particulate or elemental oxide fumes generated during welding, burning, grinding

or machining may pose acute or chronic effects.

Acute exposure: Inhalation of overexposure may cause metal fume fever characterised by fever and chills (flu like symptoms) appears to 6 hours after exposure with no know long term effects.

Chronic exposure: Chronic inhalation of metal fume may cause a benign pneumonconconiosis (siderosis) with few or no symptoms. Chronic inhalation of fumes may affect the digestive system, nervous system, respiratory system, muscles and joints.

Sensitisation to product: **Unknown** Synergistic materials: **Unknown** Reproductive effects: **No known effect**

Teratogenicity: **No known effect** Mutagenicity: **No known effect**

Carcinogenicity of material: IARC lists Hexavalent Chromium compounds under its group 1 category.

Confirmed Human Carcinogen

Note: Iron-welding fume has an exposure limit of 5mg/m³ , welding fume may also contain contaminants from fluxes or welding consumables.

Section 7 **Preventive Measures**

Personal Protective Equipment: Dependent upon process being performed on material.

Each operation must be addressed for suitable equipment and or engineering controls.

Gloves: Leather faced/ cut protection Eyes: Safety glasses or face shield as appropriate

Footwear: Safety shoes/ boots where required Other: Barrier cream may be used when handling

Respiratory: Approved respiratory protection where applicable.

Engineering Controls (eg. Ventilation, enclosures):General or local exhaust ventilation during welding.

Leak and spill procedures: N/a

Water disposal: N/a

Storage Requirements: Keep stored material dry to prevent corrosion.

Special Shipping Information: N/a

Section 8 **First-Aid Measures**

Skin: Wash affected area with soap and water. Seek medical attention if irritation persists.

Eye: For irritation from any coating material flush eyes with plenty of water.

Seek medical attention if irritation persists.

Inhalation: For overexposure to metal fumes remove to fresh air.

Seek medical attention for adverse symtons

Ingestion: N/a

Section 9 **Preparation Date of MSDS**

Prepared by **Samuel, Son & Co. Ltd.**

Phone Number **1-800-267-2683**

Date **January 2012**

The information contained is based on the data considered accurate, however, no warranty is expressed or implied regarding the accuracy of these data or the results obtained from the use thereof.



MATERIAL SAFETY DATA SHEET

1. Product and Company Identification

Product Name	Sulfur
Synonym(s)	Sulphur Flowers of sulfur
CAS #	Proprietary
Product use	Industrial process ingredient, anti-fungal agent
Manufacturer	Irving Oil Refining G.P. Box 1260 Saint John, NB E2L 4H6 CA Phone: (506) 202-2000 Refinery: (506) 202-3000 Emergency Phone: 1-800-424-9300 (CHEMTREC)

2. Hazards Identification

Emergency overview	WARNING FLAMMABLE SOLID. MAY CAUSE ALLERGIC SKIN REACTION. CAUSES SKIN IRRITATION. CAUSES EYE IRRITATION. CAUSES RESPIRATORY TRACT IRRITATION.
Potential short term health effects	
Routes of exposure	Eye, Skin contact, Inhalation, Ingestion.
Eyes	Contact with hot sulfur will cause severe burns to eyes. At high concentrations product causes severe inflammation of conjunctiva and cornea. Hydrogen sulfide is very toxic. At concentrations as low as 1 to 5 ppm, nausea and severe eye irritation may occur.
Skin	Contact with hot sulfur will cause severe burns to skin. Contact with skin can cause irritation and allergic reaction (sensitization) in some individuals.
Inhalation	Sense of smell may be impaired at concentrations of hydrogen sulfide at approximately 20 ppm, with headache and respiratory tract lung irritation. At 250 to 500ppm, potentially fatal pulmonary edema may occur. Dizziness, sudden (often fatal) collapse, unconsciousness and death occur at higher concentrations. Pulmonary edema may be delayed as long as 48 hours after exposure.
Ingestion	May cause stomach distress, nausea or vomiting.
Target organs	Skin. Eyes.
Chronic effects	Prolonged or repeated exposure can cause drying, defatting and dermatitis.
Signs and symptoms	Symptoms may include redness, edema, drying, defatting and cracking of the skin. Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.
OSHA Regulatory Status	This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.
Potential environmental effects	Components of this product have been identified as having potential environmental concerns.

3. Composition / Information on Ingredients

Ingredient(s)	CAS #	Percent
Sulfur	7704-34-9	60 - 100
Hydrogen sulfide	7783-06-4	< 0.1

4. First Aid Measures

First aid procedures	
Eye contact	Flush with cool water. Remove contact lenses, if applicable, and continue flushing. Obtain medical attention if irritation persists.

Skin contact	Quickly and gently blot away excess chemical. Gently remove contaminated clothing and shoes. Wash gently and thoroughly with water and non-abrasive soap. Get medical help. NOTE: Removal of solidified molten material from skin requires medical assistance.
Inhalation	If symptoms develop, move victim to fresh air. If symptoms persist, obtain medical attention. If breathing has stopped, trained personnel should administer CPR immediately.
Ingestion	Do not induce vomiting. Never give anything by mouth if victim is unconscious, or is convulsing. Get medical attention immediately.
Notes to physician	Treat patient symptomatically.
General advice	If you feel unwell, seek medical advice (show the label where possible). Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Show this safety data sheet to the doctor in attendance. Avoid contact with eyes and skin. Keep out of reach of children.

5. Fire Fighting Measures

Flammable properties	Flammable solid.
Extinguishing media	
Suitable extinguishing media	Carbon dioxide. Foam. Sand. Dry chemical. Powdered form in air or in contact with oxidizers is explosive. Blue flame may be difficult to see in daylight. Note: Fire may re-ignite after being extinguished.
Unsuitable extinguishing media	Not available
Protection of firefighters	
Specific hazards arising from the chemical	Not available
Protective equipment for firefighters	Firefighters should wear full protective clothing including self contained breathing apparatus.
Hazardous combustion products	May include and are not limited to: Oxides of sulfur.
Explosion data	
Sensitivity to mechanical impact	Yes.
Sensitivity to static discharge	Yes. May be ignited by static discharge. Fine dusts of sulfur dispersed in air in sufficient concentrations, and in the presence of an ignition source is a potential dust explosion hazard. Burns with a pale blue flame that may be difficult to see in the daylight. Transfer using proper grounding procedures.

6. Accidental Release Measures

Personal precautions	Keep unnecessary personnel away. Do not touch or walk through spilled material. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Keep people away from and upwind of spill/leak.
Environmental precautions	Do not discharge into lakes, streams, ponds or public waters.
Methods for containment	Prevent entry into waterways, sewers, basements or confined areas.
Methods for cleaning up	Remove sources of ignition. Before attempting clean up, refer to hazard data given above. Use broom or dry vacuum to collect material for proper disposal without raising dust. Rinse area with water. Prevent large spills from entering sewers or waterways. Contact emergency services and supplier for advice.

7. Handling and Storage

Handling	Use good industrial hygiene practices in handling this material. All equipment used when handling the product must be grounded. Keep container closed. Avoid prolonged or repeated skin contact with this material. Wash thoroughly after handling. Do not eat or drink when using. Avoid contact with skin and clothing. Avoid contact with eyes. Keep container tightly closed. Use only with adequate ventilation.
Storage	Keep away from heat, sparks, and flame. Keep out of reach of children. Store in a closed container away from incompatible materials. Bond and ground containers for transfer.

8. Exposure Controls / Personal Protection

Exposure limits Ingredient(s)	Exposure Limits
Hydrogen sulfide	ACGIH-TLV TWA: 1 ppm STEL: 5 ppm OSHA-PEL Ceiling: 20 ppm
Sulfur	ACGIH-TLV Not established OSHA-PEL Not established
Engineering controls	Not normally required if good ventilation is maintained.
Personal protective equipment	
Eye / face protection	Wear safety glasses with side shields. Emergency responders should wear full eye and face protection.
Hand protection	Heat-protective gloves.
Skin and body protection	Use full body, long sleeved garments to prevent skin contact from hot or molten material. If clothing or footwear becomes contaminated with the product, remove it and completely decontaminate it before re-use, or discard it.
Respiratory protection	Do not attempt rescue of an hydrogen sulfide knockdown victim without the use of proper respiratory protective equipment. Respirator should be selected by and used under the direction of a trained health and safety professional following requirements found in OSHA's respirator standard (29 CFR 1910.134), CAN/CSA-Z94.4 and ANSI's standard for respiratory protection (Z88.2). Where exposure guideline levels may be exceeded, use an approved NIOSH respirator.
General hygiene considerations	Handle in accordance with good industrial hygiene and safety practice. When using do not eat or drink. Wash hands before breaks and immediately after handling the product.

9. Physical and Chemical Properties

Appearance	Solid or liquid
Color	Yellow solid or amber liquid
Form	Solid or liquid
Odor	Odorless when pure. Hydrocarbon impurities may cause an oily or rotten egg odor. The rotten egg odor comes from H ₂ S. Note: H ₂ S deadens the sense of smell. Absence of rotten eggs smell does not mean absence of H ₂ S.
Odor threshold	<0.15 ppm for H ₂ S
Physical state	Solid
pH	Not applicable
Melting point	239.00 °F (115 °C)
Freezing point	239.4 °F (115.22 °C)
Boiling point	832 °F (444.44 °C)
Pour point	Not available
Evaporation rate	Not available
Flash point	404.60 °F (207 °C) Closed Cup
Auto-ignition temperature	Not available
Flammability limits in air, lower, % by volume	35 g/m ³ dust in air
Flammability limits in air, upper, % by volume	1400 g/m ³ dust in air
Vapor pressure	0.000004 mmHg @ 30°C
Vapor density	Not available
Specific gravity	Solid: 2.1 @ 20°C, Liquid: 1.8 @ 25°C

Octanol/water coefficient	Not available
Viscosity	Not available
Percent volatile	Not available

10. Stability and Reactivity

Reactivity	This product may react with strong oxidizing agents.
Possibility of hazardous reactions	Hazardous polymerization does not occur.
Chemical stability	Stable under recommended storage conditions.
Conditions to avoid	Reacts violently with strong oxidizers including but not limited to bromine, bromates, chlorine, chlorates, fluorine, peroxides, perchlorates, nitrates and nitric acid. Forms explosive, shock-sensitive, or pyrophoric mixtures with ammonia, ammonium nitrate, metal carbides, charcoal, hydrocarbons, and iron. Reacts violently with potassium, lithium, sodium, tin, uranium, and zinc. Attacks steel when moist. Avoid high temperatures. Do not mix with other chemicals.
Incompatible materials	Oxidizers.
Hazardous decomposition products	May include and are not limited to: Oxides of sulfur.

11. Toxicological Information

Component analysis - LC50

Ingredient(s)	LC50
Hydrogen sulfide	1 mg/l/4h rat; 335 ppm mouse
Sulfur	6.23 mg/l/4h rat

Component analysis - Oral LD50

Ingredient(s)	LD50
Hydrogen sulfide	Not available
Sulfur	> 5000 mg/kg human; 3000 mg/kg rat

Effects of acute exposure

Eye	Contact with hot sulfur will cause severe burns to eyes. At high concentrations product causes severe inflammation of conjunctiva and cornea. Hydrogen sulfide is very toxic. At concentrations as low as 1 to 5 ppm, nausea and severe eye irritation may occur.
Skin	Contact with hot sulfur will cause severe burns to skin. Contact with skin can cause irritation and allergic reaction (sensitization) in some individuals.
Inhalation	Sense of smell may be impaired at concentrations of hydrogen sulfide at approximately 20 ppm, with headache and respiratory tract lung irritation. At 250 to 500ppm, potentially fatal pulmonary edema may occur. Dizziness, sudden (often fatal) collapse, unconsciousness and death occur at higher concentrations. Pulmonary edema may be delayed as long as 48 hours after exposure.
Ingestion	May cause stomach distress, nausea or vomiting.
Sensitization	Non-hazardous by WHMIS/OSHA criteria. Contains a potential skin sensitizer.
Chronic effects	Non-hazardous by WHMIS/OSHA criteria.
Carcinogenicity	Not classified or listed by IARC, NTP, OSHA and ACGIH.
Mutagenicity	Non-hazardous by WHMIS/OSHA criteria.
Reproductive effects	Non-hazardous by WHMIS/OSHA criteria.
Teratogenicity	Non-hazardous by WHMIS/OSHA criteria.
Name of Toxicologically Synergistic Products	Other irritants can be expected to produce additive or synergistic effects.

12. Ecological Information

Ecotoxicity	See below	
Ecotoxicity - Freshwater Fish - Acute Toxicity Data		
Hydrogen sulfide	7783-06-4	96 Hr LC50 Lepomis macrochirus: 0.0448 mg/L [flow-through]; 96 Hr LC50 Pimephales promelas: 0.016 mg/L [flow-through]
Sulfur	7704-34-9	96 Hr LC50 Brachydanio rerio: 866 mg/L [static]; 96 Hr LC50 Lepomis macrochirus: <14 mg/L [static]; 96 Hr LC50 Oncorhynchus mykiss: >180 mg/L [static]
Ecotoxicity - Water Flea - Acute Toxicity Data		
Hydrogen sulfide	7783-06-4	96 Hr LC50 Gammarus pseudolimnaeus: 0.022 mg/L
Persistence / degradability	Not available	
Bioaccumulation / accumulation	Not available	
Mobility in environmental media	Not available	
Environmental effects	Not available	
Aquatic toxicity	Not available	
Partition coefficient	Not available	
Chemical fate information	Not available	
Other adverse effects	Not available	

13. Disposal Considerations

Disposal instructions	Dispose in accordance with all applicable regulations.
Waste from residues / unused products	Not available
Contaminated packaging	Not available

14. Transport Information

U.S. Department of Transportation (DOT)

Basic shipping requirements:

Proper shipping name SOLID: Sulfur, UN1350, Class 4.1, PG III;
LIQUID: Sulfur, molten, UN2448, Class 4.1, PGIII

Hazard class 4.1



Transportation of Dangerous Goods (TDG - Canada)

Basic shipping requirements:

Proper shipping name SOLID: Sulfur, UN1350, Class 4.1, PG III;
LIQUID: Sulfur, molten, UN2448, Class 4.1, PGIII

Hazard class 4.1



15. Regulatory Information

Canadian federal regulations This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

Canada - WHMIS - Ingredient Disclosure List

Hydrogen sulfide 7783-06-4 1 %

WHMIS status Controlled

WHMIS classification Class B - Division 4 - Flammable Solid, Class D - Division 2B

WHMIS labeling



Occupational Safety and Health Administration (OSHA)

29 CFR 1910.1200 hazardous chemical Yes

US Federal regulations This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

U.S. - CAA (Clean Air Act) - Accidental Release Prevention - Toxic Substances

Hydrogen sulfide 7783-06-4 10000 lb threshold quantity

U.S. - CERCLA/SARA - Hazardous Substances and their Reportable Quantities

Hydrogen sulfide 7783-06-4 100 Lb final RQ; 45.4 kg final RQ

U.S. - CERCLA/SARA - Section 302 Extremely Hazardous Substances EPCRA RQs

Hydrogen sulfide 7783-06-4 100 Lb EPCRA RQ

U.S. - CERCLA/SARA - Section 302 Extremely Hazardous Substances TPQs

Hydrogen sulfide 7783-06-4 500 Lb TPQ

U.S. - CERCLA/SARA - Section 313 - Emission Reporting

Hydrogen sulfide 7783-06-4 1.0 % de minimis concentration

U.S. - CWA (Clean Water Act) - Hazardous Substances

Hydrogen sulfide 7783-06-4 Present

CERCLA (Superfund) reportable quantity

Hydrogen sulfide: 100.0000

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories Immediate Hazard - Yes
Delayed Hazard - Yes
Fire Hazard - Yes
Pressure Hazard - No
Reactivity Hazard - No

Section 302 extremely hazardous substance No

Section 311 hazardous chemical Yes

Clean Water Act (CWA) Not available

State regulations

This product does not contain a chemical known to the State of California to cause cancer, birth defects or other reproductive harm.

U.S. - California - 8 CCR Section 339 - Director's List of Hazardous Substances

Hydrogen sulfide 7783-06-4 Present
Sulfur 7704-34-9 Present

U.S. - Louisiana - Reportable Quantity List for Pollutants

Hydrogen sulfide 7783-06-4 100 Lb final RQ; 45.4 kg final RQ

U.S. - Massachusetts - Right To Know List

Hydrogen sulfide 7783-06-4 Extraordinarily hazardous
Sulfur 7704-34-9 Present

U.S. - Minnesota - Hazardous Substance List

Hydrogen sulfide 7783-06-4 Present

U.S. - New Jersey - Right to Know Hazardous Substance List

Hydrogen sulfide 7783-06-4 sn 1017
Sulfur 7704-34-9 sn 1757

U.S. - New York - Reporting of Releases Part 597 - List of Hazardous Substances

Hydrogen sulfide 7783-06-4 100 Lb RQ (air); 100 lb RQ (land/water)

U.S. - North Carolina - Control of Toxic Air Pollutants

Hydrogen sulfide 7783-06-4 0.12 mg/m3 (chronic toxicants)

U.S. - Ohio - Extremely Hazardous Substances - Threshold Quantities

Hydrogen sulfide 7783-06-4 500 Lb TQ

U.S. - Pennsylvania - RTK (Right to Know) List

Hydrogen sulfide 7783-06-4 Environmental hazard
Sulfur 7704-34-9 Present

U.S. - Rhode Island - Hazardous Substance List

Hydrogen sulfide 7783-06-4 Toxic; Flammable
Sulfur 7704-34-9 Flammable

Inventory name

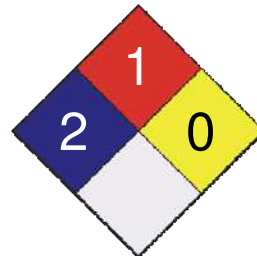
Country(s) or region	Inventory name	On inventory (yes/no)*
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

16. Other Information

LEGEND HMIS/NFPA	
Severe	4
Serious	3
Moderate	2
Slight	1
Minimal	0

Health	/ 2
Flammability	1
Physical Hazard	0
Personal Protection	X



Disclaimer

The information contained in this form is based on data from sources considered to be reliable but Irving Oil Refining G.P. does not guarantee the accuracy or completeness thereof. The information is provided as a service to the persons purchasing or using the material to which it refers and Irving Oil Refining G.P. expressly disclaims all liability for loss or damage including consequential loss or for injury to persons including death. The information shall not be reproduced, published or distributed in any manner without prior consent in writing of Irving Oil Refining G.P.

Issue date

01-Nov-2012

Effective date

01-Nov-2012

Expiry date

01-Nov-2015

Prepared by

Dell Tech Laboratories Ltd. (519) 858-5021

Other information

For an updated MSDS, please contact the supplier/manufacturer listed on the first page of the document.

This MSDS conforms to the ANSI Z400.1/Z129.1-2010 Standard.

Sulfur



Flammable solid. Contains a potential skin sensitizer. Eye and skin irritant.

Avoid contact with eyes and skin. Wear rubber gloves and safety glasses with side shields. Keep out of reach of children.

EYE: Flush with cool water. Remove contact lenses, if applicable, and continue flushing. Obtain medical attention if irritation persists.

SKIN: Quickly and gently blot away excess chemical. Gently remove contaminated clothing and shoes. Wash gently and thoroughly with water and non-abrasive soap. Get medical help. **NOTE:** Removal of solidified molten material from skin requires medical assistance.

INHALATION: If symptoms develop, move victim to fresh air. If symptoms persist, obtain medical attention. If breathing has stopped, trained personnel should administer CPR immediately.

INGESTION: Do not induce vomiting. Never give anything by mouth if victim is unconscious, or is convulsing. Get medical attention immediately.

READ MATERIAL SAFETY DATA SHEET BEFORE USING PRODUCT

=====

Solide inflammable. Contient un agent sensibilisateur potentiel de la peau. Irritant pour les yeux et la peau.

Éviter le contact avec les yeux et la peau. Porter des gants en caoutchouc et des lunettes de sécurité pourvues de protections latérales. Tenir hors de la portée des enfants.

YEUX: Rincer à grande eau froide. Enlever les verres de contact, le cas échéant, et continuer à rincer. Obtenir de l'attention médicale si l'irritation persiste.

PEAU: Sécher rapidement et doucement l'excès du produit chimique. Enlever les vêtements et les chaussures contaminés. Laver à fond, en frottant doucement avec de l'eau et du savon non abrasif. Cherchez de l'assistance médicale. **NOTE :** L'assistance médicale est requise afin d'enlever les matériaux en fusion solidifiés et adhérents à la peau.

INHALATION: En cas de symptômes, placer la victime à l'air frais. Si les symptômes persistent, obtenir de l'attention médicale. Si la victime ne respire pas du personnel qualifié devrait immédiatement commencer la réanimation cardio-pulmonaire.

INGESTION: Ne pas provoquer le vomissement. Ne jamais rien faire boire ou avaler à une victime inconsciente, ou si la victime a des convulsions. Obtenir une assistance médicale immédiate.



LIRE LA FICHE SIGNALÉTIQUE AVANT D'UTILISER CE PRODUIT



SECTION 1 - IDENTIFICATION

<p>Manufacturer: Black Swan Mfg. Co. 4540 W. Thomas St. Chicago, IL 60651-3318 Tel.: 800-252-5796 Fax: 773-227-3705 Web Site : www.blackswanmfg.com E-mail : info@blackswanmfg.com</p>	<p>For any Transportation or Medical Chemical Emergencies call: INFOTRAC (800) 535-5053 OR (352) 323-3500 24 hours per day - 7 days a week</p>
<p>Product Name: Swan Seal</p>	<p>Recommended Use: To seal threaded pipes on metal and plastic connections.</p>

SECTION 2 – HAZARD(S) IDENTIFICATION

<p>Labels  Irritant</p> <p>Signal Word Warning</p> <p>HMIS</p> <table border="1"> <tr><td>HEALTH</td><td>1</td></tr> <tr><td>FLAMMABILITY</td><td>2</td></tr> <tr><td>REACTIVITY</td><td>0</td></tr> </table>	HEALTH	1	FLAMMABILITY	2	REACTIVITY	0	<p>NFPA</p> <p>HEALTH HAZARD 4 - Deadly 3 - Extreme Danger 2 - Hazardous 1 - Slight Hazardous 0 - Normal Material</p> <p>FIRE HAZARD Flash Points 4 - Below 100 F 3 - Below 100 F 2 - Above 100 F, No exceeding 200 F 1 - Above 200 F 0 - Will not burn</p> <p>REACTIVITY 4 - May detonate 3 - Shock and heat may detonate 2 - Violent chemical change 1 - Unstable if heated 0 - Stable</p> <p>SPECIFIC HAZARD Oxidizer OX Acid ACID Alkali ALK Corrosive COR Use NO WATER W Radioactive </p> <p>NFPA Diamond: Health: 1, Fire: 2, Reactivity: 0, Specific Hazard: 0</p>	<p>GHS Classification</p> <table border="1"> <tr> <td>Health Acute Toxicity: Not Established Skin Irritation: Cat. 3 Eye Irritation: Cat. 2B Skin Sensitization: NO</td> <td>Environmental Acute Aquatic Toxicity: Not Established Chronic Aquatic Toxicity: Not Established</td> </tr> <tr> <td colspan="2">Physical Flammability: Not Established</td> </tr> </table>	Health Acute Toxicity: Not Established Skin Irritation: Cat. 3 Eye Irritation: Cat. 2B Skin Sensitization: NO	Environmental Acute Aquatic Toxicity: Not Established Chronic Aquatic Toxicity: Not Established	Physical Flammability: Not Established	
HEALTH	1											
FLAMMABILITY	2											
REACTIVITY	0											
Health Acute Toxicity: Not Established Skin Irritation: Cat. 3 Eye Irritation: Cat. 2B Skin Sensitization: NO	Environmental Acute Aquatic Toxicity: Not Established Chronic Aquatic Toxicity: Not Established											
Physical Flammability: Not Established												
<p>Hazardous Statements H317: May cause an allergic skin reaction.</p>		<p>Precautionary Statements P102: Keep out of reach of children P233: Keep container tightly closed P262: Do not get in eyes, on skin or on clothing P271: Use only outdoors or in well-ventilated area</p>										

SECTION 3 – COMPOSITION / INFORMATION ON INGREDIENTS

<u>Hazardous Chemicals</u>	<u>CAS#</u>	<u>EINECS#</u>	<u>REACH</u> <u>Pre-registration Number</u>	<u>Approx %</u>
ETHYLENE GLYCOL N-BUTYL ETHER	111-76-2	203-905-0	N/A	20-25%

All of the constituents of this adhesive product are listed on the TSCA inventory of chemical substances maintained by the US EPA, or are exempt from that listing.

SECTION 4 – FIRST-AID MEASURES

Inhalation: Move into fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen and call physician.
Skin: Remove contaminated clothing and shoes. Wash skin thoroughly with soap and water.
Eyes: Flush with water for 15 minutes. If irritation persists, get medical attention.
Ingestion: Give 1 or 2 glasses of water. DO NOT INDUCE VOMITING. Contact physician immediately.

SECTION 5 – FIRE-FIGHTING MEASURES

Fire Hazard: Combustible-Moderate flash point. Vapors heavier than air and may travel along the ground or to low spots at considerable distances to a source of ignition resulting in potential flashback. Burning liquid may float on water. Heat may build up pressure and rupture containers.
Combustion Products: None known
Extinguishing Media: Carbon Dioxide Gas, Dry Chemical Powder, and Water.
Unsuitable Extinguishing Media: None known
Protective Equipment: Self-contained breathing apparatus [(SCBA), MSHA/NIOSH]. Full protective gear.
Special Fire Fighting Procedures: As appropriate for combustibles in area.

GHS SAFETY DATA SHEET

SECTION 6 – ACCIDENTAL RELEASE MEASURES

Personal Precautions: None
Protective Equipment: None
Emergency Procedures: None
Environmental Precautions: Avoid runoff into storm sewers, ditches and waterways.
Methods for Cleaning Up: Soak up spill with an inert absorbent such as sand, earth or other noncombusting material. Transfer absorbent material to a covered, labeled, metal container. Do not use plastic or aluminum containers.

SECTION 7 – HANDLING AND STORAGE

<u>Handling</u>	<u>Storage</u>
Avoid prolonged or repeated contact with skin or clothing. Empty containers may contain residues; treat as if full and observe all product precautions. Do not reuse empty containers.	Keep container closed and upright when not in use. Do not store near heat, sparks, or open flames.

SECTION 8 – EXPOSURE CONTROLS / PERSONAL PROTECTION

<u>Hazardous Chemicals</u>	<u>Exposure Limits</u>		
	<u>ACGIH-TLV</u>	<u>ACGIH-STEL</u>	<u>OSHA-PEL</u>
ETHYLENE GLYCOL N-BUTYL ETHER	25 ppm	N/A	50 ppm

Engineering Controls: A source of running water to flush or wash the eyes and skin in case of contact. Use local exhaust as needed.
Ventilation: Local ventilation is adequate.
Personal Protective Equipment – Respiratory: Avoid breathing of fumes. If used in a confined area, a respirator may be necessary.
Personal Protective Equipment – Skin: Protective Gloves.
Personal Protective Equipment – Eyes: Protective Goggles.

SECTION 9 – PHYSICAL & CHEMICAL PROPERTIES

Appearance: White Paste	Flash Point: 82°F	Vapor Pressure: 0.88mm Hg @25°C
Odor: Mild	Specific Gravity: 1.41	Flammability: 921°F
pH: Not Established	Solubility (H2O): Slight	Flammability Limits: LEL - 1.1%
Melting Point: Not Established	Evaporation Rate: 0.6 (BUAC=1)	UEL - 10.6%
Freezing Point: Not Established	Vapor Density: >1.00 (AIR=1)	
Boiling Point: 180°F	VOC: 190 g/l	

SECTION 10 – STABILITY AND REACTIVITY

Stability: Stable
Hazardous polymerization: Will not occur
Conditions to avoid: Heat, sparks, open flames and strong oxidizing
Incompatible materials: Liquid oxygen systems, Liquid Sodium, Gaseous Fluorine, Strong Oxidizers
Hazardous decomposition products: None

SECTION 11 – TOXICOLOGICAL INFORMATION

<u>Hazardous Chemicals</u>	<u>Toxicity</u>	
	<u>LD₅₀</u>	<u>LC₅₀</u>
ETHYLENE GLYCOL N-BUTYL ETHER	N/A	N/A

Likely Routes of Exposure: Skin Contact and Eye Contact
Symptoms and Effect - Inhalation: Possible dizziness if used in confined area. **Skin Contact:** May cause mild irritation to sensitive skin.
Eye Contact: May cause eye irritation. **Ingestion:** None.
Long-Term Effect: None known
Pre-Existing Conditions: None known

SECTION 12 – ECOLOGICAL INFORMATION

Ecotoxicity: None known
Persistence & Degradability: None known
Bioaccumulative Potential: None known
Mobility in soil: None known

GHS SAFETY DATA SHEET

SECTION 13 – DISPOSAL CONSIDERATION

Dispose of product or container in accordance with federal, state or local regulations.

SECTION 14 – TRANSPORTATION INFORMATION

D.O.T. (U.S.) : Not Regulated

SECTION 15 – REGULATORY INFORMATION

Precautionary Label Information: Irritant

Risk Phrases: R36/38-Irritant to eyes and skin.

Safety Phrases: S2-Keep out of reach of children. S3-Keep in a cool place. S7-Keep container tightly closed when not in use. S24/25-Avoid contact with skin and eyes. S29-Do not empty into drains, storm drains or watercourses. S35-Dispose of material and container in a safe way.

S37/39-Wear suitable gloves and eye protection. S51-Use in well ventilated area.

SECTION 16 – OTHER INFORMATION

Information on this form is furnished solely for the purpose of compliance with the Occupational Safety and Health Act and shall not be used for any other purpose. Black Swan Mfg. Co. urges the customers receiving this Material Safety Data Sheet to study it carefully to become aware of the hazards, if any, of the product involved. In the interest of safety, you should notify your employees, agents and contractors of the information on the sheets.

DATE: 01/01/2014

SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION**PRODUCT NAME:** IPEX 636 CLR Low VOC Primer for PVC and CPVC Plastic Pipe**PRODUCT USE:** Low VOC Primer for PVC and CPVC Plastic Pipe**SUPPLIER:** IPEX Inc.807 Pharmacy Avenue
Scarborough, Ontario M1L 3K2, CAN**MANUFACTURER:** IPS Corporation17109 South Main Street, Gardena, CA 90248-3127
P.O. Box 379, Gardena, CA 90247-0379
Tel. 1-310-898-3300**EMERGENCY:** Transportation: CHEMTEL Tel. 800.255-3924, 813-248-0585 (International)**Medical:** CHEMTEL Tel. 800.255-3924, 813-248-0585 (International)**SECTION 2 - HAZARDS IDENTIFICATION****GHS CLASSIFICATION:**

Health		Environmental		Physical	
Acute Toxicity:	Category 4	Acute Toxicity:	None Known	Flammable Liquid	Category 2
Skin Irritation:	Category 3	Chronic Toxicity:	None Known		
Skin Sensitization:	NO				
Eye:	Category 2B				

GHS LABEL:

OR

**Signal Word:**
Danger**WHMIS CLASSIFICATION:** CLASS B, DIVISION 2**Hazard Statements**H225: Highly flammable liquid and vapor
H319: Causes serious eye irritation
H332: Harmful if inhaled
H335: May cause respiratory irritation
H336: May cause drowsiness or dizziness
EUH019: May form explosive peroxides**Precautionary Statements**P210: Keep away from heat/sparks/open flames/hot surfaces – No smoking
P261: Avoid breathing dust/fume/gas/mist/vapors/spray
P280: Wear protective gloves/protective clothing/eye protection/face protection
P304+P340: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
P403+P233: Store in a well ventilated place. Keep container tightly closed
P501: Dispose of contents/container in accordance with local regulation**SECTION 3 - COMPOSITION/INFORMATION ON INGREDIENTS**

	CAS#	EINECS #	REACH	CONCENTRATION
			Pre-registration Number	% by Weight
Tetrahydrofuran (THF)	109-99-9	203-726-8	05-2116297729-22-0000	45 - 59
Methyl Ethyl Ketone (MEK)	78-93-3	201-159-0	05-2116297728-24-0000	19 - 29
Acetone	67-64-1	200-662-2	05-2116297713-35-0000	5 - 20
Cyclohexanone	108-94-1	203-631-1	05-2116297718-25-0000	5 - 15

All of the constituents of this adhesive product are listed on the TSCA inventory of chemical substances maintained by the US EPA, or are exempt from that listing.

* Indicates this chemical is subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986 (40CFR372).

indicates that this chemical is found on Proposition 65's List of chemicals known to the State of California to cause cancer or reproductive toxicity.

SECTION 4 - FIRST AID MEASURES

Contact with eyes: Flush eyes immediately with plenty of water for 15 minutes and seek medical advice immediately.
Skin contact: Remove contaminated clothing and shoes. Wash skin thoroughly with soap and water. If irritation develops, seek medical advice.
Inhalation: Remove to fresh air. If breathing is stopped, give artificial respiration. If breathing is difficult, give oxygen. Seek medical advice.
Ingestion: Rinse mouth with water. Give 1 or 2 glasses of water or milk to dilute. Do not induce vomiting. Seek medical advice immediately.

SECTION 5 - FIREFIGHTING MEASURES

Suitable Extinguishing Media: Dry chemical powder, carbon dioxide gas, foam, Halon, water fog. HMIS NFPA 0-Minimal
Unsuitable Extinguishing Media: Water spray or stream. Health 2 2 1-Slight
Exposure Hazards: Inhalation and dermal contact. Flammability 3 3 2-Moderate
Combustion Products: Oxides of carbon and smoke. Reactivity 0 0 3-Serious
 PPE B 4-Severe

Protection for Firefighters: Self-contained breathing apparatus or full-face positive pressure airline masks.**SECTION 6 - ACCIDENTAL RELEASE MEASURES**

Personal precautions: Keep away from heat, sparks and open flame.
 Provide sufficient ventilation, use explosion-proof exhaust ventilation equipment or wear suitable respiratory protective equipment.
 Prevent contact with skin or eyes (see section 8).
Environmental Precautions: Prevent product or liquids contaminated with product from entering sewers, drains, soil or open water course.
Methods for Cleaning up: Clean up with sand or other inert absorbent material. Transfer to a closable steel vessel.
Materials not to be used for clean up: Aluminum or plastic containers

SECTION 7 - HANDLING AND STORAGE

Handling: Avoid breathing of vapor, avoid contact with eyes, skin and clothing.
 Keep away from ignition sources, use only electrically grounded handling equipment and ensure adequate ventilation/fume exhaust hoods.
 Do not eat, drink or smoke while handling.
Storage: Store in ventilated room or shade below 44°C (111°F) and away from direct sunlight.
 Keep away from ignition sources and incompatible materials: caustics, ammonia, inorganic acids, chlorinated compounds, strong oxidizers and isocyanates.
 Follow all precautionary information on container label, product bulletins and solvent cementing literature.

SECTION 8 - PRECAUTIONS TO CONTROL EXPOSURE / PERSONAL PROTECTION

EXPOSURE LIMITS:	Component	ACGIH TLV	ACGIH STEL	OSHA PEL	OSHA STEL:
	Tetrahydrofuran (THF)	50 ppm	100 ppm	200 ppm	
	Methyl Ethyl Ketone (MEK)	200 ppm	300 ppm	200 ppm	
	Cyclohexanone	20 ppm	50 ppm	50 ppm	
	Acetone	500 ppm	750 ppm	1000 ppm	

Engineering Controls: Use local exhaust as needed.**Monitoring:** Maintain breathing zone airborne concentrations below exposure limits.**Personal Protective Equipment (PPE):****Eye Protection:** Avoid contact with eyes, wear splash-proof chemical goggles, face shield, safety glasses (spectacles) with brow guards and side shields, etc. as may be appropriate for the exposure.**Skin Protection:** Prevent contact with the skin as much as possible. Butyl rubber gloves should be used for frequent immersion.

Use of solvent-resistant gloves or solvent-resistant barrier cream should provide adequate protection when normal adhesive application practices and procedures are used for making structural bonds.

Respiratory Protection: Prevent inhalation of the solvents. Use in a well-ventilated room. Open doors and/or windows to ensure airflow and air changes. Use local exhaust ventilation to remove airborne contaminants from employee breathing zone and to keep contaminants below levels listed above. With normal use, the Exposure Limit Value will not usually be reached. When limits approached, use respiratory protection equipment.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Clear, thin liquid	Odor Threshold:	0.88 ppm (Cyclohexanone)
Odor:	Ethereal	Boiling Range:	56°C (133°F) to 156°C (313°F)
pH:	Not Applicable	Evaporation Rate:	> 1.0 (BUAC = 1)
Melting/Freezing Point:	-108.5°C (-163.3°F) Based on first melting component: THF	Flammability:	Category 2
Boiling Point:	56°C (133°F) Based on first boiling component: Acetone	Flammability Limits:	LEL: 1.1% based on Cyclohexanone UEL: 12.8% based on Acetone
Flash Point:	-20°C (-4°F) TCC based on Acetone	Vapor Pressure:	190 mm Hg @ 20°C (68°F) Acetone
Specific Gravity:	0.858 @23°C (73°F)	Vapor Density:	>2.0 (Air = 1)
Solubility:	Solvent portion soluble in water. Resin portion separates out.	Other Data: Viscosity:	Water-thin
Partition Coefficient n-octanol/water:	Not Available		
Auto-ignition Temperature:	321°C (610°F) based on THF		
Decomposition Temperature:	Not Applicable		
VOC Content:	When applied as directed, per SCAQMD Rule 1168, Test Method 316A, VOC content is: ≤ 550 g/l.		

SECTION 10 - STABILITY AND REACTIVITY

Stability:	Stable
Hazardous decomposition products:	None in normal use. When forced to burn, this product gives off oxides of carbon and smoke.
Conditions to avoid:	Keep away from heat, sparks, open flame and other ignition sources.
Incompatible Materials:	Oxidizers, strong acids and bases, amines, ammonia

SECTION 11 - TOXICOLOGICAL INFORMATION

Likely Routes of Exposure: Inhalation, Eye and Skin Contact

Acute symptoms and effects:

Inhalation:	Severe overexposure may result in nausea, dizziness, headache. Can cause drowsiness, irritation of eyes and nasal passages.
Eye Contact:	Vapors slightly uncomfortable. Overexposure may result in severe eye injury with corneal or conjunctival inflammation on contact with the liquid.
Skin Contact:	Liquid contact may remove natural skin oils resulting in skin irritation. Dermatitis may occur with prolonged contact.
Ingestion:	May cause nausea, vomiting, diarrhea and mental sluggishness.

Chronic (long-term) effects: None known to humans

Toxicity:	LD ₅₀	LC ₅₀
Tetrahydrofuran (THF)	Oral: 2842 mg/kg (rat)	Inhalation 3 hrs. 21,000 mg/m ³ (rat)
Methyl Ethyl Ketone (MEK)	Oral: 2737 mg/kg (rat), Dermal: 6480 mg/kg (rabbit)	Inhalation 8 hrs. 23,500 mg/m ³ (rat)
Cyclohexanone	Oral: 1535 mg/kg (rat), Dermal: 948 mg/kg (rabbit)	Inhalation 4 hrs. 8,000 PPM (rat)
Acetone	Oral: 5800 mg/kg (rat)	Inhalation 50,100 mg/m ³ (rat)

Reproductive Effects	Teratogenicity	Mutagenicity	Embryotoxicity	Sensitization to Product	Synergistic Products
Not Established	Not Established	Not Established	Not Established	Not Established	Not Established

SECTION 12 - ECOLOGICAL INFORMATION

Ecotoxicity:	None Known
Mobility:	In normal use, emission of volatile organic compounds (VOC's) to the air takes place, typically at a rate of ≤ 550 g/l.
Degradability:	Biodegradable
Bioaccumulation:	Minimal to none.

SECTION 13 - WASTE DISPOSAL CONSIDERATIONS

Follow local and national regulations. Consult disposal expert.

SECTION 14 - TRANSPORT INFORMATION

Proper Shipping Name:	Flammable Liquid, n.o.s. (Acetone, Tetrahydrofuran)
Hazard Class:	3
Secondary Risk:	None
Identification Number:	UN 1993
Packing Group:	PG II
Label Required:	Class 3 Flammable Liquid
Marine Pollutant:	NO

EXCEPTION for Ground Shipping

DOT Limited Quantity: Up to 1L per inner packaging, 30 kg gross weight per package.
Consumer Commodity: Depending on packaging, these quantities may qualify under DOT as "ORM-D".

TDG INFORMATION

TDG CLASS:	FLAMMABLE LIQUID 3
SHIPPING NAME:	Flammable Liquid, n.o.s. (Acetone, Tetrahydrofuran)
UN NUMBER/PACKING GROUP:	UN 1993, PG II

SECTION 15 - REGULATORY INFORMATION

Precautionary Label Information:	Highly Flammable, Irritant	Ingredient Listings: USA TSCA, Europe EINECS, Canada DSL, Australia AICS, Korea ECL/TCCL, Japan MITI (ENCS)
Symbols:	F, Xi	
Risk Phrases:	R11: Highly flammable. R20: Harmful by inhalation. R36/37: Irritating to eyes and respiratory system.	R66: Repeated exposure may cause skin dryness or cracking R67: Vapors may cause drowsiness and dizziness
Safety Phrases:	S9: Keep container in a well-ventilated place. S16: Keep away from sources of ignition - No smoking. S25: Avoid contact with eyes.	S26: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S33: Take precautionary measures against static discharges. S46: If swallowed, seek medical advise immediately and show this container or label.

SECTION 16 - OTHER INFORMATION

Specification Information:	All ingredients are compliant with the requirements of the European Directive on RoHS (Restriction of Hazardous Substances).	
Department issuing data sheet:	Safety Health & Environmental Affairs	
Training necessary:	Yes, training in practices and procedures contained in product literature.	
Reissue date / reason for reissue:	6/11/2013 / Updated GHS Standard Format	
Intended Use of Product:	Primer for PVC and CPVC Plastic Pipe	

This product is intended for use by skilled individuals at their own risk. The information contained herein is based on data considered accurate based on current state of knowledge and experience. However, no warranty is expressed or implied regarding the accuracy of this data or the results to be obtained from the use thereof.

SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION**PRODUCT NAME:** IPEX SYS 636 GRY Low VOC Cement for PVC Plastic Pipe**PRODUCT USE:** Low VOC Solvent Cement for PVC Plastic Pipe**SUPPLIER:** IPEX Inc.
807 Pharmacy Avenue
Scarborough, Ontario M1L 3K2, CAN**MANUFACTURER:** IPS Corporation
17109 South Main Street, Gardena, CA 90248-3127
P.O. Box 379, Gardena, CA 90247-0379
Tel. 1-310-898-3300**EMERGENCY:** Transportation: CHEMTEL Tel. 800.255-3924, 813-248-0585 (International)**Medical:** CHEMTEL Tel. 800.255-3924, 813-248-0585 (International)**SECTION 2 - HAZARDS IDENTIFICATION****GHS CLASSIFICATION:**

Health		Environmental		Physical	
Acute Toxicity:	Category 4	Acute Toxicity:	None Known	Flammable Liquid	Category 2
Skin Irritation:	Category 3	Chronic Toxicity:	None Known		
Skin Sensitization:	NO				
Eye:	Category 2B				

GHS LABEL:

OR

**Signal Word:**
Danger**WHMIS CLASSIFICATION:** CLASS B, DIVISION 2**Hazard Statements**

H225: Highly flammable liquid and vapor
 H319: Causes serious eye irritation
 H332: Harmful if inhaled
 H335: May cause respiratory irritation
 H336: May cause drowsiness or dizziness
 EUH019: May form explosive peroxides

Precautionary Statements

P210: Keep away from heat/sparks/open flames/hot surfaces – No smoking
 P261: Avoid breathing dust/fume/gas/mist/vapors/spray
 P280: Wear protective gloves/protective clothing/eye protection/face protection
 P304+P340: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
 P403+P233: Store in a well ventilated place. Keep container tightly closed
 P501: Dispose of contents/container in accordance with local regulation

SECTION 3 - COMPOSITION/INFORMATION ON INGREDIENTS

	CAS#	EINECS #	REACH	CONCENTRATION
			Pre-registration Number	% by Weight
Tetrahydrofuran (THF)	109-99-9	203-726-8	05-2116297729-22-0000	25 - 50
Methyl Ethyl Ketone (MEK)	78-93-3	201-159-0	05-2116297728-24-0000	5 - 36
Cyclohexanone	108-94-1	203-631-1	05-2116297718-25-0000	15 - 30

All of the constituents of this adhesive product are listed on the TSCA inventory of chemical substances maintained by the US EPA, or are exempt from that listing.
 * Indicates this chemical is subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986 (40CFR372).
 # indicates that this chemical is found on Proposition 65's List of chemicals known to the State of California to cause cancer or reproductive toxicity.

SECTION 4 - FIRST AID MEASURES

Contact with eyes: Flush eyes immediately with plenty of water for 15 minutes and seek medical advice immediately.
Skin contact: Remove contaminated clothing and shoes. Wash skin thoroughly with soap and water. If irritation develops, seek medical advice.
Inhalation: Remove to fresh air. If breathing is stopped, give artificial respiration. If breathing is difficult, give oxygen. Seek medical advice.
Ingestion: Rinse mouth with water. Give 1 or 2 glasses of water or milk to dilute. Do not induce vomiting. Seek medical advice immediately.

SECTION 5 - FIREFIGHTING MEASURES

Suitable Extinguishing Media: Dry chemical powder, carbon dioxide gas, foam, Halon, water fog.
Unsuitable Extinguishing Media: Water spray or stream.
Exposure Hazards: Inhalation and dermal contact
Combustion Products: Oxides of carbon, hydrogen chloride and smoke

	HMIS	NFPA	
Health	2	2	0-Minimal
Flammability	3	3	1-Slight
Reactivity	0	0	2-Moderate
PPE	B		3-Serious
			4-Severe

Protection for Firefighters: Self-contained breathing apparatus or full-face positive pressure airline masks.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Personal precautions: Keep away from heat, sparks and open flame.
 Provide sufficient ventilation, use explosion-proof exhaust ventilation equipment or wear suitable respiratory protective equipment.
 Prevent contact with skin or eyes (see section 8).
Environmental Precautions: Prevent product or liquids contaminated with product from entering sewers, drains, soil or open water course.
Methods for Cleaning up: Clean up with sand or other inert absorbent material. Transfer to a closable steel vessel.
Materials not to be used for clean up: Aluminum or plastic containers

SECTION 7 - HANDLING AND STORAGE

Handling: Avoid breathing of vapor, avoid contact with eyes, skin and clothing.
 Keep away from ignition sources, use only electrically grounded handling equipment and ensure adequate ventilation/fume exhaust hoods.
 Do not eat, drink or smoke while handling.
Storage: Store in ventilated room or shade below 44°C (110°F) and away from direct sunlight.
 Keep away from ignition sources and incompatible materials: caustics, ammonia, inorganic acids, chlorinated compounds, strong oxidizers and isocyanates.
 Follow all precautionary information on container label, product bulletins and solvent cementing literature.

SECTION 8 - PRECAUTIONS TO CONTROL EXPOSURE / PERSONAL PROTECTION

EXPOSURE LIMITS:	Component	ACGIH TLV	ACGIH STEL	OSHA PEL	OSHA STEL:
	Tetrahydrofuran (THF)	50 ppm	100 ppm	200 ppm	
	Methyl Ethyl Ketone (MEK)	200 ppm	300 ppm	200 ppm	
	Cyclohexanone	20 ppm	50 ppm	50 ppm	

Engineering Controls: Use local exhaust as needed.**Monitoring:** Maintain breathing zone airborne concentrations below exposure limits.**Personal Protective Equipment (PPE):****Eye Protection:** Avoid contact with eyes, wear splash-proof chemical goggles, face shield, safety glasses (spectacles) with brow guards and side shields, etc. as may be appropriate for the exposure.**Skin Protection:** Prevent contact with the skin as much as possible. Butyl rubber gloves should be used for frequent immersion.

Use of solvent-resistant gloves or solvent-resistant barrier cream should provide adequate protection when normal adhesive application practices and procedures are used for making structural bonds.

Respiratory Protection: Prevent inhalation of the solvents. Use in a well-ventilated room. Open doors and/or windows to ensure airflow and air changes. Use local exhaust ventilation to remove airborne contaminants from employee breathing zone and to keep contaminants below levels listed above.
 With normal use, the Exposure Limit Value will not usually be reached. When limits approached, use respiratory protection equipment.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Gray, medium syrupy liquid	Odor Threshold:	0.88 ppm (Cyclohexanone)
Odor:	Ketone	Boiling Range:	66°C (151°F) to 156°C (313°F)
pH:	Not Applicable	Evaporation Rate:	> 1.0 (BUAC = 1)
Melting/Freezing Point:	-108.5°C (-163.3°F) Based on first melting component: THF	Flammability:	Category 2
Boiling Point:	66°C (151°F) Based on first boiling component: THF	Flammability Limits:	LEL: 1.1% based on Cyclohexanone
Flash Point:	-20°C (-4°F) TCC based on THF		UEL: 11.8% based on THF
Specific Gravity:	0.9611 @23°C (73°F)	Vapor Pressure:	129 mm Hg @ 20°C (68°F)based on THF
Solubility:	Solvent portion soluble in water. Resin portion separates out.	Vapor Density:	>2 (Air = 1)
Partition Coefficient n-octanol/water:	Not Available	Other Data: Viscosity:	Medium bodied
Auto-ignition Temperature:	321°C (610°F) based on THF		
Decomposition Temperature:	Not Applicable		
VOC Content:	When applied as directed, per SCAQMD Rule 1168, Test Method 316A, VOC content is: ≤ 510 g/l.		

SECTION 10 - STABILITY AND REACTIVITY

Stability:	Stable
Hazardous decomposition products:	None in normal use. When forced to burn, this product gives off oxides of carbon, hydrogen chloride and smoke.
Conditions to avoid:	Keep away from heat, sparks, open flame and other ignition sources.
Incompatible Materials:	Oxidizers, strong acids and bases, amines, ammonia

SECTION 11 - TOXICOLOGICAL INFORMATION

Likely Routes of Exposure: Inhalation, Eye and Skin Contact

Acute symptoms and effects:

Inhalation:	Severe overexposure may result in nausea, dizziness, headache. Can cause drowsiness, irritation of eyes and nasal passages.
Eye Contact:	Vapors slightly uncomfortable. Overexposure may result in severe eye injury with corneal or conjunctival inflammation on contact with the liquid.
Skin Contact:	Liquid contact may remove natural skin oils resulting in skin irritation. Dermatitis may occur with prolonged contact.
Ingestion:	May cause nausea, vomiting, diarrhea and mental sluggishness.

Chronic (long-term) effects: None known to humans

Toxicity:	LD ₅₀	LC ₅₀
Tetrahydrofuran (THF)	Oral: 2842 mg/kg (rat)	Inhalation 3 hrs. 21,000 mg/m ³ (rat)
Methyl Ethyl Ketone (MEK)	Oral: 2737 mg/kg (rat), Dermal: 6480 mg/kg (rabbit)	Inhalation 8 hrs. 23,500 mg/m ³ (rat)
Cyclohexanone	Oral: 1535 mg/kg (rat), Dermal: 948 mg/kg (rabbit)	Inhalation 4 hrs. 8,000 PPM (rat)

Reproductive Effects	Teratogenicity	Mutagenicity	Embryotoxicity	Sensitization to Product	Synergistic Products
Not Established	Not Established	Not Established	Not Established	Not Established	Not Established

SECTION 12 - ECOLOGICAL INFORMATION

Ecotoxicity:	None Known
Mobility:	In normal use, emission of volatile organic compounds (VOC's) to the air takes place, typically at a rate of ≤ 510 g/l.
Degradability:	Biodegradable
Bioaccumulation:	Minimal to none.

SECTION 13 - WASTE DISPOSAL CONSIDERATIONS

Follow local and national regulations. Consult disposal expert.

SECTION 14 - TRANSPORT INFORMATION

Proper Shipping Name:	Adhesives
Hazard Class:	3
Secondary Risk:	None
Identification Number:	UN 1133
Packing Group:	PG II
Label Required:	Class 3 Flammable Liquid
Marine Pollutant:	NO

EXCEPTION for Ground Shipping

DOT Limited Quantity: Up to 5L per inner packaging, 30 kg gross weight per package.
Consumer Commodity: Depending on packaging, these quantities may qualify under DOT as "ORM-D".

TDG INFORMATION

TDG CLASS:	FLAMMABLE LIQUID 3
SHIPPING NAME:	ADHESIVES
UN NUMBER/PACKING GROUP:	UN 1133, PG II

SECTION 15 - REGULATORY INFORMATION

Precautionary Label Information:	Highly Flammable, Irritant	Ingredient Listings:	USA TSCA, Europe EINECS, Canada DSL, Australia AICS, Korea ECL/TCCL, Japan MITI (ENCS)
Symbols:	F, Xi		
Risk Phrases:	R11: Highly flammable. R20: Harmful by inhalation. R36/37: Irritating to eyes and respiratory system.	R66: Repeated exposure may cause skin dryness or cracking R67: Vapors may cause drowsiness and dizziness	
Safety Phrases:	S9: Keep container in a well-ventilated place. S16: Keep away from sources of ignition - No smoking. S25: Avoid contact with eyes.	S26: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S33: Take precautionary measures against static discharges. S46: If swallowed, seek medical advise immediately and show this container or label.	

SECTION 16 - OTHER INFORMATION

Specification Information:	All ingredients are compliant with the requirements of the European Directive on RoHS (Restriction of Hazardous Substances).
Department issuing data sheet:	Safety Health & Environmental Affairs
Training necessary:	Yes, training in practices and procedures contained in product literature.
Reissue date / reason for reissue:	6/12/2013 / Updated GHS Standard Format
Intended Use of Product:	Solvent Cement for PVC Plastic Pipe

This product is intended for use by skilled individuals at their own risk. The information contained herein is based on data considered accurate based on current state of knowledge and experience. However, no warranty is expressed or implied regarding the accuracy of this data or the results to be obtained from the use thereof.

COPPER & ALLOYS MATERIAL SAFETY DATA SHEET

MATERIAL IDENTIFICATION AND USE MATERIAL NAME COPPER & ALLOYS SYNONYMS: COPPER, COPPER ALLOY ASIM UNS C11000, C12200, C14500, C22000, C26000, C36000, C51000, C54400, C65000, C70400, C70600, C71000, C71500, C93200 AND C95400. WHMIS CLASS: D2A, D2B		SUPPLIER: RUSSEL METALS INC. ADDRESS: 1900 MINNESOTA COURT, MISSISSAUGA, ONTARIO, CANADA, L5N 3C9. TEL: 905-819-7295 FAX: 905-819-7262 FORM #: MSDS-03-2011. DATE: NOVEMBER 2011
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1. PRODUCT INFORMATION

MATERIAL NAME: COPPER AND COPPER ALLOYS

FORM #: MSDS-03-2011

DATE: NOVEMBER 2011

MATERIAL USE: MANUFACTURE OF PARTICLES

2. HAZARDOUS INGREDIENTS

BASE METAL (ALL VALUES ARE EXPRESSED AS WEIGHT PERCENT AND ARE APPROXIMATES)

COMPONENT	C.A.S. NUMBER	TLV (ACGIH - mg/m ³)	LD ₅₀	% WEIGHT
COPPER	7440-50-8	1.0 (Dust) 0.2 (Fume)	U	70-99.9
IRON	7439-89-6	5.0 (as Iron Oxide - Respirable)	30,000 mg/kg Oral-Rat	up to 4.0
LEAD	7439-92-1	0.05 (Elemental & Inorganic Compounds as Lead)	U	up to 9.0
MANGANESE	7439-96-5	0.2 (as Inorganic Manganese)	9,000 mg/kg Oral-Rat	up to 1.0
NICKEL	7440-02-0	1.5 (Metal, Inhalable) 0.2 (Insoluble, Inhalable) 0.1 (Soluble, Inhalable)	>9,000 mg/kg Oral-Rat	up to 30.0
PHOSPHORUS	7723-14-0	0.1 (Yellow)	U	up to 0.25
SILICON	7440-21-3	10.0 (Inhalable), 3.0 (Respirable - as non fibrous Silicon Carbide)	3,160 mg/kg Oral-Rat	up to 3.0
TIN	7440-31-5	2.0 (Metal or Oxide)	U	up to 3.0
ZINC	7440-66-6	2.0 (as Zinc Oxide, Respirable)	U	up to 34.0
TELLURIUM	13494-80-9	0.1	20 mg/kg Oral-Mouse	0.50
ALUMINUM	7429-90-5	1.0 (Metal & Insoluble Compounds - Respirable)	U	up to 11.0

NOTES:

- Threshold Limit Values (TLV) established by the American Conference of Governmental Industrial Hygienists (ACGIH - 2011) are 8-hour Time Weighted Average concentrations unless otherwise noted.
- Ingredients listed as required by the WHMIS Ingredient Disclosure List of the Hazardous Products Act (Canada).
- For exact composition, refer to analysis or specifications.

3. HAZARDS IDENTIFICATION

ROUTES OF ENTRY:

None in its natural solid form.
 Inhalation of metal particulate or elemental oxide fumes generated during welding, burning, grinding or machining may pose acute or chronic health effects. In finely divided form, skin contact may produce localized irritation and/or contact dermatitis.

EYES:

High concentrations of dust may cause irritation to the eyes. Fumes can cause eye irritations.

SKIN:

May cause skin irritations. Prolonged skin contact with coated copper may cause skin irritation in sensitive individuals. Workers with anemia, kidney damage, digestive, respiratory, nervous systems, pregnant women and fertile females warrant particular attention.

INHALATION:

Dust may irritate nose and throat. If heated, copper fumes may cause metal fume fever, a delayed, benign, transient flu-like condition.

TARGET ORGANS:

Respiratory system, reproductive system, skin, liver & kidneys.

ACUTE EFFECTS:

COPPER & ZINC: Can cause metal fume fever, a metallic taste in the mouth, dryness or irritation of the throat, and coughing. After 4-48 hours symptoms can include sweating, shivering, headache, fever, muscle aches, nausea, vomiting, weakness, and tiredness.

TELLURIUM: Poison by ingestion.

CHRONIC EFFECTS:

IRON: May cause a benign pneumoconiosis (siderosis).

LEAD: Chronic exposure may cause lead poisoning that can affect the digestive system, nervous system, reproductive systems, muscles and joints. IARC lists lead and its inorganic compounds under its Group 2B category - "possibly carcinogenic to humans".

MANGANESE: Existing studies are inadequate to assess its carcinogenicity. Susceptible to Parkinson's disease, metal fume fever and kidney damage.

NICKEL: IARC lists metallic nickel under its Group 2B category - "possibly carcinogenic to humans". Nickel may cause skin sensitivity.

NOTES:

COPPER & ALLOYS MATERIAL SAFETY DATA SHEET

- International Agency for Research on Cancer (IARC) - Summaries & Evaluations (2008).
- 3rd Annual Report on Carcinogens as prepared by the National Toxicology Program (NTP).

4. FIRST AID MEASURES

EYES:	DUST ACTS AS A FOREIGN BODY. FLUSH EYES WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES. SEEK MEDICAL ATTENTION IF EYE IRRITATION PERSISTS.
SKIN:	MAINTAIN GOOD PERSONAL HYGIENE. WASH AFFECTED AREA WITH MILD SOAP AND WATER. SEEK MEDICAL ATTENTION IF SKIN IRRITATION PERSISTS.
INHALATION:	REMOVE TO FRESH AIR. CHECK FOR CLEAR AIRWAY, BREATHING AND PRESENCE OF PULSE. IF NECESSARY ADMINISTER CPR. CONSULT A PHYSICIAN IMMEDIATELY.
INGESTION:	RARE IN INDUSTRY. DUST MAY IRRITATE MOUTH AND GASTROINTESTINAL TRACT. IF INGESTED, SEEK MEDICAL ATTENTION PROMPTLY.

5. FIRE FIGHTING MEASURES

FLAMMABILITY CLASSIFICATION:	No, not flammable.		
MEANS OF EXTINCTION:	None. Use extinguishers appropriate for surrounding materials.		
FLASH POINT (°C):	N/A	AUTO-IGNITION TEMP (°C):	N/A
UPPER FLAMMABLE LIMIT % BY VOL:	N/A	LOWER FLAMMABLE LIMIT % BY VOL:	N/A
SENSITIVITY TO STATIC DISCHARGE	N/A	EXPLOSION DATA (SENSITIVITY TO IMPACT):	No
HAZARDOUS COMBUSTION PRODUCTS:	Copper oxide and smaller amounts of other metallic oxides.		
UNUSUAL FIRE HAZARDS:	None for this product. Dusts from grinding operation may burn if they are ignited. Dust, powder and fumes are flammable when exposed to flame or by chemical reaction with oxidizing agents.		
SPECIAL FIRE FIGHTING:	None for this product. Dry powder for metal fires. Do not use water on dust, powder or fume fires.		

6. ACCIDENTAL RELEASE MEASURES

LEAK AND SPILL PROCEDURES:	Solid metal does not pose any problems. Dust spills should be cleaned up avoiding dust generation. Collect and recycle to process. Wash down with water if in contact with acids. Avoid inhalation of dusts.
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7. HANDLING AND STORAGE

HANDLING:	Operations with the potential for generating high concentrations of airborne particulates should be evaluated and controlled as necessary. Practice good housekeeping. Avoid breathing metal fumes and/or dust. Eating, drinking or smoking should not be allowed in areas where this alloy is processed, handled or stored.
STORAGE	Store away from corrosive chemicals, such as acids.

8. EXPOSURE CONTROLS

ENGINEERING CONTROLS: (e.g. ventilation, enclosure, specify)	General or local exhaust during welding or grinding operations.		
PERSONAL PROTECTIVE EQUIPMENT	Dependent upon process being performed on material each operation must be addressed for suitable equipment.		
GLOVES (Specify):	Wear gloves as required	EYES (Specify):	Safety glasses or goggles as required
CLOTHING (Specify):	N/A	FOOTWEAR (Specify):	N/A
RESPIRATOR (Specify):	If concentrations exceed established limits use NIOSH/MSHA approved particulate respirators (dust & fume or high efficiency dust fume) when grinding or welding.		
OTHER (Specify):	With molten metal, use full body cover clothing suitably treated to prevent burns.		

9. CHEMICAL AND PHYSICAL PROPERTIES

PHYSICAL STATE:	Solid	APPEARANCE:	Reddish metallic solid	ODOUR:	Not Applicable
BOILING POINT:	2324°C (4215°F)	VAPOUR PRESSURE:	Not Applicable	VAPOUR DENSITY:	Not Applicable
MELTING POINT:	1150°C	DENSITY:	8.90	pH:	Not Applicable
EVAPORATION RATE:	Not Applicable	SOLUBILITY:	Not Applicable		
COEFFICIENT WATER/OIL DISTRIBUTION:	Not Applicable				

10. STABILITY AND REACTIVITY

CHEMICAL STABILITY:	Yes. Copper and its alloys are stable under normal storage and handling conditions.
HAZARDOUS POLYMERIZATION:	Hazardous polymerization cannot occur.
INCOMPATIBILITY TO OTHER SUBSTANCES:	Yes
CONDITIONS OF REACTIVITY:	Copper reacts violently with acetylene, ammonium nitrate, bromates, chlorates, iodates. Copper will burn spontaneously in gaseous chlorine. Avoid contact with chlorine and oxygen difluoride, ethylene oxide, fluorine, hydrogen peroxide, hydrazine mononitrate, hydrazoic acid. Incompatible with hydrogen sulfide, lead azide,

COPPER & ALLOYS MATERIAL SAFETY DATA SHEET

potassium peroxide.

May turn green on prolonged contact with air, due to formation of cupric carbonate.

CONDITIONS TO AVOID:

Reacts violently with hydrogen peroxide.

Reaction with acids could produce noxious gases. In contact with acids, hydrogen gas may evolve.

HAZARDOUS DECOMPOSITION PRODUCTS:

None.

Products other than fire or explosion – does not decompose.

Reaction with acids other than fire and explosion – does not decompose.

11. TOXICOLOGICAL INFORMATION

IRRITANCY OF MATERIAL:	See Section 3.	SENSITIZATION OF MATERIAL:	Works with skin sensitivity warrant particular attention.
ID₅₀ (of Material):	Unknown for copper.	LC₅₀ (of Material):	Not established.
MUTAGENICITY OF MATERIAL:	N/A		
REPRODUCTIVE EFFECTS:	<u>LEAD</u> : Clinical studies on test animals exposed to lead indicate adverse reproductive effects. <u>TELLURIUM</u> : Reproductive effects reported.		
TERATOGENICITY OF MATERIAL:	N/A		
CARCINOGENICITY OF MATERIAL:	<u>LEAD</u> : IARC lists lead and its inorganic compounds under its Group 2B category - "possibly carcinogenic to humans". <u>MANGANESE</u> : Existing studies are inadequate to assess its carcinogenicity. <u>NICKEL</u> : IARC lists metallic nickel under its Group 2B category - "possibly carcinogenic to humans".		
SYNERGISTIC MATERIALS:	N/A		
NOTE:	Prolonged skin contact may cause reddening and drying of skin or dermatitis in sensitive individuals due to chromium content in the copper alloys.		

12. ECOLOGICAL INFORMATION

ECOTOXICITY:	No data available for the material as a whole. However, individual components of the material have been found to be toxic to the environment. Metal dusts may migrate into soil and groundwater and be ingested by wild life.
ENVIRONMENTAL FATE:	No data available.
ENVIRONMENTAL DEGRADATION:	No data available.

13. DISPOSAL INFORMATION

WASTE DISPOSAL:	Recover copper for recycling.
GENERAL INFORMATION:	Dispose of in accordance with applicable federal, provincial/state or local regulations.

14. TRANSPORTATION INFORMATION

GENERAL SHIPPING INFORMATION:	Material not regulated for shipping.
SHIPPING NAME AND DESCRIPTION:	N/A
UN NUMBER:	N/A
CLASS:	N/A
PACKING GROUP/ RISK GROUP:	N/A
TRANSPORT REGULATIONS:	Canadian Transportation of Dangerous Goods Regulations (TDG) March 2011. US Department of Transport (DOT) Hazardous Materials shipping information (Title 49 - Transportation March 2011).

15. REGULATORY INFORMATION

REGULATORY INFORMATION:	<i>The following listing of regulations relating to a Russel Metals Inc. product may not be complete and should not be solely relied upon for all regulatory compliance responsibilities.</i>
ADDITIONAL CANADIAN REGULATIONS:	
WHMIS CLASSIFICATION:	Class D2A/D2B: Materials Causing Other Toxic Effects.
DOMESTIC SUBSTANCES LIST:	The components of this material are on the federal DSL Inventory.
OTHER CANADIAN REGULATIONS:	N/A
ADDITIONAL U.S. REGULATIONS:	
SARA:	The components of this material are subject to the reporting requirements of Sections 302, 304 and 313 of Title III of the Superfund Amendments and Reauthorization Act (SARA – Oct. 2006), as follows:

CHEMICAL NAME	SARA 302 (40 CFR 355, Appendix A)	SARA 304 (40 CFR Table 302.4)	SARA 313 (40 CFR 372.65)	CERCLA Reportable Quantities
Aluminum	No	No	Yes	None listed
Copper	No	No	Yes	5,000 lbs.
Lead	No	No	Yes	10 lbs.
Manganese	No	No	Yes	None listed
Phosphorus	Yes	Yes	Yes	1 lb.
Zinc	No	No	No	1,000 lbs

SARA THRESHOLD PLANNING QUANTITY: The should Planning Quantities for Phosphorus is 100 lb. (45.4 kg), per 40 CFR 370.20.
TSCA INVENTORY STATUS: The components of this material are listed on the Toxic Substances Control Act Inventory.

COPPER & ALLOYS MATERIAL SAFETY DATA SHEET

CERCLA REPORTABLE QUANTITY (RQ):	RQ's for Hazardous Substances in the Comprehensive Environmental Response, Compensation, and Liability Act are: Copper = 5000 lb. (2270 kg); Lead = 10 lb. (4.45 kg); Phosphorus 1 lb. (0.454 kg); Zinc = 1000 lb. (454 kg).
CALIFORNIA (PROPOSITION 65):	The Lead component of this material is known in the State of California to cause cancer, and/or birth defects (or other reproductive harm). The Nickel component of this material is known in the State of California to cause cancer.
OTHER U.S. FEDERAL REGULATIONS:	Lead is regulated under 29 CFR 1910.1025.
ADDITIONAL EUROPEAN UNION REGULATIONS:	
RoHS & WEEE	This MSDS follows the European Union Directive "Restriction on the Use of Certain Hazardous Substances (RoHS) in Electrical and Electronic Equipment" (2002/95/EC) and the "Waste Electrical and Electronic Equipment (WEEE)" Directive (2002/96/EC).
Lead (Pb):	Lead is present in this copper alloy at levels above the EU Directive limit of 0.1%. Note, the EU Directive has a lead exemption limit of up to 4.0% as an alloying element in copper.
Chromium VI (Cr+6):	The hexavalent oxidation state of chromium does not normally exist as part of a metal alloy.

16. OTHER INFORMATION

HAZARD LABELING SYSTEMS:

NFPA CODE H=0 F=0 R=0

HMIS CODE H=1* F=0 R=0 PPE: See Section 8

* D denotes possible chronic hazard if airborne dusts or fumes are generated.

PREPARED BY: RUSSEL METALS INC. AND ENVIRO TEST INC. **DATE:** NOVEMBER 2011

TELEPHONE: 905-819-7295 **NOTE:** CONTACT SUPPLIER FOR ADDITIONAL PRODUCT INFORMATION

DISCLAIMER: THE INFORMATION CONTAINED HEREIN BASED ON DATA CONSIDERED ACCURATE. HOWEVER, NO WARRANTY IS EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THESE DATA OR THE RESULTS OBTAINED FROM THE USE THEREOF.



MATERIAL SAFETY DATA SHEET

1. Product and Company Identification

Product Name	Thermo-Trap Gel (4371-32)
CAS #	Mixture
Product use	Heat absorbent gel
Manufacturer	Nu-Calgon 2008 Altom Court St. Louis, MO 63146 US Phone: 314-469-7000 / 800-554-5499 Emergency Phone: 1-800-424-9300 (CHEMTREC)

2. Hazards Identification

Emergency overview	Health injuries are not known or expected under normal use.
Potential short term health effects	
Routes of exposure	Eye, Skin contact, Inhalation, Ingestion.
Eyes	Non-irritating by WHMIS/OSHA criteria.
Skin	Not expected to be a primary skin irritant.
Inhalation	May cause respiratory tract irritation.
Ingestion	May cause stomach distress, nausea or vomiting.
Target organs	Eyes. Skin.
Chronic effects	Prolonged or repeated exposure can cause drying, defatting and dermatitis.
Signs and symptoms	Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.
OSHA Regulatory Status	This product is NOT known to be a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.
Potential environmental effects	This product has not been tested.

3. Composition / Information on Ingredients

Composition comments	This product is considered non hazardous by WHMIS/OSHA criteria.
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4. First Aid Measures

First aid procedures	
Eye contact	Flush with cool water. Remove contact lenses, if applicable, and continue flushing. Obtain medical attention if irritation persists.
Skin contact	Flush with cool water. Wash with soap and water. Obtain medical attention if irritation persists.
Inhalation	Not a normal route of harmful exposure. If symptoms develop move victim to fresh air. If symptoms persist, obtain medical attention.
Ingestion	Do not induce vomiting. If vomiting occurs naturally, have victim lean forward to reduce risk of aspiration. Never give anything by mouth if victim is unconscious, or is convulsing. Obtain medical attention.
Notes to physician	Symptoms may be delayed.
General advice	If you feel unwell, seek medical advice (show the label where possible). Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Show this safety data sheet to the doctor in attendance. Avoid contact with eyes and skin. Keep out of reach of children.

5. Fire Fighting Measures

Flammable properties	Not flammable by WHMIS/OSHA criteria.
Extinguishing media	
Suitable extinguishing media	Treat for surrounding material.
Unsuitable extinguishing media	Not available

Protection of firefighters**Specific hazards arising from the chemical** Not available**Protective equipment for firefighters** Firefighters should wear full protective clothing including self contained breathing apparatus.**Hazardous combustion products** May include and are not limited to: Oxides of carbon.**Explosion data****Sensitivity to mechanical impact** Not available**Sensitivity to static discharge** Not available

6. Accidental Release Measures

Personal precautions Keep unnecessary personnel away. Do not touch or walk through spilled material. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Keep people away from and upwind of spill/leak.**Environmental precautions** Do not discharge into lakes, streams, ponds or public waters.**Methods for containment** Stop leak if you can do so without risk. Prevent entry into waterways, sewers, basements or confined areas.**Methods for cleaning up** Before attempting clean up, refer to hazard data given above. Small spills may be absorbed with non-reactive absorbent and placed in suitable, covered, labelled containers. Prevent large spills from entering sewers or waterways. Contact emergency services and supplier for advice. Never return spills to original containers for re-use.

7. Handling and Storage

Handling Use good industrial hygiene practices in handling this material.
When using do not eat or drink.
Avoid contact with skin and clothing. Avoid contact with eyes.
Avoid breathing vapors or mists of this product.
Keep container tightly closed.
Wash thoroughly after handling.**Storage** Keep out of reach of children.
Store in a closed container away from incompatible materials.

8. Exposure Controls / Personal Protection

Engineering controls General ventilation normally adequate.**Personal protective equipment****Eye / face protection** Helpful in avoiding unnecessary contact.**Hand protection** Helpful in avoiding unnecessary contact.**Skin and body protection** As required by employer code.**Respiratory protection** Where exposure guideline levels may be exceeded, use an approved NIOSH respirator.**General hygiene considerations** Handle in accordance with good industrial hygiene and safety practice.When using do not eat or drink.
Washing with soap and water after use is recommended as good hygienic practice to prevent possible eye irritation from hand contact.

9. Physical and Chemical Properties

Appearance gel**Color** Translucent**Form** Gel**Odor** Mild**Odor threshold** Not available**Physical state** Liquid**pH** 9.5**Melting point** Not available**Freezing point** Not available**Boiling point** Not available**Pour point** Not available**Evaporation rate** Not available

Flash point	None
Auto-ignition temperature	Not available
Flammability limits in air, lower, % by volume	Not available
Flammability limits in air, upper, % by volume	Not available
Vapor pressure	Not available
Vapor density	Not available
Specific gravity	1 @ 60°F (15.6°C)
Octanol/water coefficient	Not available
Solubility (H ₂ O)	> 95 %
VOC (Weight %)	Not available
Viscosity	Not available
Percent volatile	Not available

10. Stability and Reactivity

Reactivity	This product may react with strong oxidizing agents.
Possibility of hazardous reactions	Hazardous polymerization does not occur.
Chemical stability	Stable under recommended storage conditions.
Conditions to avoid	Do not mix with other chemicals.
Incompatible materials	Caustics. Acids.
Hazardous decomposition products	May include and are not limited to: Oxides of carbon.

11. Toxicological Information

Effects of acute exposure	
Eye	Non-irritating by WHMIS/OSHA criteria.
Skin	Not expected to be a primary skin irritant.
Inhalation	May cause respiratory tract irritation.
Ingestion	May cause stomach distress, nausea or vomiting.
Sensitization	Non-hazardous by WHMIS/OSHA criteria.
Chronic effects	Non-hazardous by WHMIS/OSHA criteria.
Carcinogenicity	Non-hazardous by WHMIS/OSHA criteria.
Mutagenicity	Non-hazardous by WHMIS/OSHA criteria.
Reproductive effects	Non-hazardous by WHMIS/OSHA criteria.
Teratogenicity	Non-hazardous by WHMIS/OSHA criteria.
Name of Toxicologically Synergistic Products	Not available

12. Ecological Information

Ecotoxicity	This material is not expected to be harmful to aquatic life.
Persistence / degradability	Not available
Bioaccumulation / accumulation	Not available
Mobility in environmental media	Not available
Environmental effects	Not available
Aquatic toxicity	Not available
Partition coefficient	Not available
Chemical fate information	Not available
Other adverse effects	Not available

13. Disposal Considerations

Disposal instructions	Dispose in accordance with all applicable regulations.
Waste from residues / unused products	Not available

14. Transport Information

U.S. Department of Transportation (DOT)

Not regulated as dangerous goods.

Transportation of Dangerous Goods (TDG - Canada)

Not regulated as dangerous goods.

15. Regulatory Information

Canadian federal regulations

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

WHMIS status

Not Controlled

Occupational Safety and Health Administration (OSHA)

29 CFR 1910.1200 hazardous chemical No

US Federal regulations

This product is not known to be a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

CERCLA (Superfund) reportable quantity

Sodium nitrite: 100.0000

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories
 Immediate Hazard - No
 Delayed Hazard - No
 Fire Hazard - No
 Pressure Hazard - No
 Reactivity Hazard - No

Section 302 extremely hazardous substance No

Section 311 hazardous chemical No

Clean Air Act (CAA)

Not available

Clean Water Act (CWA)

Hazardous substance

State regulations

This product does not contain a chemical known to the State of California to cause cancer, birth defects or other reproductive harm.

Inventory name

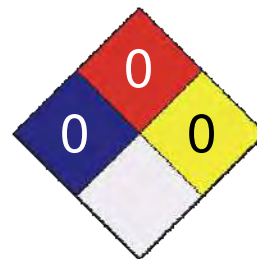
Country(s) or region	Inventory name	On inventory (yes/no)*
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

16. Other Information

LEGEND HMIS/NFPA	
Severe	4
Serious	3
Moderate	2
Slight	1
Minimal	0

Health	/ 0
Flammability	0
Physical Hazard	0
Personal Protection	



Disclaimer

Information contained herein was obtained from sources considered technically accurate and reliable. While every effort has been made to ensure full disclosure of product hazards, in some cases data is not available and is so stated. Since conditions of actual product use are beyond control of the supplier, it is assumed that users of this material have been fully trained according to the requirements of all applicable legislation and regulatory instruments. No warranty, expressed or implied, is made and supplier will not be liable for any losses, injuries or consequential damages which may result from the use of or reliance on any information contained in this document.

Issue date

04-Nov-2011

Effective date

15-Dec-2011

Expiry date

15-Dec-2014

Prepared by

Nu-Calgon Technical Service (314) 469-7000

Other information

For an updated MSDS, please contact the supplier/manufacturer listed on the first page of the document.

Material Safety Data Sheet

Section 1 Product and Company Identification

Product Name: **Slic-Tite® PTFE Thread Tape,
PTFE Thread Seal Tape**

Revision #: 2.4

Date Prepared: June 27, 1990

Date Revised: February 19, 2013

Manufacturer:

LA-CO INDUSTRIES, Inc. *Markal Co.*

1201 Pratt Blvd.

Elk Grove Village, IL, USA 60007-5746

Information Telephone: 847-956-7600

Emergency Telephone: Call CHEMTREC

USA 800-424-9300

International (Call Collect) 1-703-527-3887

Chemical Formula: Mixture

CAS No.: Not Applicable. Derivation: Not Applicable.

Synonyms: Not Applicable.

General Use: Pipe Thread Sealant

Supplier/Importer:

Section 2 Composition/Information on Ingredients

<u>Ingredient</u>	<u>CAS No.</u>	<u>%</u>
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No Hazardous ingredients according to the U.S. OSHA Hazard Communication Standard 29 CFR 1910.1200, Canadian WHMIS regulations, British CHIP2 regulation 6, and Australian Regulations for the Control of Workplace Hazardous Substances.

(For Section 2 footnotes: See Section 15)

Section 3 Hazards Identification

EMERGENCY OVERVIEW: None.

POTENTIAL HEALTH EFFECTS

Primary Exposure Routes: None.

Acute Effects

Eyes: Not Applicable.

Skin: Not Applicable.

Ingestion: Not Applicable.

Inhalation: Not Applicable.

Chronic Effects

Eyes: Not Applicable.

Skin: Not Applicable.

Ingestion: Not Applicable.

Inhalation: Not Applicable.

Carcinogenicity: Not Applicable.

Target Organ Effects: Not Applicable.

Medical Conditions Aggravated by Long-Term Exposure: Not Determined.

Other Information: Not Applicable.

Section 4 First Aid

Product Name:

Slic-Tite® PTFE Thread Tape, PTFE Thread Seal Tape

Revision #: 2.4

Date Prepared: June 27, 1990

Date Revised: February 19, 2013

Eye Contact: Not Applicable.

Skin Contact: Not Applicable.

Ingestion: Not Applicable.

Inhalation: Not Applicable.

Other Information: None Known.

Section 5 Fire Fighting Measures

Flash Point (method): Not Applicable.

Autoignition Temperature: Not Applicable.

LEL: Not Applicable. **UEL:** Not Applicable.

Flammability Classification: Not Applicable.

Extinguishing Media: Not Applicable.

Hazardous Combustion Products: PTFE will decompose forming hydrogen fluoride at high temperatures.

Unusual Fire or Explosion Hazards: None Known.

Fire-Fighting Instructions/Equipment: Keep personnel removed and upwind of any fire. Wear full fire-fighting turn-out gear (full Bunker gear), and respiratory protection (SCBA).

Section 6 Accidental Release Measures

Use recommended personal protective equipment (see Section 8). Sweep up.

Section 7 Handling and Storage

Handling Precautions: Use recommended personal protective equipment (see Section 8). Wash thoroughly after handling.

Storage Requirements: Store away from incompatible chemicals (see Sec. 10).

Section 8 Exposure Controls/Personal Protection

Eye/Face Protection: Suitable for related activities where this product is used.

Skin/Hand Protection: Suitable for related activities where this product is used.

Respiratory Protection: Suitable for related activities where this product is used.

Other Equipment: Suitable for related activities where this product is used.

Engineering Controls: Suitable for related activities where this product is used.

Administrative Controls: Users of this product must be properly trained and qualified in its use.

Other Information: No food or beverage should be consumed in the work area. Wash thoroughly before eating, drinking, or smoking.

Section 9 Physical and Chemical Properties

Appearance/Physical State: White tape.

Odor: None

Odor Threshold (ppm): Not Determined.

Specific Gravity (H₂O = 1): 2.15 - 2.20

Solubility - Water: Insoluble

- **Fat:** Insoluble

Product Name:

Slic-Tite® PTFE Thread Tape, PTFE Thread Seal Tape

Revision #: 2.4

Date Prepared: June 27, 1990

Date Revised: February 19, 2013

Coefficient of Water/Oil Solubility: Not Determined.

Partition Coefficient (n-octanol/water): Not Determined.

pH: Not Applicable.

Melting Point: 621⁰F/327⁰C

Boiling Point: Not Determined.

Vapor Pressure (mm Hg at 20⁰C): Not Applicable.

Vapor Density (Air = 1): Not Applicable.

Evaporation Rate (n-BuAc=1): Not Applicable.

V.O.C. (U.S. Clean Air Act Section 111): 0%

Flash Point (method): (see Section 5)

Autoignition Temperature: (see Section 5)

Flammability Classification: (see Section 5)

Unusual Fire or Explosion Hazards: (see Section 5)

Oxidizing Properties: Not Applicable.

Other Information: None.

Note: The physical data represented above are typical values and should not be construed as a specification.

Section 10 Stability and Reactivity

Chemical Stability: Stable

Hazardous Polymerization: Will Not Occur

Conditions to Avoid: Temperatures above 750⁰F/400⁰C

Chemicals to Avoid: Not Determined.

Hazardous Decomposition Products (non-thermal): None Known.

Section 11 Toxicological Information

Sensitization to Product: Not Applicable.

Irritancy of Product: Not Applicable.

Reproductive Toxicity: Not Applicable.

Teratogenicity: Not Applicable.

Mutagenicity: Not Applicable.

Further hazard information, if applicable, may be found in Section 3. Toxicological information regarding individual ingredients, if applicable, may be found in Section 2.

Section 12 Ecological Information

Mobility: Not Determined.

Degradability: Not Determined.

Accumulation: Not Determined.

Ecotoxicity: Not Determined.

Other Adverse Effects: Not Determined.

Section 13 Disposal Considerations

Dispose of in accordance with all applicable regulations.

Section 14 Transport Information

Product Name:

**Slic-Tite® PTFE Thread Tape,
PTFE Thread Seal Tape**

Revision #: 2.4

Date Prepared: June 27, 1990

Date Revised: February 19, 2013

D.O.T. (U.S.)

Proper Shipping Name: Not Regulated.

Hazard Class or Division: Not Regulated.

Hazard Label: Not Regulated.

I.D. Number: Not Regulated.

TDG (Canada): Not Regulated.

IATA: Not Regulated.

ICAO: Not Regulated.

IMO: Not Regulated.

Australian Code for the Transport of Dangerous Goods

Dangerous Goods Class and Subsidiary Risk: Not Regulated.

Section 15 Regulatory Information

Footnotes for Section 2:

- 1 Subject to the reporting requirements of SARA Title III, Section 313.
- 2 Appears on the California Safe Drinking Water and Toxic Enforcement Act (Prop. 65) Substances List.
- 3 Appears on the Massachusetts Substances List.
- 4 Appears on the New Jersey Right-To-Know Hazardous Substances List.
- 5 Appears on the Pennsylvania Hazardous Substances List.
- 6 Appears on the Canadian WHMIS Ingredient Disclosure List.

U.S.A.

OSHA Hazard Status: This product is not considered to be hazardous as defined by the U.S. OSHA HCS (29 CFR 1910.1200).

EPA SARA sec. 311/312 Hazard Categories: Not Applicable.

Toxic Substances Control Act (TSCA): All ingredients contained in this product are listed on the U.S. EPA TSCA Chemical Substance Inventory.

HMIS Rating: Health 0, Flammability 1, Reactivity 0

NFPA (704) Rating: Health 1, Flammability 1, Reactivity 0

CANADA

WHMIS Status: This product is not considered to be hazardous as defined by Canadian WHMIS Controlled Products Regulations.

WHMIS Rating: None.

WHMIS Risk Phrases: None.

WHMIS Precautionary Statements: None.

Domestic Substances List (DSL): All ingredients contained in this product are listed on the Canadian EPA (CEPA) Domestic Substances List (DSL).

E.U.

European Inventory of Existing Chemical Substances (EINECS): All ingredients contained in this product are listed on the European Inventory of Existing Chemical Substances (EINECS).

Categories of Danger (Labeling Information): None.

Risk (R) Phrases: None.

Safety (S) Phrases: None.

AUSTRALIA

Worksafe Australia Status: This product is not classified as hazardous according to criteria of Worksafe Australia.

HAZCHEM Code: None allocated.

Poisons Schedule Number: None allocated.

Product Name:

**Slic-Tite® PTFE Thread Tape,
PTFE Thread Seal Tape**

Revision #: 2.4

Date Prepared: June 27, 1990

Date Revised: February 19, 2013

Further regulatory information regarding individual ingredients, if applicable, may be found in Section 2.

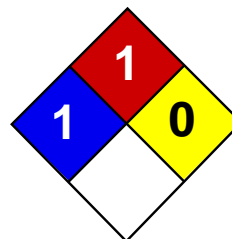
This product has been classified in accordance with the hazard criteria of the U.S. OSHA Hazard Communication Standard, the Canadian WHMIS Controlled Products Regulations, the British CHIP2 regulation 6, and the Australian NMRCWHS. This MSDS contains the information required by the above regulations and conforms to ANSI Z400.1-1993.

Section 16

Other Information

MSDS Prepared By: Director of Chemical Safety

The information contained herein is based on data available to us and is accurate and reliable to the best of our knowledge and belief. However, LA-CO Industries, Inc. makes no representations as to its completeness or accuracy. Information is supplied on condition that persons receiving such information will make their own determination as to its suitability for their purposes prior to use. In no event will LA-CO Industries, Inc. be responsible for damages of any nature whatsoever resulting from the use of or reliance upon the information contained herein.



Health	1
Fire	1
Reactivity	0
Personal Protection	B

Material Safety Data Sheet Tin MSDS

Section 1: Chemical Product and Company Identification

Product Name: Tin

Catalog Codes: SLT3304, SLT1291, SLT2584, SLT3880

CAS#: 7440-31-5

RTECS: XP7320000

TSCA: TSCA 8(b) inventory: Tin

CI#: Not available.

Synonym:

Chemical Name: Tin

Chemical Formula: Sn

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:

1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Tin	7440-31-5	100

Toxicological Data on Ingredients: Not applicable.

Section 3: Hazards Identification

Potential Acute Health Effects: Slightly hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation.

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. Repeated or prolonged exposure is not known to aggravate medical condition.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin Contact: Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

Serious Skin Contact: Not available.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation: Not available.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: May be combustible at high temperature.

Auto-Ignition Temperature: Not available.

Flash Points: Not available.

Flammable Limits: Not available.

Products of Combustion: Some metallic oxides.

Fire Hazards in Presence of Various Substances:

Slightly flammable to flammable in presence of open flames and sparks, of heat. Non-flammable in presence of shocks.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:

SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

Special Remarks on Fire Hazards:

When heated in Chlorine, Tin reacts, producing light and much heat. In the presence of water, cupric nitrate and tin foil, on prolonged intimate contact, will produce flaming and sparking. Sodium peroxide and Potassium peroxide, potassium dioxide, oxidize tin with incandescence. The reaction between tin and tellurium attains incandescence.

Special Remarks on Explosion Hazards:

Tin reacts violently or explosively with fused ammonium nitrate below 200 deg. C. Contact of metallic tin with turpentine may cause fires and explosions.

Section 6: Accidental Release Measures

Small Spill:

Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:

Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not breathe dust. Keep away from incompatibles such as oxidizing agents, acids, alkalis.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area. Do not store above 25°C (77°F).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Gloves (impervious).

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Boots. Gloves. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 2 (mg/m³) from OSHA (PEL) [United States] TWA: 2 (mg/m³) from ACGIH (TLV) [United States] TWA: 2 (mg/m³) from NIOSH TWA: 2 STEL: 4 (mg/m³) [Canada] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid.

Odor: Odorless.

Taste: Not available.

Molecular Weight: 118.71 g/mole

Color: Silver-white Grey.

pH (1% soln/water): Not applicable.

Boiling Point: 2507°C (4544.6°F)

Melting Point: 231.9°C (449.4°F)

Critical Temperature: Not available.

Specific Gravity: 7.31 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Insoluble in cold water, hot water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Excess heat, incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents, acids, alkalis.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:

Incompatible with bromine, bromine trifluoride, Chlorine, Chlorine trifluoride + Carbon, water + Cupric Nitrate, Sodium peroxide, water vapor + Carbon Tetrachloride, Disulfur Dichloride, fused Ammonium Nitrate, Potassium dioxide, Tellurium, Turpentine, Acids (Nitric acid, Sulfuric Acid, Hydrochloric Acid, Acetic Acid), caustic Alkali, Iodine Bromide. In the presence of water vapor, the interaction between tin and carbon tetrachloride is violent. The interaction between tin and disulfur dichloride is violent. Tin reacts violently with Iodine Bromide

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Ingestion.

Toxicity to Animals:

LD50: Not available. LC50: Not available.

Chronic Effects on Humans: Not available.

Other Toxic Effects on Humans: Slightly hazardous in case of skin contact (irritant), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects: Skin: May cause skin irritation. Eyes: May cause eye irritation to due mechanical action.
Inhalation: Inhalation of tin dust may cause respiratory tract and mucous membrane tract irritation due to mechanical action
Ingestion: It is poorly absorbed from the digestive tract. It can cause gastrointestinal tract disturbances which may be from irritant or astringent action on the stomach.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The product itself and its products of degradation are not toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport:

Transportation information for Tin Metal Powder: Metal Powder, Flammable, n.o.s. (Tin Metal, Powder), Class 4.1, Flammable Solid, UN3089, PGIII

Section 15: Other Regulatory Information

Federal and State Regulations:

Rhode Island RTK hazardous substances: Tin Pennsylvania RTK: Tin Massachusetts RTK: Tin New Jersey: Tin California Director's List of Hazardous Substances: Tin TSCA 8(b) inventory: Tin

Other Regulations: EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada): Not controlled under WHMIS (Canada).

DSCL (EEC):

This product is not classified according to the EU regulations. Not applicable.

HMIS (U.S.A.):

Health Hazard: 1

Fire Hazard: 1

Reactivity: 0

Personal Protection: B

National Fire Protection Association (U.S.A.):

Health: 1

Flammability: 1

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves (impervious). Lab coat. Not applicable. Safety glasses.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 12:05 AM

Last Updated: 05/21/2013 12:00 PM

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Material Safety Data Sheet (MSDS)/Safety Data Sheet (SDS)

www.alleghenyludlum.com or www.ATIMetals.com

Section 1 – Chemical Product and Company Identification

GHS Product Identifier: Titanium Alloy **MSDS Category:** TI
Other means of identification: Titanium steel (semi-finished steel product)
Supplier's Details: ATI Allegheny Ludlum **CAS Number:** Mixture
 100 River Road, Brackenridge, PA 15014
Phone Number (s): 724-226-5980 (M-F, 9 a.m.-4:30 p.m. EST)
Off-Hour Emergency Phone Number: 724-226-5555 **CHEMTREC:** 800-424-9300
Original Issue: 12/15/2007 **Revised/Approval:** 12/15/2011
Expiration: 12/15/2014

Section 2 - Hazards Identification

As sold, this product, **Titanium Alloy** (semi-finished steel products) is not hazardous according to the criteria specified in European Directives 67/548/EEC and 1999/45/EC. Under 29 CFR 1910.1200 Hazard Communication Standard, steel products are considered mixtures due to further processing which may produce dusts and or fumes. Refer to Section 3 and 8 for additional information. Refer to Section 11 for Toxicological Information.

Precautionary Statement/Emergency Overview: Odorless solid product in various forms, silver-gray color. This formed solid metal product poses little or no immediate health or fire hazards. Product may be coated - refer to appropriate coating MSDS for physical and health hazards. When product is subjected to welding, burning, melting, sawing, brazing, grinding, or other similar processes, potentially hazardous airborne particulate and fumes may be generated. These operations should be performed in well-ventilated areas, and if appropriate, respiratory protection and other PPE should be utilized.

Section 3 – Composition/Information on Ingredients

Chemical Identity of Regulated Substances under 29 CFR 1910.1200 (Hazard Communication Standard):

Ingredient Name	EC Number	CAS Number	% weight
Titanium	231-142-3	7440-32-6	88 – 99.9
Aluminum	231-072-3	7429-90-5	0-7.0
Vanadium	231-171-1	7440-62-2	0-4.5
Nickel	231-111-4	7440-02-0	0 – 0.9
Molybdenum	231-107-2	7439-98-7	0-0.4

Chemical Identity of Substances Not Regulated under 29 CFR 1910.1200 (Hazard Communication Standard), but offered as information for grade(s):

Palladium	231-115-6	7440-05-3	0 – 0.25
Iron	231-096-4	7439-89-6	0-0.5

EC - European Community

CAS - Chemical Abstract Service

Section 4 - First Aid Measures

Description of necessary first aid measures:

- **Inhalation:** If large amounts of dusts, fumes, or particulates are generated, move person to fresh air. If symptoms develop, seek medical attention.
- **Eye Contact:** For contact with dusts or particulates, flush eyes with water for 15 minutes. Eye injuries from solid particles should be treated by a physician immediately.
- **Skin Contact:** For skin contact with dusts or powders, wash immediately with soap and water. Cuts or abrasions should be treated promptly with thorough cleansing of the affected area.
- **Ingestion:** No need for first aid is anticipated if material is swallowed, however if symptoms develop, seek medical attention. For Ingestion of Dusts: IF SWALLOWED: Call a poison center or Doctor/physician if you feel unwell. Rinse mouth.

Most important acute and chronic symptoms/effects:

Primary Entry Routes: **Titanium Alloy** (semi-finished steel products) products in their usual physical form do not present an inhalation, ingestion or contact hazard. However, operations such as burning, welding, sawing, brazing, machining and grinding may result in the following effects if exposures exceed recommended limits as listed in Section 8.

Target Organs: Respiratory system

Section 4 - First Aid Measures (continued)

Acute Effects:

- **Inhalation:** Excessive exposure to high concentrations of dust may cause irritation to the eyes, skin and mucous membranes of the upper respiratory tract. Nickel compounds are respiratory tract irritants.
- **Eye:** Excessive exposure to high concentrations of dust may cause irritation and/or sensitization to the eyes. Molybdenum compounds are eye irritants.
- **Skin:** Repeated or prolonged contact with dusts may cause skin irritation or sensitization, possibly leading to dermatitis. Skin contact with metallic fumes and dusts may cause physical abrasion. Exposure to nickel may cause contact and atopic dermatitis and allergic sensitization. Molybdenum compounds are skin irritants.
- **Ingestion:** Ingestion of harmful amounts of this product as distributed is unlikely due to its solid insoluble form. Ingestion of dust may cause nausea or vomiting.

Acute Effects by component:

- **TITANIUM:** Not Reported/ Not Classified
- **ALUMINUM:** Not Reported/ Not Classified
- **VANADIUM (as Vanadium Oxide):** Vanadium oxide is fatal if swallowed or inhaled, and may be harmful in contact with skin.
- **NICKEL:** Nickel may cause allergic skin sensitization.
- **MOLYBDENUM:** Molybdenum causes skin and eye irritation.

Chronic Effects by component:

- **TITANIUM:** There is no evidence of a health hazard from inhalation of titanium dioxide at airborne concentrations below 10 mg/m³. Rats (but not mice) exposed to ultrafine TiO₂ particles at 10 mg/m³ developed lung tumors; probably results from inhibited particle clearance from lung. The toxicity of titanium dioxide has been found to be relatively inert. Eye contact with pure material can cause particulate irritation. Skin contact with titanium dusts may cause physical abrasion.
- **ALUMINUM:** Chronic inhalation of finely divided powder has been reported to cause pulmonary fibrosis and emphysema. Repeated skin contact has been associated with bleeding into the tissue, delayed hypersensitivity and granulomas. Chronic exposure to aluminum flake has been reported to cause pneumoconiosis in workers. Repeat oral exposure to aluminum results in decrements in neurobehavioral function and development.
- **VANADIUM:** Vanadium is considered non-toxic. Excessive long term or repeated exposures to vanadium compounds, especially vanadium pentoxide, may result in chronic pulmonary changes such as emphysema or bronchitis. Vanadium pentoxide is suspected of damaging fertility or the unborn child. Vanadium pentoxide is fatal if swallowed or inhaled. It causes damage to lungs by single, repeated or prolonged exposure.
- **NICKEL:** Exposure to nickel dusts and fumes can cause sensitization dermatitis, respiratory irritation, asthma, pulmonary fibrosis, edema and may cause nasal or lung cancer in humans. Causes damage to lungs through prolonged or repeated inhalation exposure. IARC lists nickel and certain nickel compounds as Group 2B carcinogens (sufficient animal data). ACGIH 2009 TLVs® and BEIs® lists insoluble nickel compounds as confirmed human carcinogens. Suspected of damaging the unborn child.
- **MOLYBDENUM:** Certain handling operations, such as burning and welding, may generate both insoluble molybdenum compounds (metal and molybdenum dioxide) and soluble molybdenum compounds (molybdenum trioxide). Molybdenum compounds generally exhibit a low order of toxicity with the trioxide the more toxic. However, some reports indicate that the dust of the molybdenum metal, molybdenum dioxide and molybdenum trioxide may cause eye, skin, nose and throat irritation in animals. Also has been reported to cause induction of tumors in experimental animals, suspected of causing cancer. Molybdenum oxide is suspected of causing cancer in humans.

Long-term inhalation exposure to high concentrations (over-exposure) to pneumoconiotic agents may act synergistically with inhalation of oxides, fumes or dusts of this product to cause toxic effects.

Carcinogenicity: IARC, NTP, and OSHA do not list steel products as carcinogens. IARC identifies nickel and certain nickel compounds and welding fumes as Group 2B carcinogens that are possibly carcinogenic to humans. ACGIH lists insoluble nickel compounds as confirmed human carcinogens.

Medical Conditions Aggravated by Long-Term Exposure: Individuals with chronic respiratory disorders (i.e., asthma, chronic bronchitis, emphysema, etc.) may be adversely affected by any fume or airborne particulate matter exposure.

SARA Potential Hazard Categories: Immediate Acute Health Hazard; Delayed Chronic Health Hazard

Section 5 – Fire and Explosion Hazard Information

Suitable Extinguishing Media: Not applicable for solid product. Use extinguishers appropriate for surrounding materials. For fines, use a Type-D fire extinguisher or table salt to control small fires. Machining of titanium alloys will generate fine turnings, chips or dust. Warning: May Form Combustible (Explosive) Dust - Air Mixtures. Keep away from all ignition sources including heat, sparks, and flame. Keep container closed and grounded. Prevent dust accumulations to minimize explosion hazard.

Specific Hazards arising from the chemical: Not applicable for solid product.

Explosion hazard: Accumulated metal dust can be combustible. Avoid creating dust.

Special protective equipment and precautions for fire fighters: Self-contained MSHA/NIOSH approved respiratory protection and full protective clothing should be worn when fumes and/or smoke from fire are present. Heat and flames cause emittance of acrid smoke and fumes. Do not release runoff from fire control methods to sewers or waterways.

Section 6 - Accidental Release Measures

Personal Precautions, Protective Equipment and Emergency Procedures: Not applicable to steel in solid state. For spills involving finely divided particles, clean-up personnel should be protected against contact with eyes and skin. Collect material in appropriate, labeled containers for recovery or disposal in accordance with federal, state, and local regulations.

Environmental precautions: Not applicable to steel in solid state. Follow applicable Federal, state, and local regulations.

Methods and materials for containment and clean up: Collect material in appropriate, labeled containers for recovery or disposal in accordance with federal, state, and local regulations. Follow applicable OSHA regulations (29 CFR 1910.120) and all other pertinent state and federal requirements.

Section 7 - Handling and Storage

Precautions for safe handling: Operations with the potential for generating high concentrations of airborne particulates should be evaluated and controlled as necessary. Practice good housekeeping. Avoid breathing metal fumes and/or dust.

Conditions for safe storage, including any incompatibilities: Store away from acids and incompatible materials.

Section 8 - Exposure Controls / Personal Protection

Occupational Exposure Limits (OELs): This product in its physical form as sold does not present an inhalation, ingestion or contact hazard, nor would any of the following exposure data apply. However, operations such as high temperature (burning, welding), sawing, brazing, machining and grinding may produce fumes and/or particulates. The following exposure limits are offered as reference, for an experienced industrial hygienist to review.

Ingredients	OSHA PEL ¹	ACGIH TLV ²	NIOSH REL ³	IDLH ⁴
Titanium	15 mg/m ³ (as TiO ₂ , total dust)	10 mg/m ³ (as TiO ₂)	LFC (as TiO ₂) ⁵	5,000 mg/m ³ (as TiO ₂)
Aluminum	15 mg/m ³ (as total dust, PNOR ⁶) 5.0 mg/m ³ (as respirable fraction, PNOR)	10 mg/m ³ (as metal dust) 5.0 mg/m ³ (as welding fume)	10 mg/m ³ (as total dust) 5.0 mg/m ³ (as respirable dust)	NE
Vanadium	"C" 0.5 mg/m ³ (as V ₂ O ₅ , respirable dust) "C" 0.1 mg/m ³ (as V ₂ O ₅ , fume)	0.05 mg/m ³ (as V ₂ O ₅ , inhalable fraction) ⁷	"C" 0.05 mg/m ³ (as V ₂ O ₅ , total dust or fume)	35 mg/m ³ (as V, dust or fume)
Nickel	1.0 mg/m ³ (as Ni metal & insoluble compounds)	1.5 mg/m ³ (as inhalable fraction Ni metal) 0.2 mg/m ³ (as inhalable fraction Ni inorganic only insoluble and soluble compounds)	0.015 mg/m ³ (as Ni metal & insoluble and soluble compounds)	10 mg/m ³ (as Ni)
Molybdenum	15 mg/m ³ (as total dust, PNOR) 5.0 mg/m ³ (as respirable fraction, PNOR)	10 mg/m ³ (as Mo insoluble compounds, inhalable fraction) 3.0 mg/m ³ (as Mo insoluble compounds, respirable fraction) ⁸ 0.5 mg/m ³ (as Mo soluble compounds, respirable fraction)	NE	NE

NE - None Established

Notes:

- OSHA PELs (Permissible Exposure Limits) are 8-hour TWA (time-weighted average) concentrations unless otherwise noted. A ("C") designation denotes a ceiling limit, which should not be exceeded during any part of the working exposure unless otherwise noted. A Short Term Exposure Limit (STEL) is defined as a 15-minute exposure, which should not be exceeded at any time during a workday.
- Threshold Limit Values (TLV) established by the American Conference of Governmental Industrial Hygienists (ACGIH) are 8-hour TWA concentrations unless otherwise noted. ACGIH TLVs are for guideline purposes only and as such are not legal, regulatory limits for compliance purposes.
- The National Institute for Occupational Safety and Health Recommended Exposure Limits (NIOSH-REL): Compendium of Policy and Statements. NIOSH, Cincinnati, OH (1992). NIOSH is the federal agency designated to conduct research relative to occupational safety and health. As is the case with ACGIH TLVs, NIOSH RELs are for guideline purposes only and as such are not legal, regulatory limits for compliance purposes.
- The "immediately dangerous to life or health air concentration values (IDLHs)" are used by NIOSH as part of the respirator selection criteria and were first developed in the mid-1970's by NIOSH. The Documentation for Immediately Dangerous to Life or Health Concentrations (IDLHs) is a compilation of the rationale and sources of information used by NIOSH during the original determination of 387 IDLHs and their subsequent review and revision in 1994.
- LFC - Lowest Feasible Concentration, Refer to Section 11, Toxicological Information
- PNOR (Particulates Not Otherwise Regulated). All inert or nuisance dusts, whether mineral, inorganic, or organic, not listed specifically by substance name are covered by the PNOR limit which is the same as the inert or nuisance dust limit of 15 mg/m³ for total dust and 5.0 mg/m³ for the respirable fraction (containing less than 1% crystalline silica).
- Inhalable fraction. The concentration of inhalable particulate for the application of this TLV is to be determined from the fraction passing a size-selector with the characteristics defined in the ACGIH 2009 TLVs[®] and BEIs[®] (Biological Exposure Indices) Appendix D, paragraph A.
- Respirable fraction - The concentration of respirable dust for the application of this limit is to be determined from the fraction passing a size-selector with the characteristics defined in the ACGIH 2009 TLVs[®] and BEIs[®] Appendix D, paragraph C

Appropriate Engineering Controls: Use controls as appropriate to minimize exposure to metal fumes and dusts during handling operations. Provide general or local exhaust ventilation systems to minimize airborne concentrations. Local exhaust is necessary for use in enclosed or confined spaces. Provide sufficient general/local exhaust ventilation in pattern/volume to control inhalation exposures below current exposure limits.

Section 8 - Exposure Controls / Personal Protection (continued)

Personal Protective Equipment (PPE)

- **Respiratory Protection (continued):** Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, use only a NIOSH-approved respirator. Select respirator based on its suitability to provide adequate worker protection for given working conditions, level of airborne contamination, and presence of sufficient oxygen. Concentration in air of the various contaminants determines the extent of respiratory protection needed. Half-face, negative-pressure, air-purifying respirator equipped with P100 filter is acceptable for concentrations up to 10 times the exposure limit. Full-face, negative-pressure, air-purifying respirator equipped with P100 filter is acceptable for concentrations up to 50 times the exposure limit. Protection by air-purifying negative-pressure and powered air respirators is limited. Use a positive-pressure-demand, full-face, supplied air respirator or self contained breathing apparatus (SCBA) for concentrations above 50 times the exposure limit. If exposure is above the IDLH (Immediately dangerous to life or health) for any of the constituents, or there is a possibility of an uncontrolled release or exposure levels are unknown, then use a positive-demand, full-face, supplied air respirator with escape bottle or SCBA.

Warning! Air-purifying respirators both negative-pressure, and powered-air do not protect workers in oxygen-deficient atmospheres.

Protective Clothing/Equipment:

- **Eyes:** Wear appropriate eye protection to prevent eye contact. For operations, which result in elevating the temperature of the product to or above its melting point or result in the generation of airborne particulates, use safety glasses or goggles to prevent eye contact. Contact lenses should not be worn where industrial exposures to this material are likely. Use safety glasses or goggles as required for welding, burning, sawing, brazing, grinding or machining operations.
- **Skin:** Wear appropriate personal protective clothing to prevent skin contact. Cut resistant gloves and sleeves should be worn when working with steel products. For operations, which result in elevating the temperature of the product to or above its melting point or result in the generation of airborne particulates, use protective clothing, and gloves to prevent skin contact. Protective gloves should be worn as required for welding, burning or handling operations.
- **Other protective equipment:** An eyewash fountain and deluge shower should be readily available in the work area when operations which could result in fumes and/or particulates are being performed.

Section 9 - Physical and Chemical Properties

Appearance and Odor: Silver-gray metallic solid form, odorless	Water Solubility: Insoluble
Odor Threshold: NA	Fat Solubility: NA
Vapor Pressure: NA	Other Solubilities: NA
Vapor Density (Air=1): NA	Boiling Point: Ti-5930°F
Formula Weight: NA	Viscosity: NA
Density: NA	Refractive Index: NA
Specific Gravity (H₂O=1, 60°F): 4.5	Surface Tension: NA
pH: NA	% Volatile by volume: NA
Flash Point (closed cup): NA	Evaporation Rate: NA
Auto-ignition Temperature: NA	Freezing Point: NA
Decomposition Temperature: ND	Melting Point: : 2800-3040 °F
Partition Coefficient n-octanol/water: ND	UEL: NA
Flammability (solid, gas): Non-flammable	LEL: NA
Explosive Properties: ND	Oxidizing Properties: ND

NA - Not Applicable

ND - Not determined for product as a whole

Section 10 - Stability and Reactivity

Reactivity: Not Determined (ND) for product as a whole.

Stability: Steel products are stable under normal storage and handling conditions.

Polymerization: Hazardous polymerization cannot occur.

Chemical Incompatibilities: Will react with strong acids to form hydrogen.

Conditions to Avoid: Storage with strong acids or calcium hypochlorite






Hazardous Decomposition/Combustion Products: Thermal oxidative decomposition of steel products can produce fumes containing oxides as well as other alloying elements.

Sensitivity to Mechanical Impact: ND

Sensitivity to Static Discharge: ND

Section 11 - Toxicological Information

Toxicological information has not been established for this product as sold. However, processing of this product in operations such as high temperature (burning, welding), sawing, brazing, machining and grinding may produce fumes and/or particulates, which would result in the material being classified as hazardous under OSHA 29 CFR 1910.1200. The categories of Health Hazards as defined in “GLOBALLY HARMONIZED SYSTEM OF CLASSIFICATION AND LABELLING OF CHEMICALS (GHS), Third revised edition ST/SG/AC.10/30/Rev. 3” United Nations, New York and Geneva, 2009 have been evaluated and are listed below:

Potential Hazard	Hazard Category	Hazard Symbol	Signal Word	Hazard Statement
Skin Irritation	3 ^b	No Symbol	Warning	Causes mild skin irritation
Eye Damage/ Irritation	2B ^c	No Symbol	Warning	Causes eye irritation
Skin Sensitization	1 ^d		Warning	May cause an allergic skin reaction
Carcinogenicity	2 ^g		Warning	Suspected of causing cancer
Toxic Reproduction	2 ^h		Warning	Suspected of damaging the unborn child
Specific Target Organ Systemic Toxicity (STOST) following Single Exposure	3 ⁱ		Warning	May cause respiratory irritation
STOST following Repeated Exposure	1 ^j		Danger	Causes damage to lungs through prolonged or repeated inhalation exposure. Causes damage to the central nervous system.

Notes:

- No **LC₅₀** or **LD₅₀** has been established for **Titanium Alloy** (semi-finished steel products). The following data has been determined for the components:
 - Nickel:** LD₅₀ > 9000 mg/kg (Oral/Rat); LC₅₀ > 10.2 mg/l (Inhalation/Rat)
- No **Skin (Dermal) Irritation** data available for **Titanium Alloy** (semi-finished steel products) as a mixture. The following Skin (Dermal) Irritation information was found for the components:
 - Nickel:** Slight irritation only in rabbits
 - Molybdenum:** Irritating
- No **Eye Irritation** data available for **Titanium Alloy** (semi-finished steel products) as a mixture. The following Eye Irritation information was found for the components:
 - Molybdenum:** Causes eye irritation
 - Nickel:** Slight eye irritation from particulate abrasion only.
- No **Skin (Dermal) Sensitization** data available for **Titanium Alloy** (semi-finished steel products) a mixture. The following Skin (Dermal) Sensitization information was found for the components:
 - Nickel:** Human skin sensitizer
- No **Germ Cell Mutagenicity** data available for **Titanium Alloy** (semi-finished steel products) as a mixture. The following Mutagenicity and Genotoxicity information was found for the components:
 - Nickel:** Positive results *in vitro* and *in vivo* but insufficient data for classification
 - Aluminum:** Not mutagenic *in vitro*; but has marginal effects *in vivo*
- Carcinogenicity:** IARC, NTP, and OSHA do not list **Titanium Alloy** (semi-finished steel products) as carcinogens. The following Carcinogenicity information was found for the components:
 - Welding Fumes,** IARC Group 2B carcinogen, a mixture that is possibly carcinogenic to humans.
 - Nickel and certain nickel compounds** - IARC Group 2B carcinogens that are possibly carcinogenic to humans. Insoluble nickel compounds - ACGIH confirmed human carcinogen. Nickel - EURAR Insufficient evidence to conclude carcinogenic potential in animals or humans; suspect carcinogen classification Category 2 Suspected of causing cancer. Nickel Oxide – HSDB listed as Category 1a, may cause cancer. Human data in which exposure to nickel refinery dust caused lung and nasal tumors.
- No **Toxic Reproduction** data available for **Titanium Alloy** (semi-finished steel products) as a mixture. The following Toxic Reproduction information was found for the components:
 - Nickel:** Oral administration to experimental animals caused fetotoxicity.
 - Aluminum:** May cause delay in development of neurobehavioral indices.
- No **Specific Target Organ Systemic Toxicity (STOST) following a Single Exposure** data available for **Titanium Alloy** (semi-finished steel products) as a mixture. The following STOST following a Single Exposure data was found for the components:
 - Molybdenum:** May cause respiratory irritation.

Section 11 - Toxicological Information (continued)

- j. No **Specific Target Organ Systemic Toxicity (STOST) following Repeated Exposure** data was available for **Titanium Alloy** (semi-finished steel products) as a whole. The following STOST following Repeated Exposure data was found for the components:
- **Hexavalent Chrome:** Inflammation of lung, skin irritation and ulceration with repeat exposures in workers.
 - **Nickel:** Rats exposed to Nickel by inhalation at 1 mg/m³ for 90 days developed lung inflammation, hyperplasia and fibrosis.
 - **Aluminum:** Chronic exposure to aluminum flake has been reported to cause pneumoconiosis in workers. Repeat oral exposure to aluminum results in decrements in neurobehavioral function and development.

The above toxicity information was determined from available scientific sources to illustrate the prevailing posture of the scientific community. The scientific resources includes: The American Conference of Governmental Industrial Hygienist (ACGIH) Documentation of the Threshold Limit Values (TLVs) and Biological Exposure indices (BEIs) with Other Worldwide Occupational Exposure Values 2009, The International Agency for Research on Cancer (IARC), The National Toxicology Program (NTP) updated documentation, the World Health Organization (WHO) and other available resources, the International Uniform Chemical Information Database (IUCLID), European Union Risk Assessment Report (EU-RAR), Concise International Chemical Assessment Documents (CICAD), European Union Scientific Committee for Occupational Exposure Limits (EU-SCOEL), Agency for Toxic Substances and Disease Registry (ATSDR), Hazardous Substance Data Bank (HSDB), and International Programme on Chemical Safety (IPCS).

Section 12 - Ecological Information

Hazard Category: Not Reported

Hazard Symbol: No Symbol

Signal Word: No Signal Word

Hazard Statement: No Hazard Statement

Ecotoxicity: No data available for the product, **Titanium Alloy** (semi-finished steel products) as a whole. However, individual components of the product have been found to be toxic to the environment. Metal dusts may migrate into soil and groundwater and be ingested by wildlife as follows:

- **Aluminum:** LC₅₀> 100 mg/l for fish and algae

Mobility: No data available for the product, **Titanium Alloy** (semi-finished steel products) as a whole. However, individual components of the product have been found to be absorbed by plants from soil.

Persistence & Degradability: No Data Available

Bioaccumulative Potential: No Data Available

Note: The listing of regulations relating to an ATI product may not be complete and should not be solely relied upon for all regulatory compliance responsibilities.

Section 13 - Disposal Considerations

Disposal: Steel scrap should be recycled whenever possible. Product dusts and fumes from processing operations should also be recycled, or classified by a competent environmental professional and disposed of in accordance with applicable federal, state or local regulations.

Container Cleaning and Disposal: Follow applicable Federal, state and local regulations. Observe safe handling precautions. European Waste Catalogue (EWC): 16 01 17 (ferrous metals), 12 01 99 (wastes not otherwise specified), 16 03 (off specification batches and unused products), or 15 01 04 (metallic packaging).

Please note this information is for Titanium Alloy (semi-finished steel products) in its original form. Any alterations can void this information.

Section 14 - Transport Information

DOT Transportation Data (49 CFR 172.101):

US Department of Transportation (DOT) under 49 CFR 172 does not regulate **Titanium Alloy** (semi-finished steel products) as a hazardous material. All federal, state, and local laws and regulations that apply to the transport of this type of material must be adhered to.

<p>Shipping Name: Not Applicable (NA) Shipping Symbols: NA Hazard Class: NA UN No.: Not applicable Packing Group: NA DOT/ IMO Label: NA Special Provisions (172.102): NA</p>	<p>Packaging Authorizations a) Exceptions: NA b) Group: NA c) Authorization: NA</p>	<p>Quantity Limitations a) Passenger, Aircraft, or Railcar: NA b) Cargo Aircraft Only: NA Vessel Stowage Requirements a) Vessel Stowage: NA b) Other: NA DOT Reportable Quantities: NA</p>
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The International Maritime Dangerous Goods (IMDG) and the Regulations Concerning the International Carriage of Dangerous Goods by Rail (RID) classification, packaging and shipping requirements follow the US DOT Hazardous Materials Regulation.

ADR – Regulations Concerning the International Carriage of Dangerous Goods by Road does not regulate **Titanium Alloy** (semi-finished steel products) as a hazardous material.

<p>Shipping Name: Not Applicable (NA) Classification Code: NA UN No.: Not applicable Packing Group: NA ADR Label: NA Special Provisions: NA Limited Quantities: NA</p>	<p>Packaging a) Packing Instructions: NA b) Special Packing Provisions: NA c) Mixed Packing Provisions: NA</p>	<p>Portable Tanks & Bulk Containers a) Instructions: NA b) Special Provisions: NA</p>
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Section 14 - Transport Information (continued)

IATA – International Air Transport Association (IATA) does not regulate **Titanium Alloy** (semi-finished steel products) as a hazardous material.

Shipping Name: Not Applicable (NA) Class/Division: NA Hazard Label (s): NA UN No.: NA Packing Group: NA Excepted Quantities (EQ): NA	Passenger & Cargo Aircraft Limited Quantity (EQ)		Cargo Aircraft Only	Special Provisions:
	Pkg Inst: NA Max Net Qty/Pkg: NA	Pkg Inst: NA Max Net Qty/Pkg: NA	Pkg Inst: NA Max Net Qty/Pkg: NA	ERG Code: NA

Pkg Inst – Packing Instructions Max Net Qty/Pkg – Maximum Net Quantity per Package ERG – Emergency Response Drill Code

Transport Dangerous Goods (TDG) classification: **Titanium Alloy** (semi-finished steel products) does not have a TDG classification.

Section 15 - Regulatory Information

Regulatory Information: *The following listing of regulations relating to an ATI Allegheny Ludlum product may not be complete and should not be solely relied upon for all regulatory compliance responsibilities.*

This product and/or its constituents are subject to the following regulations:

OSHA Regulations: Air Contaminant (29 CFR 1910.1000, Table Z-1, Z-2, Z-3): The product, **Titanium Alloy** (semi-finished steel products) as a whole is not listed. However, individual components of the product are listed: Refer to Section 8, Exposure Controls and Personal Protection

EPA Regulations: **Titanium Alloy** (semi-finished steel products) is not listed as a whole. However, individual components of the product are listed:

Components	Regulations
Aluminum	SWDA, SARA 313
Vanadium	SARA 313
Nickel	CAA, CWA, SARA 313, CERCLA, RCRA, SDWA
Molybdenum	SDWA

SARA Potential Hazard Categories: Immediate Acute Health Hazard; Delayed Chronic Health Hazard

Regulations Key:

- CAA Clean Air Act (42 USC Sec. 7412; 40 CFR Part 61 [As of: 8/18/06])
- CERCLA Comprehensive Environmental Response, Compensation and Liability Act (42 USC secs. 9601(14), 9603(a); 40 CFR Sec. 302.4, Table 302.4, Table 302.4 and App. A)
- CWA Clean Water Act (33 USC Secs. 1311; 1314(b), (c), (e), (g); 136(b), (c); 137(b), (c) [as of 8/2/06])
- RCRA Resource Conservation Recovery Act (42 USC Sec. 6921; 40 CFR Part 261 App VIII)
- SARA Superfund Amendments and Reauthorization Title III Section 302 Extremely Hazardous Substances (42 USC secs. 11023, 13106; 40 CFR Sec. 372.65) and Section 313 Toxic Chemicals (42 USC secs. 11023, 13106; 40 CFR sec. 372.65 [as of 6/30/05])
- TSCA Toxic Substance Control Act (15 U.S.C. s/s 2601 et seq. [1976])
- SDWA Safe Drinking Water Act (42 U.S.C. s/s 300f et seq. [1974])

Section 313 Supplier Notification: This product, **Titanium Alloy** (semi-finished steel products) contains the following toxic chemicals subject to the reporting requirements of section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR part 372:

CAS #	Chemical Name	Max Percent by Weight
7429-90-5	Aluminum	7
7440-62-2	Vanadium	4.5
7440-02-0	Nickel	0.9

This information should be included in all MSDSs that are copied and distributed for this material.

State Regulations: The product, **Titanium Alloy** (semi-finished steel products) as a whole is not listed in any state regulations. However, individual components of the product are listed in various state regulations:

Pennsylvania Right to Know: Contains regulated material in the following categories:

- Hazardous Substances: Nickel, Molybdenum, and Aluminum
- Environmental Hazards: Aluminum (dust and Fume), Nickel, and Vanadium
- Special Hazard Substances: Nickel

California Prop. 65: The product, **Titanium Alloy** (semi-finished steel products) may possibly contain trace quantities (generally much less than 0.1%) of metallic elements known to the State of California to cause cancer or reproductive toxicity. This includes nickel.

New Jersey: Contains regulated material in the following categories:

- Special Health Hazard Substances: Nickel
- Hazardous Substance List: Titanium, Molybdenum, Vanadium, Aluminum (dust and fume), and Nickel
- Environmental Hazards: Not Listed

Minnesota: Nickel (elemental, soluble, and insoluble compounds), and Aluminum (dust and fume)

Massachusetts: Aluminum (dust and fume), Nickel, Vanadium, and Molybdenum

Other Regulations:

WHMIS Classification (Canadian): **Titanium Alloy** (semi-finished steel products) is not listed as a whole. However individual components are listed.

Section 15 - Regulatory Information (continued)

WHMIS Classification (Canadian) (continued):

Ingredients	WHMIS Classification
Titanium	D26
Vanadium	D3B
Nickel	D2B
Molybdenum	B4, D2B

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

Section 16 – Other Information

Hazardous Material Identification System (HMIS) Classification

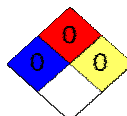
Health Hazard	0
Fire Hazard	0
Physical Hazard	0

HEALTH = 0, No significant risk to health.

FIRE= 0, Materials that will not burn

PHYSICAL HAZARDS = 0, Materials that are normally stable, even under fire conditions, and will not react with water, polymerize, decompose, condense, or self-react. Non-explosives

National Fire Protection Association (NFPA)



HEALTH = 0, No hazard beyond that of ordinary combustible materials.

FIRE = 0, Materials that will not burn

INSTABILITY = 0, Normally stable, even under fire exposure conditions, and are not reactive with water.

ABBREVIATIONS/ACRONYMS:

ACGIH	American Conference of Governmental Industrial Hygienists
BEIs	Biological Exposure Indices
CAS	Chemical Abstracts Service
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CNS	Central Nervous System
GI, GIT	Gastro-Intestinal, Gastro-Intestinal Tract
HMIS	Hazardous Materials Identification System
IARC	International Agency for Research on Cancer
LC50	Median Lethal Concentration
LD50	Median Lethal Dose
LD_{Lo}	Lowest Dose to have killed animals or humans
LEL	Lower Explosive Limit
µg/m³	microgram per cubic meter of air
mg/m³	milligram per cubic meter of air
mppcf	million particles per cubic foot
MSDS	Material Safety Data Sheet
MSHA	Mine Safety and Health Administration
NFPA	National Fire Protection Association

NIF	No Information Found
NIOSH	National Institute for Occupational Safety and Health
NTP	National Toxicology Program
ORC	Organization Resources Counselors
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
PNOR	Particulate Not Otherwise Regulated
PNOC	Particulate Not Otherwise Classified
PPE	Personal Protective Equipment
ppm	parts per million
RCRA	Resource Conservation and Recovery Act
RTECS	Registry of Toxic Effects of Chemical Substances
SARA	Superfund Amendment and Reauthorization Act
SCBA	Self-contained Breathing Apparatus
STEL	Short-term Exposure Limit
TLV	Threshold Limit Value
TWA	Time-weighted Average
UEL	Upper Explosive Limit

DISCLAIMER: All information, recommendations, and suggestions appearing herein concerning the product are based upon data believed to be reliable. It is the user's responsibility to determine the safety, toxicity, and suitability for their own use of the product described herein. Since the actual use by others is beyond our control, no guarantee, expressed or implied is made by AM Health and Safety, Inc. (acting consultant) and ATI Allegheny Ludlum as to the effects of such use, the results to be obtained, or the safety and toxicity of the product, nor does AM H&S or ATI Allegheny Ludlum assume any liability arising out of use by others of the product referred to herein. AMH&S and ATI Allegheny Ludlum shall not in any event be liable for special, incidental or consequential damages in connection with this MSDS. This MSDS is not intended as a license to operate under, or recommendation to infringe on, any patents. Appropriate warnings and safe handling procedures should be provided to handlers and users.

This information is not intended to serve as a complete regulatory compliance document. This information is offered as a guide to the MSDS user. No guarantees can be made whether the user will be in complete or correct compliance with all applicable regulations when this MSDS is used. It is the user's responsibility to comply with all federal, state, and local regulations.

NOTE: The percent composition in Section 3 reflects the range that is possible within this GROUP of products. These are not the technical specifications for a particular product.

PREPARED BY: AM Health and Safety, Inc. (acting consultant)

REVISION NO.: 1

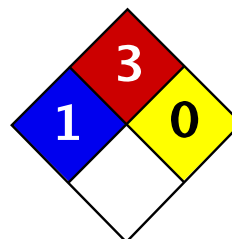
APPROVAL DATE: 12/15/11

MFR. CONTACT: M.R. Shirey (724-226-5980)

SUPERSEDES MSDS DATED: 12-15-07

WEBSITE: www.alleghenyludlum.com or www.ATIMetals.com

Note: This MSDS supersedes all prior MSDSs issued by ATI Allegheny Ludlum.



Health	2
Fire	3
Reactivity	0
Personal Protection	H

Material Safety Data Sheet Turpentine MSDS

Section 1: Chemical Product and Company Identification

Product Name: Turpentine

Catalog Codes: SLT2377, SLT3670

CAS#: 8006-64-2

RTECS: YO8400000

TSCA: TSCA 8(b) inventory: Turpentine

CI#: Not available.

Synonym:

Chemical Name: Not available.

Chemical Formula: C10H16

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Turpentine	8006-64-2	100

Toxicological Data on Ingredients: Turpentine: ORAL (LD50): Acute: 5760 mg/kg [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:

Very hazardous in case of ingestion. Hazardous in case of skin contact (irritant), of eye contact (irritant), of inhalation. Slightly hazardous in case of skin contact (permeator).

Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH.

MUTAGENIC EFFECTS: Not available.

TERATOGENIC EFFECTS: Not available.

DEVELOPMENTAL TOXICITY: Not available.

The substance may be toxic to kidneys, lungs, bladder, gastrointestinal tract, upper respiratory tract, skin, eyes, Urinary System, central nervous system (CNS), ears, nose/sinuses.

Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention.

Skin Contact:

In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. **WARNING:** It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek medical attention.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 253°C (487.4°F)

Flash Points: CLOSED CUP: 35°C (95°F). (TAG)

Flammable Limits: LOWER: 0.8%

Products of Combustion: These products are carbon oxides (CO, CO₂).

Fire Hazards in Presence of Various Substances: Flammable in presence of oxidizing materials.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available.

Risks of explosion of the product in presence of static discharge: Not available.

Slightly explosive in presence of oxidizing materials.

Fire Fighting Media and Instructions:

Flammable liquid, insoluble in water.

SMALL FIRE: Use DRY chemical powder.

LARGE FIRE: Use water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:

Toxic flammable liquid, insoluble or very slightly soluble in water.

Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents.

Storage:

Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:

Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 100 (ppm) from OSHA (PEL) [United States]

TWA: 100 from ACGIH (TLV) [United States] [1999]

TWA: 560 from ACGIH (TLV) [United States]

TWA: 100 (ppm) [Australia]

TWA: 150 (ppm) [United Kingdom (UK)]

Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Characteristic.

Taste: Not available.

Molecular Weight: 136 g/mole

Color: Colorless.

pH (1% soln/water): Not applicable.

Boiling Point: 165°C (329°F)

Melting Point: -55°C (-67°F)

Critical Temperature: Not available.

Specific Gravity: 0.861 (Water = 1)

Vapor Pressure: 76.9kPa (@ 20°C)

Vapor Density: 4.69 (Air = 1)

Volatility: Not available.

Odor Threshold: 100 ppm

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties:

Very slightly dispersed in methanol, diethyl ether, n-octanol.
Is not dispersed in cold water, hot water.

Solubility:

Very slightly soluble in methanol, diethyl ether, n-octanol.
Insoluble in cold water, hot water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Reactive with oxidizing agents.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Do not combine with Stannic Chloride, Chromyl Chloride, Acetone, Chlorine

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:

WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE.

Acute oral toxicity (LD50): 5760 mg/kg [Rat].

Acute toxicity of the vapor (LC50): 29000 1 hours [Mouse].

Chronic Effects on Humans:

CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH.

May cause damage to the following organs: kidneys, lungs, bladder, gastrointestinal tract, upper respiratory tract, skin, eyes, Urinary System, central nervous system (CNS), ears, nose/sinuses.

Other Toxic Effects on Humans:

Very hazardous in case of ingestion.
Hazardous in case of skin contact (irritant), of inhalation.
Slightly hazardous in case of skin contact (permeator).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are more toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification: : Turpentine UNNA: UN1299 PG: III

Special Provisions for Transport: Marine Pollutant

Section 15: Other Regulatory Information

Federal and State Regulations:

Florida: Turpentine
Minnesota: Turpentine
Massachusetts RTK: Turpentine
New Jersey: Turpentine
TSCA 8(b) inventory: Turpentine

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada):

CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F).
CLASS D-2B: Material causing other toxic effects (TOXIC).

DSCL (EEC):

R10- Flammable.
R20/21/22- Harmful by inhalation, in contact with skin and if swallowed.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 1

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves.

Lab coat.

Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate.

Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 12:12 AM

Last Updated: 11/06/2008 12:00 PM

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall ScienceLab.com be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if ScienceLab.com has been advised of the possibility of such damages.



Material Safety Data Sheet

LA0093
UCARTHERM(TM) HTF 50-C

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Id: LA0093
Product Name: UCARTHERM(TM) HTF 50-C
Synonyms: None
Chemical Family: Glycols
Application: Heat transfer fluids.

Distributed By:
Univar Canada Ltd.
9800 Van Horne Way
Richmond, BC
V6X 1W5

Prepared By: The Environment, Health and Safety Department of Univar Canada Ltd.
Preparation date of MSDS: 14/Mar/2014
Telephone number of preparer: 1-866-686-4827

24-Hour Emergency Telephone Number (CANUTEC): (613) 996-6666
Ucartherm(TM) is a registered trademark of Dow Chemical Company.

2. HAZARDS IDENTIFICATION

Potential Acute Health Effects:

Eye Contact: Vapors or mists may cause eye irritation. May cause slight eye irritation. Corneal injury is unlikely.
Skin Contact: Brief contact is essentially non-irritating to skin. Prolonged contact may cause skin irritation with local redness. Repeated contact may cause skin irritation with local redness. Prolonged skin contact is unlikely to result in absorption of harmful amounts. Repeated skin exposure to large quantities may result in absorption of harmful amounts. Massive contact with damaged skin or if material sufficiently hot to burn skin may result in absorption of potential lethal amounts.
Inhalation: At room temperature, exposure to vapor is minimal due to low volatility. With good ventilation, single exposure is not expected to cause adverse effects. If material is heated or areas are poorly ventilated, vapor/mist may accumulate and cause respiratory irritation and symptoms such as headache and nausea.
Ingestion: Oral toxicity is expected to be moderate in humans due to ethylene glycol even though tests with animals show a lower degree of toxicity. Excessive exposure may cause central nervous system effects, cardiopulmonary effects (metabolic acidosis), and kidney failure. Swallowing may result in severe effects, even death. The lethal dose in adult humans for ethylene glycol is approximately 3 ounces (100 ml) (1/3 cup). May cause nausea or vomiting. May cause abdominal discomfort or diarrhea.

3. COMPOSITION/ INFORMATION ON INGREDIENTS

Ingredients	Percentage (W/W)	LD50s and LC50s Route & Species:
-------------	------------------	----------------------------------

Water 7732-18-5	30-60	Oral LD50 (Rat) >90 mL/kg
Ethylene Glycol 107-21-1	30-60	Oral LD50 Rat = 4000 mg/kg
Dipotassium phosphate 7758-11-4	0.1-1	Not available.

Note: No additional remark.

4. FIRST AID MEASURES

Eye Contact: Immediately flush eyes with large amounts of water for at least 15 minutes. Get immediate medical attention. Remove contact lenses, if worn.

Skin Contact: Remove contaminated clothing and launder before reuse. Wash with soap and water. Get medical attention if irritation persists.

Inhalation: Remove person to fresh air. If not breathing, give artificial respiration. If breathing is difficult, get immediate medical attention.

Ingestion: Do NOT induce vomiting. Never give anything by mouth to an unconscious or convulsing person. Seek immediate medical attention. If vomiting occurs spontaneously, keep head below hips to prevent aspiration of liquid into the lungs.

Notes to Physician: If several ounces (60 - 100 ml) of ethylene glycol have been ingested, early administration of ethanol may counter the toxic effects (metabolic acidosis, renal damage). Consider hemodialysis or peritoneal dialysis & thiamine 100 mg plus pyridoxine 50 mg intravenously every 6 hours. If ethanol is used, a therapeutically effective blood concentration in the range of 100 - 150 mg/dl may be achieved by a rapid loading dose followed by a continuous intravenous infusion. Consult standard literature for details of treatment. 4-Methyl pyrazole (Antizol®) is an effective blocker

of alcohol dehydrogenase and should be used in the treatment of ethylene glycol (EG), di- or triethylene glycol (DEG, TEG), ethylene glycol butyl ether (EGBE), or methanol intoxication if available. Fomepizole protocol (Brent, J. et al., New England Journal of Medicine, Feb. 8, 2001, 344:6, p. 424-9): loading dose 15 mg/kg intravenously, follow by bolus dose of 10 mg/kg every 12 hours; after 48 hours, increase bolus dose to 15 mg/kg every 12 hours. Continue fomepizole until serum methanol, EG, DEG, TEG or EGBE are undetectable. The signs and symptoms of poisoning include anion gap metabolic acidosis, CNS depression, renal tubular injury, and possible late stage cranial nerve involvement. Respiratory symptoms, including pulmonary edema, may be delayed. Persons receiving significant exposure should be observed 24-48 hours for signs of respiratory distress. In severe poisoning, respiratory support with mechanical ventilation and positive end expiratory pressure may be required. Maintain adequate ventilation and oxygenation of the patient. If lavage is performed, suggest endotracheal and/or esophageal control. Danger from lung aspiration must be weighed against toxicity when considering emptying the stomach. If burn is present, treat as any thermal burn, after decontamination. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

5. FIRE FIGHTING MEASURES

Flash Point: 126.7 °C / 260.06 °F

Flash Point Method: Pensky-Martens Closed Cup ASTM D93

Autoignition Temperature: 398°C / 748°F

Flammable Limits in Air (%): Lower: 3.2% Upper: 15 % (Ethylene Glycol)

Extinguishing Media: Water fog or fine spray, carbon dioxide, dry chemical, foam. Alcohol resistant foams (ATC type) are preferred if available. General purpose synthetic foams (including AFFF) or protein foams may function, but much less effectively. Do not use direct water stream, which will spread fire.

Special Exposure Hazards: Move containers from fire area if you can do it without risk. Fight fire from a safe distance and from a protected location. Isolate and restrict area access. Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank. Always stay away from the end of tanks. Do not direct a solid stream of water or foam into hot, burning pools; this may cause frothing and increase fire intensity. Violent steam generation or eruption may occur upon application of direct water stream to hot liquids. Use water spray to cool fire-exposed containers and structures. Liquid mist of this product can burn. Consider use of unmanned hose holder or monitor nozzles. Container may rupture from gas generation in a fire situation.

Hazardous Decomposition/Combustion Materials (under fire conditions): Decomposition products can include and are not limited to: Carbon monoxide. Carbon dioxide.

Special Protective Equipment: Fire fighters should wear full protective clothing, including self-contained breathing equipment.

NFPA RATINGS FOR THIS PRODUCT ARE: HEALTH 1, FLAMMABILITY 1, INSTABILITY 0

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5. FIRE FIGHTING MEASURES

HMIS RATINGS FOR THIS PRODUCT ARE: HEALTH 1, FLAMMABILITY 1, REACTIVITY 0

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures: Wear appropriate protective equipment.

Environmental Precautionary Measures: Prevent entry into sewers or streams, dike if needed.

Procedure for Clean Up: Small spills: soak up with absorbent material and scoop into containers. Large spills : prevent contamination of waterways. Dike and pump into suitable containers. Clean up residual with absorbent material, place in appropriate container and flush with water. Isolate hazard area and restrict access. Stop leak only if safe to do so.

7. HANDLING AND STORAGE

Handling: For industrial use only. Avoid contact with eyes. Avoid breathing vapor. Avoid breathing aerosols. Do not swallow. Use with adequate ventilation. Wash thoroughly after handling. Keep the containers closed when not in use. The maximum recommended temperature on the Heat Transfer Fluid side of a heat exchanger is 160°C. If the fluid is exposed to excessively high temperatures, thermal degradation can occur; organic acids and other irritating fumes could result. Respiratory protection, such as an air supplied mask, may be needed until the fumes can be removed.

Storage: Store in a cool, dry, well ventilated area, away from heat and ignition sources. Place away from incompatible materials. Store in original container. Do not store in: galvanized steel. Store in carbon steel, stainless steel. Store in accordance with good industrial practices.

8. EXPOSURE CONTROLS/ PERSONAL PROTECTION

Engineering Controls:

General (mechanical) room ventilation may be adequate, if handled at ambient temperatures or in covered equipment. If ambient temperatures are exceeded or operations exist which may produce mist, aerosol or vapor, local exhaust ventilation or other engineering controls may be required.

Respiratory Protection: Respiratory protection is not usually needed unless product is heated or misted. If exposure exceeds occupational exposure limits, use an appropriate NIOSH-approved respirator. Organic vapor cartridge with a particulate pre-filter.

Gloves:

Use gloves chemically resistant to this material, examples of preferred glove barrier materials include: Neoprene gloves. Nitrile gloves. PVC gloves. Natural rubber gloves. Polyethylene gloves. Ethyl Vinyl Alcohol Laminate (EVAL). NOTICE: The selection of a specific glove for a particular application and duration of use in a workplace should also take into account all relevant workplace factors such as, but not limited to: Other chemicals which may be handled, physical requirements (cut/puncture protection, dexterity, thermal protection), potential body reactions to glove materials as well as the instructions/specifications provided by the glove supplier.

Skin Protection: Skin contact should be prevented through the use of suitable protective clothing, gloves and footwear, selected for conditions of use and exposure potential. Consideration must be given both to durability as well as permeation resistance. When handling hot material, protect skin from thermal burns as well as from skin absorption.

Eyes: Chemical safety goggles and/or full face shield to protect eyes and face, if product is handled such that it could be splashed into eyes.

Other Personal Protection Data: Ensure that eyewash stations and safety showers are proximal to the work-station location.

Ingredients	Exposure Limit - ACGIH	Exposure Limit - OSHA	Immediately Dangerous to Life or Health - IDLH
Water	Not available.	Not available.	Not Available.
Ethylene Glycol	100 mg/m ³ Ceiling	50 ppm Ceiling 125 mg/m ³ Ceiling	Not Available.
Dipotassium phosphate	Not available.	Not available.	Not Available.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State: Liquid

Color: Colorless to Yellow

Odor: Characteristic.

pH 9.5 (@ 50%) ASTM D1287

Specific Gravity: 1.08

9. PHYSICAL AND CHEMICAL PROPERTIES

Boiling Point: 108°C /226.4°F
Freezing/Melting Point: -37°C / -34.6°F
Vapor Pressure: 11.8 mmHg @ 20°C
Vapor Density: >1.0
% Volatile by Volume: 96 Wt%
Evaporation Rate: 0.1
Solubility: 100%
VOCs: Not Available.
Viscosity: 14.0 cSt @ 20°C
Molecular Weight: Not Available.
Other: Not Available.

10. STABILITY AND REACTIVITY

Chemical Stability: Stable.
Hazardous Polymerization: Will not occur.
Conditions to Avoid: Incompatible materials. Product can decompose at elevated temperatures. Generation of gas during decomposition can cause pressure in closed systems.
Materials to Avoid: Strong oxidizing agents. Strong acids and bases. Materials reactive with hydroxyl compounds.
Hazardous Decomposition Products: Decomposition products can include and are not limited to: Alcohols. Ethers. Aldehydes.
Additional Information:
No additional remark.

11. TOXICOLOGICAL INFORMATION

Principle Routes of Exposure

Ingestion: Oral toxicity is expected to be moderate in humans due to ethylene glycol even though tests with animals show a lower degree of toxicity. Excessive exposure may cause central nervous system effects, cardiopulmonary effects (metabolic acidosis), and kidney failure. Swallowing may result in severe effects, even death. The lethal dose in adult humans for ethylene glycol is approximately 3 ounces (100 ml) (1/3 cup). May cause nausea or vomiting. May cause abdominal discomfort or diarrhea.

Skin Contact: Brief contact is essentially non-irritating to skin. Prolonged contact may cause skin irritation with local redness. Repeated contact may cause skin irritation with local redness. Prolonged skin contact is unlikely to result in absorption of harmful amounts. Repeated skin exposure to large quantities may result in absorption of harmful amounts. Massive contact with damaged skin or if material sufficiently hot to burn skin may result in absorption of potential lethal amounts.

Inhalation: At room temperature, exposure to vapor is minimal due to low volatility. With good ventilation, single exposure is not expected to cause adverse effects. If material is heated or areas are poorly ventilated, vapor/mist may accumulate and cause respiratory irritation and symptoms such as headache and nausea.

Eye Contact: Vapors or mists may cause eye irritation. May cause slight eye irritation. Corneal injury is unlikely.

Additional Information: Repeated skin contact with ethylene glycol may, in a very small proportion of cases, cause sensitization with the development of allergic contact dermatitis. The incidence is significantly less than 1% with the undiluted material. Repeated inhalation of ethylene glycol may produce signs of central nervous system involvement, particularly dizziness and nystagmus (involuntary eye movement). Exposure may place individuals with existing heart problems at added risk of potential cardiac irregularities and heart failure. In animals, effects have been reported on the following organs: Kidney, liver. May aggravate an existing kidney disease.

Acute Test of Product:

Acute Oral LD50: 8200 mg/kg (Rat) similar material

Acute Dermal LD50: >2000 mg/kg (Rabbit) similar material

Acute Inhalation LC50: Not Available.

Carcinogenicity:

Ingredients	IARC - Carcinogens	ACGIH - Carcinogens
Water	Not listed.	Not listed.
Ethylene Glycol	Not listed.	A4

Ingredients	IARC - Carcinogens	ACGIH - Carcinogens
Dipotassium phosphate	Not listed.	Not listed.

Carcinogenicity Comment: Did not cause cancer in long-term animal studies.

Reproductive Toxicity/ Teratogenicity/ Embryotoxicity/ Mutagenicity: Based on animal studies, ingestion of very large amounts of ethylene glycol appears to be the major and possibly only route of exposure to produce birth defects. Exposures by inhalation or skin contact, the primary routes of occupational exposure, had minimal effect on the fetus, in animal studies. Ingestion of large amounts of ethylene glycol has been shown to interfere with reproduction in animals. Specifically, growth retardation and decreased litter size in rats and mice and decreased mating frequency in mice were observed. Ethylene glycol has been shown to produce dose-related teratogenic effects in rats and mice when given by gavage or in drinking water at high concentrations or doses. The no-effect doses for developmental toxicity for ethylene glycol given by gavage over the period of organogenesis has been shown to be 150 mg/kg/day for the mouse and 500 mg/kg/day for the rat. Also, in a preliminary study to assess the effects of exposure of pregnant rats and mice to aerosols at concentrations of 150, 1000 and 2500 mg/m³ for 6 hours a day throughout the period of organogenesis, teratogenic effects were produced at the highest concentration, but only in mice. The conditions of these latter experiments did not allow a conclusion as to whether the developmental toxicity was mediated by inhalation of aerosol, percutaneous absorption of ethylene glycol from contaminated skin, or swallowing of ethylene glycol as a result of grooming the wetted coat. In a further study, comparing effects from high aerosol concentration by whole-body or nose-only exposure, it was shown that nose-only exposure resulted in maternal toxicity (1000 and 2500 mg/m³) and developmental toxicity with minimal evidence of teratogenicity (2500 mg/m³). The no-effects concentration (based on maternal toxicity) was 500 mg/m³. In a further study in mice, no teratogenic effects could be produced when ethylene glycol was applied to the skin of pregnant mice over the period of organogenesis. The above observations suggest that ethylene glycol is to be regarded as an animal teratogen. There is currently no available information to suggest that ethylene glycol has caused birth defects in humans. Cutaneous application of ethylene glycol is ineffective in producing developmental toxicity. Exposure to high aerosol concentrations is only minimally effective in producing developmental toxicity. A three generation study indicated that ethylene glycol did not affect reproductive parameters at dietary concentrations up to 1.0 gm/kg/day in any generation.

12. ECOLOGICAL INFORMATION

Ecotoxicological Information:

Ingredients	Ecotoxicity - Fish Species Data	Acute Crustaceans Toxicity:	Ecotoxicity - Freshwater Algae Data
Water	Not Available.	Not Available.	Not Available.
Ethylene Glycol	14 - 18 mL/L LC50 (Oncorhynchus mykiss) 96 h static 40000 - 60000 mg/L LC50 (Pimephales promelas) 96 h static 16000 mg/L LC50 (Poecilia reticulata) 96 h static 27540 mg/L LC50 (Lepomis macrochirus) 96 h static 40761 mg/L LC50 (Oncorhynchus mykiss) 96 h static 41000 mg/L LC50 (Oncorhynchus mykiss) 96 h	Not Available.	6500 - 13000 mg/L EC50 Pseudokirchneriella subcapitata 96 h
Dipotassium phosphate	Not Available.	Not Available.	Not Available.

Other Information:

Ecotoxicity: Material is practically non-toxic to aquatic organisms on an acute basis (LC50 or EC50 >100 mg/L in the most sensitive species tested).

13. DISPOSAL CONSIDERATIONS

Disposal of Waste Method: Disposal of all wastes must be done in accordance with municipal, provincial and federal regulations.

Contaminated Packaging: Empty containers should be recycled or disposed of through an approved waste management facility.

14. TRANSPORT INFORMATION

DOT (U.S.):

DOT Shipping Name: Not Regulated.

DOT Hazardous Class: Not Applicable.

DOT UN Number: Not Applicable.

DOT Packing Group: Not Applicable.

DOT Reportable Quantity (lbs): Not Available.

Note: No additional remark.

Marine Pollutant: No.

TDG (Canada):

TDG Shipping Name: Not Regulated.

Hazard Class: Not Applicable.

UN Number: Not Applicable.

Packing Group: Not Applicable.

Note: No additional remark.

Marine Pollutant: No.

15. REGULATORY INFORMATION

U.S. TSCA Inventory Status: All components of this product are either on the Toxic Substances Control Act (TSCA) Inventory List or exempt.

Canadian DSL Inventory Status: All components of this product are either on the Domestic Substances List (DSL), the Non-Domestic Substances List (NDSL) or exempt.

Note: Not available.

U.S. Regulatory Rules

Ingredients	CERCLA/SARA - Section 302:	SARA (311, 312) Hazard Class:	CERCLA/SARA - Section 313:
Water	Not Listed.	Not Listed.	Not Listed.
Ethylene Glycol	Not Listed.	Listed	Listed
Dipotassium phosphate	Not Listed.	Not Listed.	Not Listed.

California Proposition 65: Not Listed.

MA Right to Know List: Listed.

New Jersey Right-to-Know List: Listed.

Pennsylvania Right to Know List: Listed.

WHMIS Hazardous Class:

D2A VERY TOXIC MATERIALS



16. OTHER INFORMATION

Additional Information:

This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

Disclaimer:

NOTICE TO READER:

Univar, expressly disclaims all express or implied warranties of merchantability and fitness for a particular purpose, with respect to the product or information provided herein, and shall under no circumstances be liable for incidental or consequential damages.

Do not use ingredient information and/or ingredient percentages in this MSDS as a product specification. For product specification information refer to a Product Specification Sheet and/or a Certificate of Analysis. These can be obtained from your local Univar Sales Office.

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*****END OF MSDS*****



MATERIAL SAFETY DATA SHEET

1. Product and Company Identification

Material name W1060 (R45) - W1200 (R60) Welding Rods
Version # 01
Issue date 28-February-2014
Revision date -
Supersedes date -
CAS # Mixture
Product type Carbon Steel Alloy
Product use Carbon Steel Oxyfuel Gas Welding.
Manufacturer information
Manufacturer/Supplier Harris Products Group
4501 Quality Place
Mason, Ohio 45040 US
custservmason@jwharris.com
Telephone number 513-754-2000
Emergency Telephone Numbers 1-888-609-1762 (US, Canada, Mexico only)
Please quote 333988

2. Hazards Identification

Physical state Solid.
Appearance Solid wire.
Emergency overview WARNING
May cause eye, skin and respiratory tract irritation. Toxic: danger of serious damage to health by prolonged exposure through inhalation.
OSHA regulatory status This product is considered hazardous under 29 CFR 1910.1200 (Hazard Communication).
Potential health effects
Routes of exposure Inhalation. Skin contact. Eye contact.
Eyes Fumes from heated material may cause eye irritation. Dust may irritate the eyes. Exposure to hot material may cause thermal burns.
Skin Exposure to hot material may cause thermal burns. Dust may irritate skin.
Inhalation Inhalation of fumes may cause a flu-like illness called metal fume fever. Inhalation of dusts may cause respiratory irritation.
Ingestion Ingestion is not likely to be a primary route of occupational exposure.
Target organs Respiratory system. Eyes. Skin. Central nervous system.
Chronic effects Chronic inhalation of fumes or dust may cause irritation or other respiratory conditions (e.g., bronchitis). May cause lung damage.
Chronic inhalation of high concentrations of iron oxide fumes or dust may lead to benign pneumoconiosis (siderosis).
Overexposure to manganese fumes may affect the brain and central nervous system, resulting in poor coordination, difficulty speaking, and arm or leg tremor. This condition can be irreversible
Long-term exposure to copper compounds may cause anemia.
Refer to Section 11 Toxicological Information for more details.
Signs and symptoms Contact may cause irritation and redness. Dust may irritate respiratory system. Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting. Typical metal fume fever begins four to twelve hours after sufficient exposure to freshly formed fumes. The first symptoms are a metallic taste, dryness and irritation of the throat. Cough and shortness of breath may occur along with headache, fatigue, nausea, vomiting, muscle and joint pain, fever and chills. The syndrome runs its course in 24-48 hours.
Potential environmental effects Alloys in massive forms present a limited hazard for the environment.

3. Composition / Information on Ingredients

Components	CAS #	Percent
Manganese	7439-96-5	0.5 - 1.40
Copper	7440-50-8	0.3
Iron	7439-89-6	Balance

Composition comments All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

4. First Aid Measures

First aid procedures

- Eye contact** Rinse immediately with plenty of water for at least 15 minutes. Remove any contact lenses. Get medical attention if irritation develops or persists.
- Skin contact** Remove contaminated clothes and rinse skin thoroughly with water for at least 15 minutes. Get medical attention if irritation develops and persists.
- Inhalation** Remove person from contaminated area to fresh air. Apply artificial respiration if needed. Call a physician if symptoms develop or persist.
- Ingestion** Do NOT induce vomiting. Immediately rinse mouth and drink a cupful of water. Never give anything by mouth to an unconscious person. Get medical attention immediately.

Notes to physician Treat symptomatically.

General advice Show this safety data sheet to the doctor in attendance.

5. Fire Fighting Measures

Flammable properties Solid metal is not flammable; however, finely divided metallic dust or powder may form an explosive mixture with air. Do not use water on molten metal: Explosion hazard could result.

Extinguishing media

- Suitable extinguishing media** Extinguish with foam, carbon dioxide or dry powder.
- Unsuitable extinguishing media** Do not use water or halogenated extinguishing media.

Protection of firefighters

- Specific hazards arising from the chemical** Fire or high temperatures create: Metal oxides.

Fire fighting equipment/instructions Self-contained breathing apparatus and full protective clothing must be worn in case of fire. Move containers from fire area if you can do it without risk.

6. Accidental Release Measures

Personal precautions Keep unnecessary personnel away. Avoid inhalation of dust from the spilled material. Wear protective clothing as described in Section 8 of this MSDS. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.

Environmental precautions Prevent further leakage or spillage if safe to do so. Do not contaminate water.

Methods for containment Stop leak if you can do so without risk. Local authorities should be advised if significant spillages cannot be contained.

Methods for cleaning up Collect for salvage or disposal. Put material in suitable, covered, labeled containers. Avoid the generation of dusts during clean-up. For waste disposal, see Section 13 of the MSDS.

Other information Clean up in accordance with all applicable regulations.

7. Handling and Storage

Handling Follow the recommendations in ANSI Z49.1, Safety in welding and cutting (ANSI=American National Standard Institute). Avoid inhalation of dust and fumes. Use process enclosures, local exhaust ventilation, or other engineering controls to control sources of dust and fumes. Keep formation of airborne dusts to a minimum. Avoid contact with skin and eyes. Wear appropriate personal protective equipment (See Section 8). Do not eat, drink or smoke when using the product. Wash thoroughly after handling. Avoid release to the environment.

Storage Store in tightly closed original container in a dry, cool and well-ventilated place. Store in a closed container away from incompatible materials. Keep away from food, drink and animal feedings.

8. Exposure Controls / Personal Protection

Occupational exposure limits

US. ACGIH Threshold Limit Values

Components	Type	Value	Form
Iron oxide (CAS 1309-37-1)	TWA	5 mg/m3	Respirable fraction.
Manganese (CAS 7439-96-5)	TWA	0.1 mg/m3	Inhalable fraction.
		0.02 mg/m3	Respirable fraction.

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value	Form
Iron oxide (CAS 1309-37-1)	PEL	10 mg/m3	Fume.
Manganese (CAS 7439-96-5)	Ceiling	5 mg/m3	Fume.

Canada. Alberta OELs (Occupational Health & Safety Code, Schedule 1, Table 2)

Components	Type	Value	Form
Iron oxide (CAS 1309-37-1)	TWA	5 mg/m3	Respirable.
Manganese (CAS 7439-96-5)	TWA	0.2 mg/m3	

Canada. British Columbia OELs. (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended)

Components	Type	Value	Form
Iron oxide (CAS 1309-37-1)	STEL	10 mg/m3	Fume.
		5 mg/m3	Fume.
		5 mg/m3	Dust.
		3 mg/m3	Respirable fraction.
		10 mg/m3	Total dust.
Manganese (CAS 7439-96-5)	TWA	0.2 mg/m3	

Canada. Manitoba OELs (Reg. 217/2006, The Workplace Safety And Health Act)

Components	Type	Value	Form
Iron oxide (CAS 1309-37-1)	TWA	5 mg/m3	Respirable fraction.
Manganese (CAS 7439-96-5)	TWA	0.1 mg/m3	Inhalable fraction.
		0.02 mg/m3	Respirable fraction.

Canada. Ontario OELs. (Control of Exposure to Biological or Chemical Agents)

Components	Type	Value	Form
Iron oxide (CAS 1309-37-1)	TWA	5 mg/m3	Respirable fraction.
Manganese (CAS 7439-96-5)	TWA	0.2 mg/m3	

Canada. Quebec OELs. (Ministry of Labor - Regulation Respecting the Quality of the Work Environment)

Components	Type	Value	Form
Iron oxide (CAS 1309-37-1)	TWA	5 mg/m3	Dust and fume.
		10 mg/m3	Total dust.
		3 mg/m3	Fume.
Manganese (CAS 7439-96-5)	TWA	5 mg/m3	Dust.
		1 mg/m3	Fume.

Mexico. Occupational Exposure Limit Values

Components	Type	Value	Form
Iron oxide (CAS 1309-37-1)	STEL	10 mg/m3	
	TWA	5 mg/m3	

Mexico. Occupational Exposure Limit Values

Components	Type	Value	Form
Manganese (CAS 7439-96-5)	STEL	3 mg/m3	Fume.
	TWA	1 mg/m3 0.2 mg/m3	Fume.

Engineering controls Provide adequate ventilation. Observe occupational exposure limits and minimize the risk of inhalation of dust and fumes. Shower, hand and eye washing facilities near the workplace are recommended.

Personal protective equipment

Eye / face protection Wear safety glasses with side shields (or goggles). When welding, it is recommended that safety glasses, goggles, or face-shield with filter lens of appropriate shade number (per ANSI Z49.1-1988, "Safety in Welding and Cutting") be worn.

Skin protection Protective clothing is recommended. When welding, wear protective clothing that protects from sparks and flame (per ANSI Z49.1-1988, "Safety in Welding and Cutting").

Respiratory protection Use a respirator when local exhaust or ventilation is not adequate to keep exposures below the TLV. In a confined space a supplied respirator may be required. Selection and use of respiratory protective equipment should be in accordance with OSHA General Industry Standard 29 CFR 1910.134; or in Canada with CSA Standard Z94.4. Use a NIOSH/MSHA approved respirator if there is a risk of exposure to dust/fume at levels exceeding the exposure limits.

General hygiene considerations Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical & Chemical Properties

Appearance	Solid wire.
Physical state	Solid.
Form	Solid.
Color	Gray.
Odor	Odorless.
Odor threshold	Not available.
pH	Not available.
Vapor pressure	Not available.
Vapor density	Not available.
Boiling point	5432 °F (3000 °C)
Melting point/Freezing point	2372 °F (1300 °C)
Solubility (water)	Insoluble in water.
Specific gravity	7.6 - 7.78 (water=1)
Flash point	Not available.
Flammability limits in air, upper, % by volume	Not available.
Flammability limits in air, lower, % by volume	Not available.
Auto-ignition temperature	Not available.

10. Chemical Stability & Reactivity Information

Chemical stability	Material is stable under normal conditions.
Conditions to avoid	Contact with incompatible materials.
Incompatible materials	Strong oxidizing agents. Strong acids. Strong bases. Acetylene. Ammonia. Hydrogen peroxide (H ₂ O ₂). Chlorine. Bromine, iodine, turpentine, magnesium metal. Hydrogen sulfide. Ammonium nitrate.

Hazardous decomposition products

Toxic metal oxides are emitted when heated above the melting point. Welding fumes and gases cannot be classified simply. The composition and quantity of both are dependent upon the metal being welded, the process, procedure and electrodes used.

Other conditions which also influence the composition and quantity of the fumes and gases to which workers may be exposed include: coatings on the metal being welded (such as paint, plating, or galvanizing), the number of welders and the volume of the worker area, the quality and amount of ventilation, the position of the welder's head with respect to the fume plume, as well as the presence of contaminants in the atmosphere (such as chlorinated hydrocarbon vapors from cleaning and degreasing activities.)

Fumes can be reasonably expected to include: Metal oxides.

Possibility of hazardous reactions

Hazardous polymerization does not occur.

11. Toxicological Information**Toxicological data**

Components	Species	Test Results
Iron (CAS 7439-89-6)		
Acute		
<i>Oral</i>		
LD50	Rat	30 g/kg
Manganese (CAS 7439-96-5)		
Acute		
<i>Oral</i>		
LD50	Rat	9000 mg/kg

Sensitization

This product is not expected to cause skin sensitization.

Acute effects

When heated, the vapors/fumes given off may cause respiratory tract irritation. High concentrations of freshly formed fumes/dusts of metal oxides can produce symptoms of metal fume fever.

Local effects

Elevated temperatures or mechanical action may form dust and fumes which may be irritating to the eye, mucous membranes and respiratory tract.

Chronic effects

Chronic inhalation of high concentrations of iron oxide fumes or dust may lead to benign pneumoconiosis (siderosis). Overexposure to manganese fumes may affect the brain and central nervous system, resulting in poor coordination, difficulty speaking, and arm or leg tremor. This condition can be irreversible. Long-term exposure to copper compounds may cause anemia.

Carcinogenicity

This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.

ACGIH Carcinogens

Manganese (CAS 7439-96-5)

A4 Not classifiable as a human carcinogen.

Epidemiology

Based on epidemiological studies, pre-existing pulmonary disorders may be aggravated by prolonged exposure to high concentrations of metal dust or fumes.

Mutagenicity

No data available.

Reproductive effects

This product is not reported to cause reproductive effects in humans. Manganese metal may damage the reproductive system and has shown teratogenic effects in laboratory animals.

Further information

No other specific acute or chronic health impact noted.

12. Ecological Information**Ecotoxicological data**

Components	Species	Test Results
Iron (CAS 7439-89-6)		
Aquatic		
Fish	LC50 Channel catfish (<i>Ictalurus punctatus</i>)	> 500 mg/l, 96 hours
Ecotoxicity	Alloys in massive forms present a limited hazard for the environment.	
Environmental effects	Significant environmental persistence and bioaccumulation can be expected.	
Persistence and degradability	The product is not biodegradable.	
Bioaccumulation / Accumulation	The product contains potentially bioaccumulating substances.	

Mobility in environmental media Alloys in massive forms are not mobile in the environment.

13. Disposal Considerations

Disposal instructions Dispose in accordance with all applicable regulations.
Waste from residues / unused products Recover and recycle, if practical. Solid metal and alloys in the form of particles may be reactive. Its hazardous characteristics, including fire and explosion, should be determined prior to disposal.
Contaminated packaging Since emptied containers may retain product residue, follow label warnings even after container is emptied.

14. Transport Information

DOT

Not regulated as a hazardous material by DOT.

IATA

Not regulated as dangerous goods.

IMDG

Not regulated as dangerous goods.

TDG

Not regulated as dangerous goods.

15. Regulatory Information

US federal regulations This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.
All components are on the U.S. EPA TSCA Inventory List.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Manganese (CAS 7439-96-5)

US EPCRA (SARA Title III) Section 313 - Toxic Chemical: De minimis concentration

Manganese (CAS 7439-96-5) 1.0 %

US EPCRA (SARA Title III) Section 313 - Toxic Chemical: Listed substance

Manganese (CAS 7439-96-5) Listed.

CERCLA (Superfund) reportable quantity (lbs) (40 CFR 302.4)

None

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories Immediate Hazard - Yes
Delayed Hazard - Yes
Fire Hazard - No
Pressure Hazard - No
Reactivity Hazard - No

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical Yes

Drug Enforcement Administration (DEA) (21 CFR 1308.11-15) Not controlled

Canadian regulations This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

WHMIS status Controlled

WHMIS classification D2B - Other Toxic Effects-TOXIC

WHMIS labeling



Inventory status

Country(s) or region	Inventory name	On inventory (yes/no)*
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s).

A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

State regulations

This product does not contain a chemical known to the State of California to cause cancer, birth defects or other reproductive harm.

US - California Hazardous Substances (Director's): Listed substance

Iron (CAS 7439-89-6) Listed.

Manganese (CAS 7439-96-5) Listed.

US - California Proposition 65 - Carcinogens & Reproductive Toxicity (CRT): Listed substance

Not listed.

US. Massachusetts RTK - Substance List

Manganese (CAS 7439-96-5) Listed.

US. New Jersey Worker and Community Right-to-Know Act

Manganese (CAS 7439-96-5)

US. Pennsylvania Worker and Community Right-to-Know Law

Manganese (CAS 7439-96-5)

Mexico regulations

This safety data sheet was prepared in accordance with the Official Mexican Standard (NOM-018-STPS-2000).

16. Other Information

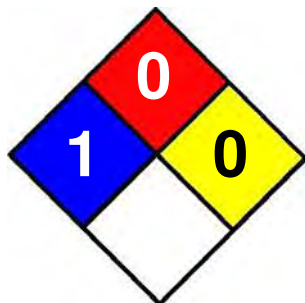
Further information

HMIS® is a registered trade and service mark of the NPCA.

HMIS® ratings

Health: 2*
Flammability: 0
Physical hazard: 0

NFPA Ratings



Disclaimer

The information in the sheet was written based on the best knowledge and experience currently available.



WD-40



MATERIAL SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

<p>MANUFACTURER/SUPPLIER: US Office: WD-40 Company 1061 Cudahy Place San Diego, CA 92110</p> <p>Information Phone #: (619) 275-1400 Emergency Phone # 24 hr: Chemtrec: (800) 424-9300 – Designated for use only in the event of chemical emergencies involving a spill, leak, fire exposure or accident involving chemicals.</p>	<p>Canadian Office: WD-40 Products [Canada] Ltd. P.O. Box 220 Toronto, Ontario M9C 4V3</p> <p>Information Phone #: (416) 622-9881 Emergency Phone # 24 hr: Canutec: (613) 996-6666 – Designated for use only in the event of chemical emergencies involving a spill, leak, fire exposure or accident involving chemicals</p>
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PRODUCT NAME: WD-40 Aerosol
 PRODUCT USE: Cleaner, lubricant.
 MSDS DATE OF PREPARATION: March 10, 2013

SECTION 2 HAZARDS IDENTIFICATION

DANGER! Harmful or fatal if swallowed. Flammable aerosol. Contents under pressure. Avoid eye contact. Use with adequate ventilation. Keep away from heat, sparks and all other sources of ignition.

POTENTIAL HEALTH EFFECTS:

PRIMARY ROUTES OF ENTRY: Inhalation, skin and eye contact.

ACUTE EFFECTS:

INGESTION: This product has low oral toxicity. Swallowing of the liquid contents may cause irritation, nausea, vomiting and diarrhea. The liquid contents are an aspiration hazard. If swallowed, can enter the lungs and may cause chemical pneumonitis.

EYES: Contact may be mildly irritating to eyes. May cause redness and tearing.

SKIN: Prolonged and/or repeated contact may produce mild irritation and defatting with possible dermatitis.

INHALATION: High concentrations may cause nasal and respiratory irritation and central nervous system effects such as headache, dizziness and nausea. May aggravate existing respiratory conditions such as asthma. Intentional abuse may be harmful or fatal.

CHRONIC EFFECTS: None expected.

SECTION 3 COMPOSITION INFORMATION ON INGREDIENTS

Ingredient	CAS Number	Percent
Aliphatic Petroleum Distillates	64742-47-8	50-70%
	64742-88-7	
Petroleum Base Oil	64742-58-1	30-35%
	64742-53-6	
	64742-56-9	
	64742-65-0	
Non-Hazardous Ingredients	Proprietary	<10%
Carbon Dioxide	124-38-9	2-3%

SECTION 4 FIRST AID MEASURES

For Medical Emergencies Call 1-888-324-7596 (24 hours/day)

INGESTION: Aspiration Hazard. DO NOT induce vomiting. Call physician, poison control center or the WD-40 Safety Hotline at 1-888-324-7596 immediately.

EYE CONTACT: Flush thoroughly with water. Get medical attention if irritation persists.

SKIN CONTACT: Wash with soap and water. If irritation develops and persists, get medical attention.

INHALATION: If irritation is experienced, move to fresh air. Get medical attention if irritation or other symptoms develop and persist.

SECTION 5 FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA: Use water fog, dry chemical, carbon dioxide or foam. Do not use water jet or flooding amounts of water. Burning product will float on the surface and spread fire.

SPECIAL FIRE FIGHTING PROCEDURES: Firefighters should always wear positive pressure self-contained breathing apparatus and full protective clothing. Cool fire-exposed containers with water. Use shielding to protect against bursting containers.

UNUSUAL FIRE/EXPLOSION HAZARDS: Contents under pressure. Aerosol containers may burst under fire conditions. Vapors are heavier than air and may travel along surfaces to remote ignition sources and flash back.

SECTION 6 ACCIDENTAL RELEASE MEASURES

SPILL RESPONSE: Wear appropriate protective clothing (see Section 8). Eliminate all sources of ignition and ventilate area. Leaking cans should be placed in a plastic bag or open pail until the pressure has dissipated. Contain and collect liquid with an inert absorbent and place in a container for disposal. Clean spill area thoroughly. Report spills to authorities as required.

SECTION 7 HANDLING AND STORAGE

HANDLING: Avoid contact with eyes. Avoid prolonged contact with skin. Avoid breathing vapors or aerosols. Use with adequate ventilation. Keep away from heat, sparks and open flames. Wash thoroughly with soap and water after handling. Do not puncture or incinerate containers. Keep can away from electrical current or battery terminals. Electrical arcing can cause burn-through (puncture) which may result in flash fire, causing serious injury. Keep out of the reach of children.

STORAGE: Do not store above 120°F or in direct sunlight. U.F.C (NFPA 30B) Level 3 Aerosol.

SECTION 8 EXPOSURE CONTROLE/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS:

Aliphatic Petroleum Distillates	1200 mg/m ³ TWA Manufacturer Recommended
Petroleum Base Oil	5 mg/m ³ TWA ACGIH TLV 10 mg/m ³ STEL ACGIH TLV
Non-Hazardous Ingredients	None Established
Carbon Dioxide	5000 ppm TWA, 30,000 ppm STEL ACGIH TLV

The Following Controls are Recommended for Normal Consumer Use of this Product

Engineering Controls: Use in a well-ventilated area.

Personal Protection:

Eye Protection: Avoid eye contact. Safety glasses or goggles recommended.

Skin Protection: Avoid prolonged skin contact. Chemical resistant gloves recommended for operations where skin contact is likely.

Respiratory Protection: None needed for normal use with adequate ventilation.

For Bulk Processing or Workplace Use the Following Controls are Recommended

Engineering Controls: Use adequate general and local exhaust ventilation to maintain exposure levels below that occupational exposure limits.

Personal Protection:

Eye Protection: Safety goggles recommended where eye contact is possible.

Skin Protection: Wear chemical resistant gloves.

Respiratory Protection: None required if ventilation is adequate. If the occupational exposure limits are exceeded, wear a NIOSH approved respirator. Respirator selection and use should be based on contaminant type, form and concentration. Follow applicable regulations and good Industrial Hygiene practice.

Work/Hygiene Practices: Wash with soap and water after handling.

SECTION 9 PHYSICAL DATA

APPEARANCE AND ODOR: Light amber liquid with a mild odor.

Boiling Point:	361 - 369°F (183 - 187°C)	Specific Gravity:	0.8 – 0.82 @ 60°F
Solubility in Water:	Insoluble	pH:	Not Applicable
Vapor Pressure:	95-115 PSI @ 70°F	Vapor Density:	Greater than 1
Percent Volatile:	70-75%	VOC:	412 grams/liter (49.5%)
Coefficient of Water/Oil Distribution:	Not Determined	Kinematic Viscosity:	2.79-2.96cSt @ 100°F
Flash Point:	122°F (49°C) Tag Open Cup (concentrate)	Flammable Limits: (Solvent Portion)	LEL: 0.6% UEL: 8.0%
Pour Point:	-63°C (-81.4°F) ASTM D-97		

SECTION 10 STABILITY AND REACTIVITY

STABILITY: Stable

INCOMPATIBILITY: Strong oxidizing agents. Avoid heat and open flames. Do not puncture or incinerate containers.

HAZARDOUS DECOMPOSITION PRODUCTS: Carbon monoxide, carbon dioxide.

SECTION 11 TOXICOLOGICAL INFORMATION

The oral toxicity of this product is estimated to be greater than 5,000 mg/kg based on an assessment of the ingredients. This product is not classified as toxic by established criteria. It is an aspiration hazard.

None of the components of this product is listed as a carcinogen or suspected carcinogen or is considered a reproductive hazard.

SECTION 12 ECOLOGICAL INFORMATION

No data is currently available.

SECTION 13 DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD: If this product becomes a waste, it would be expected to meet the criteria of a hazardous waste based on flammability. However, it is the responsibility of the generator to determine at the time of disposal the proper classification and method of disposal. Dispose in accordance with federal, state, and local regulations.

SECTION 14 TRANSPORT INFORMATION

DOT Surface Shipping Description: Consumer Commodity, ORM-D

After 1/1/2014 UN1950, Aerosols, 2.1 Ltd. Qty (Note: Shipping Papers are not required for Limited Quantities unless transported by air or vessel – each package must be marked with the Limited

Quantity Mark)

Canadian TDG Classification: Limited Quantity

IMDG Code Hazard Classification: UN1950, Aerosols, 2.1.

SECTION 15 REGULATORY INFORMATION

U.S. FEDERAL REGULATIONS:

CERCLA 103 Reportable Quantity: This product is not subject to CERCLA reporting requirements, however, oil spills are reportable to the National Response Center under the Clean Water Act and many states have more stringent release reporting requirements. Report spills as required under federal, state and local regulations.

SARA TITLE III:

Hazard Category For Section 311/312: Acute Health, Fire Hazard, Sudden Release of Pressure

Section 313 Toxic Chemicals: This product contains the following chemicals subject to SARA Title III Section 313 Reporting requirements: None

Section 302 Extremely Hazardous Substances (TPQ): None

EPA Toxic Substances Control Act (TSCA) Status: All of the components of this product are listed on the TSCA inventory.

CANADIAN REGULATIONS:

Canadian Environmental Protection Act: All of the ingredients are listed on the Canadian Domestic Substances List or exempt from notification

Canadian WHMIS Classification: Class B-5 (Flammable Aerosol).

This MSDS has been prepared according to the criteria of the Controlled Products Regulation (CPR) and the MSDS contains all of the information required by the CPR.

SECTION 16 OTHER INFORMATION

HMIS Hazard Rating: Health – 1 (slight hazard), Fire Hazard – 4 (severe hazard), Physical Hazard – 0 (minimal hazard)

Revision Date: 03/10/13

Supersedes: 07/21/12

Prepared By: Industrial Health & Safety Consultants, Inc. 1-203-929-3473

This MSDS complies with OSHA guidelines set by 29 CFR 1910.1200 and the Canadian WHMIS regulations. The foregoing information has been compiled from sources believed to be accurate but is not warranted to be. Recipients are advised to confirm in advance of need that data is correct. Standards change without notice. It is the responsibility of the recipient to insure that their personnel have been notified of any changes which may affect them. The data provided on this MSDS are not meant to be used as specifications, only as guideline information as to the safe use of this product. User should refer to applicable laws before use.

N/D = Not Determined N/E = Not Established N/A = Not Applicable

1014100 / No. 0084101



WD-40



MATERIAL SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

MANUFACTURER/SUPPLIER: WD-40 Products [Canada] Ltd. P.O. Box 220 Toronto, Ontario M9C 4V3 Information Phone #: (416) 622-9881 Emergency Phone # 24 hr: Canutec: (613) 996-6666 Designated for use only in the event of chemical emergencies involving a spill, leak, fire exposure or accident involving chemicals	US Office: WD-40 Company 1061 Cudahy Place San Diego, CA 92110 Information Phone #: (619) 275-1400 Emergency Phone # 24 hr: Chemtrec: (800) 424-9300 Designated for use only in the event of chemical emergencies involving a spill, leak, fire exposure or accident involving chemicals.
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PRODUCT NAME: WD-40 Bulk Liquid
 PRODUCT USE: Cleaner, lubricant.
 MSDS DATE OF PREPARATION: March 27, 2014

SECTION 2 HAZARDS IDENTIFICATION

DANGER! Harmful or fatal if swallowed. Combustible Liquid. Avoid eye contact. Use with adequate ventilation. Keep away from heat, sparks and all other sources of ignition.

POTENTIAL HEALTH EFFECTS:

PRIMARY ROUTES OF ENTRY: Inhalation, skin and eye contact.

ACUTE EFFECTS:

INGESTION: This product has low oral toxicity. Swallowing may cause irritation, nausea, vomiting and diarrhea. This product is an aspiration hazard. If swallowed, can enter the lungs and may cause chemical pneumonitis.

EYES: Contact may be mildly irritating to eyes. May cause redness and tearing.

SKIN: Prolonged and/or repeated contact may produce mild irritation and defatting with possible dermatitis.

INHALATION: High concentrations may cause nasal and respiratory irritation and central nervous system effects such as headache, dizziness and nausea. May aggravate existing respiratory conditions such as asthma. Intentional abuse may be harmful or fatal.

CHRONIC EFFECTS: None expected.

SECTION 3 COMPOSITION INFORMATION ON INGREDIENTS

Ingredient	CAS Number	Percent
Aliphatic Petroleum Distillates	64742-47-8	50-70%
	64742-88-7	
Petroleum Base Oil	64742-58-1	30-35%
	64742-53-6	
	64742-56-9	
	64742-65-0	
Non-Hazardous Ingredients	Proprietary	<10%

SECTION 4 FIRST AID MEASURES

For Medical Emergencies Call 1-888-324-7596 (24 hours/day)

INGESTION: Aspiration Hazard. DO NOT induce vomiting. Call physician, poison control center or the WD-40 Safety Hotline at 1-888-324-7596 immediately.

EYE CONTACT: Flush thoroughly with water. Get medical attention if irritation persists.

SKIN CONTACT: Wash with soap and water. If irritation develops and persists, get medical attention.

INHALATION: If irritation is experienced, move to fresh air. Get medical attention if irritation or other symptoms develop and persist.

SECTION 5 FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA: Use water fog, dry chemical, carbon dioxide or foam. Do not use water jet or flooding amounts of water. Burning product will float on the surface and spread fire.

SPECIAL FIRE FIGHTING PROCEDURES: Firefighters should always wear positive pressure self-contained breathing apparatus and full protective clothing. Cool fire-exposed containers with water.

UNUSUAL FIRE/EXPLOSION HAZARDS: Combustible liquid and vapor. Vapors are heavier than air and may travel along surfaces to remote ignition sources and flash back.

SECTION 6 ACCIDENTAL RELEASE MEASURES

SPILL RESPONSE: Wear appropriate protective clothing (see Section 8). Eliminate all sources of ignition and ventilate area. Contain and collect liquid with an inert absorbent and place in a container for disposal. Clean spill area thoroughly. Report spills to authorities as required.

SECTION 7 HANDLING AND STORAGE

HANDLING: Avoid contact with eyes. Avoid prolonged contact with skin. Avoid breathing vapors or aerosols. Use with adequate ventilation. Keep away from heat, sparks and open flames. Wash thoroughly with soap and water after handling. Keep containers closed when not in use. Keep out of the reach of children.

STORAGE: Store away from heat, flames and incompatible materials.

SECTION 8 EXPOSURE CONTROLE/PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS:

Aliphatic Petroleum Distillates	1200 mg/m3 TWA Manufacturer Recommended
Petroleum Base Oil	5 mg/m3 TWA ACGIH TLV 10 mg/m3 STEL ACGIH TLV
Non-Hazardous Ingredients	None Established

The Following Controls are Recommended for Normal Consumer Use of this Product

Engineering Controls: Use in a well-ventilated area.

Personal Protection:

Eye Protection: Avoid eye contact. Safety glasses or goggles recommended.

Skin Protection: Avoid prolonged skin contact. Chemical resistant gloves recommended for operations where skin contact is likely.

Respiratory Protection: None needed for normal use with adequate ventilation.

For Bulk Processing or Workplace Use the Following Controls are Recommended

Engineering Controls: Use adequate general and local exhaust ventilation to maintain exposure levels below that occupational exposure limits.

Personal Protection:

Eye Protection: Safety goggles recommended where eye contact is possible.

Skin Protection: Wear chemical resistant gloves.

Respiratory Protection: None required if ventilation is adequate. If the occupational exposure limits are exceeded, wear a NIOSH approved respirator. Respirator selection and use should be based on contaminant type, form and concentration. Follow applicable regulations and good Industrial Hygiene practice.

Work/Hygiene Practices: Wash with soap and water after handling.

SECTION 9 PHYSICAL DATA

APPEARANCE AND ODOR: Light amber liquid with a mild odor.

Freezing Point:	Not Applicable	Odor Threshold:	Not Determined
Boiling Point:	361 - 369°F (183 - 187°C)	Specific Gravity:	0.78 – 0.82 @ 60°F
Solubility in Water:	Insoluble	pH:	Not Applicable
Vapor Pressure:	1 psi @38°C (100°F) ASTM D323	Vapor Density:	Greater than 1
Percent Volatile:	70-75%	VOC:	533 grams/liter (65%)
Coefficient of Water/Oil Distribution:	Not Determined	Kinematic Viscosity:	2.79-2.96cSt @ 100°F
Flash Point:	122°F (49°C) Tag Open Cup	Flammable Limits: (Solvent Portion)	LEL: 0.6% UEL: 8.0%
Pour Point:	-63°C (-81.4°F) ASTM D-97	Explosion Impact:	None

SECTION 10 STABILITY AND REACTIVITY

STABILITY: Stable

INCOMPATIBILITY: Strong oxidizing agents. Avoid heat and open flames.

HAZARDOUS DECOMPOSITION PRODUCTS: Carbon monoxide, carbon dioxide.

SECTION 11 TOXICOLOGICAL INFORMATION

The oral toxicity of this product is estimated to be greater than 5,000 mg/kg based on an assessment of the ingredients. This product is not classified as toxic by established criteria. It is an aspiration hazard.

None of the components of this product is listed as a carcinogen or suspected carcinogen or is considered a reproductive hazard.

SECTION 12 ECOLOGICAL INFORMATION

No data is currently available.

SECTION 13 DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD: If this product becomes a waste, it would be expected to meet the criteria of a hazardous waste based on flammability. However, it is the responsibility of the generator to determine at the time of disposal the proper classification and method of disposal. Dispose in accordance with federal, state, and local regulations.

SECTION 14 TRANSPORT INFORMATION

U.S. DOT Hazard Classification: Excepted from Hazmat (49CFR 173.150 (F)) in non-bulk packagings. Bulk Packagings: Combustible Liquid, n.o.s. (contains Petroleum Distillates), NA1993, PG III

Canadian TDG Classification: Not regulated as a dangerous good when packages in a small means of containment (See 1.33 Class 3, Flammable Liquids: General Exemption).

IMDG Code Hazard Classification: UN1268, Petroleum Distillates, n.o.s. 3, PG III.

SECTION 15 REGULATORY INFORMATION

U.S. FEDERAL REGULATIONS:

CERCLA 103 Reportable Quantity: This product is not subject to CERCLA reporting requirements, however, oil spills are reportable to the National Response Center under the Clean Water Act and many states have more stringent release reporting requirements. Report spills as required under federal, state and local regulations.

SARA TITLE III:

Hazard Category For Section 311/312: Acute Health, Fire Hazard

Section 313 Toxic Chemicals: This product contains the following chemicals subject to SARA Title III Section 313 Reporting requirements: None

Section 302 Extremely Hazardous Substances (TPQ): None

EPA Toxic Substances Control Act (TSCA) Status: All of the components of this product are listed on the TSCA inventory.

CANADIAN REGULATIONS:

Canadian Environmental Protection Act: All of the ingredients are listed on the Canadian Domestic Substances List or exempt from notification

Canadian WHMIS Classification: Class B-3 (Combustible Liquid).

This MSDS has been prepared according to the criteria of the Controlled Products Regulation (CPR) and the MSDS contains all of the information required by the CPR.

SECTION 16 OTHER INFORMATION

HMIS Hazard Rating: Health – 1 (slight hazard), Fire Hazard – 2 (moderate hazard), Physical Hazard – 0 (minimal hazard)

Revision Date: 03/27/14

Supersedes: 03/10/13

Prepared By: Industrial Health & Safety Consultants, Inc. 1-203-929-3473

This MSDS complies with OSHA guidelines set by 29 CFR 1910.1200 and the Canadian WHMIS regulations. The foregoing information has been compiled from sources believed to be accurate but is not warranted to be. Recipients are advised to confirm in advance of need that data is correct. Standards change without notice. It is the responsibility of the recipient to insure that their personnel have been notified of any changes which may affect them. The data provided on this MSDS are not meant to be used as specifications, only as guideline information as to the safe use of this product. User should refer to applicable laws before use.

N/D = Not Determined N/E = Not Established N/A = Not Applicable

1071200/ No.0084302



GHS SAFETY DATA SHEET

WELD-ON® 705™ Low VOC Cements for PVC Plastic Pipe

Date Revised: **DEC 2011**Supersedes: **FEB 2010**

SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: WELD-ON® 705™ Low VOC Cements for PVC Plastic Pipe**PRODUCT USE:** Low VOC Solvent Cement for PVC Plastic Pipe**SUPPLIER:****MANUFACTURER:** IPS Corporation

17109 South Main Street, Carson, CA 90248-3127

P.O. Box 379, Gardena, CA 90247-0379

Tel. 1-310-898-3300

EMERGENCY: Transportation: CHEMTEL Tel. 800.255-3924, 813-248-0585 (International)**Medical:** Tel. 800.451.8346, 760.602.8703 3E Company (International)

SECTION 2 - HAZARDS IDENTIFICATION

GHS CLASSIFICATION:

Health		Environmental		Physical	
Acute Toxicity:	Category 4	Acute Toxicity:	None Known	Flammable Liquid	Category 2
Skin Irritation:	Category 3	Chronic Toxicity:	None Known		
Skin Sensitization:	NO				
Eye:	Category 2B				

GHS LABEL:

OR

**Signal Word:**
Danger**WHMIS CLASSIFICATION:** CLASS B, DIVISION 2Hazard Statements

H225: Highly flammable liquid and vapor
 H319: Causes serious eye irritation
 H332: Harmful if inhaled
 H335: May cause respiratory irritation
 H336: May cause drowsiness or dizziness
 EUH019: May form explosive peroxides

Precautionary Statements

P210: Keep away from heat/sparks/open flames/hot surfaces – No smoking
 P261: Avoid breathing dust/fume/gas/mist/vapors/spray
 P280: Wear protective gloves/protective clothing/eye protection/face protection
 P304+P340: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
 P403+P233: Store in a well ventilated place. Keep container tightly closed
 P501: Dispose of contents/container in accordance with local regulation

SECTION 3 - COMPOSITION/INFORMATION ON INGREDIENTS

	CAS#	EINECS #	REACH	CONCENTRATION
			Pre-registration Number	% by Weight
Tetrahydrofuran (THF)	109-99-9	203-726-8	05-2116297729-22-0000	25 - 50
Methyl Ethyl Ketone (MEK)	78-93-3	201-159-0	05-2116297728-24-0000	5 - 36
Cyclohexanone	108-94-1	203-631-1	05-2116297718-25-0000	15 - 30

All of the constituents of this adhesive product are listed on the TSCA inventory of chemical substances maintained by the US EPA, or are exempt from that listing.

* Indicates this chemical is subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986 (40CFR372).

indicates that this chemical is found on Proposition 65's List of chemicals known to the State of California to cause cancer or reproductive toxicity.

SECTION 4 - FIRST AID MEASURES

Contact with eyes: Flush eyes immediately with plenty of water for 15 minutes and seek medical advice immediately.
Skin contact: Remove contaminated clothing and shoes. Wash skin thoroughly with soap and water. If irritation develops, seek medical advice.
Inhalation: Remove to fresh air. If breathing is stopped, give artificial respiration. If breathing is difficult, give oxygen. Seek medical advice.
Ingestion: Rinse mouth with water. Give 1 or 2 glasses of water or milk to dilute. Do not induce vomiting. Seek medical advice immediately.

SECTION 5 - FIREFIGHTING MEASURES

Suitable Extinguishing Media: Dry chemical powder, carbon dioxide gas, foam, Halon, water fog.
Unsuitable Extinguishing Media: Water spray or stream.
Exposure Hazards: Inhalation and dermal contact
Combustion Products: Oxides of carbon, hydrogen chloride and smoke

	HMS	NFPA	
Health	2	2	0-Minimal
Flammability	3	3	1-Slight
Reactivity	0	0	2-Moderate
PPE	B		3-Serious
			4-Severe

Protection for Firefighters: Self-contained breathing apparatus or full-face positive pressure airline masks.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Personal precautions: Keep away from heat, sparks and open flame.
 Provide sufficient ventilation, use explosion-proof exhaust ventilation equipment or wear suitable respiratory protective equipment.
 Prevent contact with skin or eyes (see section 8).
Environmental Precautions: Prevent product or liquids contaminated with product from entering sewers, drains, soil or open water course.
Methods for Cleaning up: Clean up with sand or other inert absorbent material. Transfer to a closable steel vessel.
Materials not to be used for clean up: Aluminum or plastic containers

SECTION 7 - HANDLING AND STORAGE

Handling: Avoid breathing of vapor, avoid contact with eyes, skin and clothing.
 Keep away from ignition sources, use only electrically grounded handling equipment and ensure adequate ventilation/fume exhaust hoods.
 Do not eat, drink or smoke while handling.
Storage: Store in ventilated room or shade below 44 °C (110 °F) and away from direct sunlight.
 Keep away from ignition sources and incompatible materials: caustics, ammonia, inorganic acids, chlorinated compounds, strong oxidizers and isocyanates.
 Follow all precautionary information on container label, product bulletins and solvent cementing literature.

SECTION 8 - PRECAUTIONS TO CONTROL EXPOSURE / PERSONAL PROTECTION

EXPOSURE LIMITS:	Component	ACGIH TLV	ACGIH STEL	OSHA PEL	OSHA STEL:
	Tetrahydrofuran (THF)	50 ppm	100 ppm	200 ppm	
	Methyl Ethyl Ketone (MEK)	200 ppm	300 ppm	200 ppm	
	Cyclohexanone	20 ppm	50 ppm	50 ppm	

Engineering Controls: Use local exhaust as needed.**Monitoring:** Maintain breathing zone airborne concentrations below exposure limits.**Personal Protective Equipment (PPE):****Eye Protection:** Avoid contact with eyes, wear splash-proof chemical goggles, face shield, safety glasses (spectacles) with brow guards and side shields, etc. as may be appropriate for the exposure.**Skin Protection:** Prevent contact with the skin as much as possible. Butyl rubber gloves should be used for frequent immersion.

Use of solvent-resistant gloves or solvent-resistant barrier cream should provide adequate protection when normal adhesive application practices and procedures are used for making structural bonds.

Respiratory Protection: Prevent inhalation of the solvents. Use in a well-ventilated room. Open doors and/or windows to ensure airflow and air changes. Use local exhaust ventilation to remove airborne contaminants from employee breathing zone and to keep contaminants below levels listed above.
 With normal use, the Exposure Limit Value will not usually be reached. When limits approached, use respiratory protection equipment.



GHS SAFETY DATA SHEET

WELDON® 705™ Low VOC Cements for PVC Plastic Pipe

Date Revised: DEC 2011

Supersedes: FEB 2010

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Clear or gray, medium syrupy liquid	Odor Threshold:	0.88 ppm (Cyclohexanone)
Odor:	Ketone	Boiling Range:	66 °C (151 °F) to 156 °C (313 °F)
pH:	Not Applicable	Evaporation Rate:	> 1.0 (BUAC = 1)
Melting/Freezing Point:	-108.5 °C (-163.3 °F) Based on first melting component: THF	Flammability:	Category 2
Boiling Point:	66 °C (151 °F) Based on first boiling component: THF	Flammability Limits:	LEL: 1.1% based on Cyclohexanone UEL: 11.8% based on THF
Flash Point:	-20 °C (-4 °F) TCC based on THF	Vapor Pressure:	129 mm Hg @ 20 °C (68 °F) based on THF
Specific Gravity:	0.9611 @23 °C (73 °F)	Vapor Density:	>2 (Air = 1)
Solubility:	Solvent portion soluble in water. Resin portion separates out.	Other Data: Viscosity:	Medium bodied
Partition Coefficient n-octanol/water:	Not Available		
Auto-ignition Temperature:	321 °C (610 °F) based on THF		
Decomposition Temperature:	Not Applicable		
VOC Content:	When applied as directed, per SCAQMD Rule 1168, Test Method 316A, VOC content is: ≤ 510 g/l.		

SECTION 10 - STABILITY AND REACTIVITY

Stability:	Stable
Hazardous decomposition products:	None in normal use. When forced to burn, this product gives off oxides of carbon, hydrogen chloride and smoke.
Conditions to avoid:	Keep away from heat, sparks, open flame and other ignition sources.
Incompatible Materials:	Oxidizers, strong acids and bases, amines, ammonia

SECTION 11 - TOXICOLOGICAL INFORMATION

Likely Routes of Exposure: Inhalation, Eye and Skin Contact

Acute symptoms and effects:

Inhalation:	Severe overexposure may result in nausea, dizziness, headache. Can cause drowsiness, irritation of eyes and nasal passages.
Eye Contact:	Vapors slightly uncomfortable. Overexposure may result in severe eye injury with corneal or conjunctival inflammation on contact with the liquid.
Skin Contact:	Liquid contact may remove natural skin oils resulting in skin irritation. Dermatitis may occur with prolonged contact.
Ingestion:	May cause nausea, vomiting, diarrhea and mental sluggishness.

Chronic (long-term) effects: None known to humans

Toxicity:	LD ₅₀	LC ₅₀
Tetrahydrofuran (THF)	Oral: 2842 mg/kg (rat)	Inhalation 3 hrs. 21,000 mg/m ³ (rat)
Methyl Ethyl Ketone (MEK)	Oral: 2737 mg/kg (rat), Dermal: 6480 mg/kg (rabbit)	Inhalation 8 hrs. 23,500 mg/m ³ (rat)
Cyclohexanone	Oral: 1535 mg/kg (rat), Dermal: 948 mg/kg (rabbit)	Inhalation 4 hrs. 8,000 PPM (rat)

Reproductive Effects	Teratogenicity	Mutagenicity	Embryotoxicity	Sensitization to Product	Synergistic Products
Not Established	Not Established	Not Established	Not Established	Not Established	Not Established

SECTION 12 - ECOLOGICAL INFORMATION

Ecotoxicity:	None Known
Mobility:	In normal use, emission of volatile organic compounds (VOC's) to the air takes place, typically at a rate of ≤ 510 g/l.
Degradability:	Biodegradable
Bioaccumulation:	Minimal to none.

SECTION 13 - WASTE DISPOSAL CONSIDERATIONS

Follow local and national regulations. Consult disposal expert.

SECTION 14 - TRANSPORT INFORMATION

Proper Shipping Name:	Adhesives
Hazard Class:	3
Secondary Risk:	None
Identification Number:	UN 1133
Packing Group:	PG II
Label Required:	Class 3 Flammable Liquid
Marine Pollutant:	NO

EXCEPTION for Ground Shipping

DOT Limited Quantity: Up to 5L per inner packaging, 30 kg gross weight per package.
Consumer Commodity: Depending on packaging, these quantities may qualify under DOT as "ORM-D".

TDG INFORMATION

TDG CLASS:	FLAMMABLE LIQUID 3
SHIPPING NAME:	ADHESIVES
UN NUMBER/PACKING GROUP:	UN 1133, PG II

SECTION 15 - REGULATORY INFORMATION

Precautionary Label Information:	Highly Flammable, Irritant	Ingredient Listings:	USA TSCA, Europe EINECS, Canada DSL, Australia
Symbols:	F, Xi		AICS, Korea ECL/TCCL, Japan MITI (ENCS)
Risk Phrases:	R11: Highly flammable. R20: Harmful by inhalation. R36/37: Irritating to eyes and respiratory system.	R66:	Repeated exposure may cause skin dryness or cracking
Safety Phrases:	S9: Keep container in a well-ventilated place. S16: Keep away from sources of ignition - No smoking. S25: Avoid contact with eyes.	R67:	Vapors may cause drowsiness and dizziness
		S26:	In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
		S33:	Take precautionary measures against static discharges.
		S46:	If swallowed, seek medical advise immediately and show this container or label.

SECTION 16 - OTHER INFORMATION

Specification Information:		
Department issuing data sheet:	IPS, Safety Health & Environmental Affairs	All ingredients are compliant with the requirements of the European
E-mail address:	<EHSinfo@ipscorp.com>	Directive on RoHS (Restriction of Hazardous Substances).
Training necessary:	Yes, training in practices and procedures contained in product literature.	
Reissue date / reason for reissue:	12/14/2011 / Updated GHS Standard Format	
Intended Use of Product:	Solvent Cement for PVC Plastic Pipe	

This product is intended for use by skilled individuals at their own risk. The information contained herein is based on data considered accurate based on current state of knowledge and experience. However, no warranty is expressed or implied regarding the accuracy of this data or the results to be obtained from the use thereof.



GHS SAFETY DATA SHEET

WELD-ON® 714™ Low VOC Cement for CPVC Plastic Pipe

Date Revised: DEC 2011

Supersedes: NOV 2010

SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: WELD-ON® 714™ Low VOC Cement for CPVC Plastic Pipe**PRODUCT USE:** Low VOC Solvent Cement for CPVC Plastic Pipe**SUPPLIER:****MANUFACTURER:** IPS Corporation

17109 South Main Street, Carson, CA 90248-3127

P.O. Box 379, Gardena, CA 90247-0379

Tel. 1-310-898-3300

EMERGENCY: Transportation: CHEMTEL Tel. 800.255-3924, 813-248-0585 (International)**Medical:** Tel. 800.451.8346, 760.602.8703 3E Company (International)

SECTION 2 - HAZARDS IDENTIFICATION

GHS CLASSIFICATION:

Health		Environmental		Physical	
Acute Toxicity:	Category 4	Acute Toxicity:	None Known	Flammable Liquid	Category 2
Skin Irritation:	Category 3	Chronic Toxicity:	None Known		
Skin Sensitization:	NO				
Eye:	Category 2B				

GHS LABEL:

OR

**Signal Word:** Danger**WHMIS CLASSIFICATION:** CLASS B, DIVISION 2Hazard Statements

H225: Highly flammable liquid and vapor

H319: Causes serious eye irritation

H332: Harmful if inhaled

H335: May cause respiratory irritation

H336: May cause drowsiness or dizziness

EUH019: May form explosive peroxides

Precautionary Statements

P210: Keep away from heat/sparks/open flames/hot surfaces – No smoking

P261: Avoid breathing dust/fume/gas/mist/vapors/spray

P280: Wear protective gloves/protective clothing/eye protection/face protection

P337+P313: Get medical advice/attention

P403+P233: Store in a well ventilated place. Keep container tightly closed

P501: Dispose of contents/container in accordance with local regulation

SECTION 3 - COMPOSITION/INFORMATION ON INGREDIENTS

	CAS#	EINECS #	REACH	CONCENTRATION
			Pre-registration Number	% by Weight
Tetrahydrofuran (THF)	109-99-9	203-726-8	05-2116297729-22-0000	30 - 60
Methyl Ethyl Ketone (MEK)	78-93-3	201-159-0	05-2116297728-24-0000	5 - 25
Cyclohexanone	108-94-1	203-631-1	05-2116297718-25-0000	5 - 20

All of the constituents of this adhesive product are listed on the TSCA inventory of chemical substances maintained by the US EPA, or are exempt from that listing.

* Indicates this chemical is subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986 (40CFR372).

indicates that this chemical is found on Proposition 65's List of chemicals known to the State of California to cause cancer or reproductive toxicity.

SECTION 4 - FIRST AID MEASURES

Contact with eyes:	Flush eyes immediately with plenty of water for 15 minutes and seek medical advice immediately.
Skin contact:	Remove contaminated clothing and shoes. Wash skin thoroughly with soap and water. If irritation develops, seek medical advice.
Inhalation:	Remove to fresh air. If breathing is stopped, give artificial respiration. If breathing is difficult, give oxygen. Seek medical advice.
Ingestion:	Rinse mouth with water. Give 1 or 2 glasses of water or milk to dilute. Do not induce vomiting. Seek medical advice immediately.

SECTION 5 - FIREFIGHTING MEASURES

Suitable Extinguishing Media:	Dry chemical powder, carbon dioxide gas, foam, Halon, water fog.	HMIS	NFPA	0-Minimal
Unsuitable Extinguishing Media:	Water spray or stream.	Health	2	2
Exposure Hazards:	Inhalation and dermal contact	Flammability	3	3
Combustion Products:	Oxides of carbon, hydrogen chloride and smoke	Reactivity	0	0
		PPE	B	4-Severe

Protection for Firefighters: Self-contained breathing apparatus or full-face positive pressure airline masks.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Personal precautions:	Keep away from heat, sparks and open flame. Provide sufficient ventilation, use explosion-proof exhaust ventilation equipment or wear suitable respiratory protective equipment. Prevent contact with skin or eyes (see section 8).
Environmental Precautions:	Prevent product or liquids contaminated with product from entering sewers, drains, soil or open water course.
Methods for Cleaning up:	Clean up with sand or other inert absorbent material. Transfer to a closable steel vessel.
Materials not to be used for clean up:	Aluminum or plastic containers

SECTION 7 - HANDLING AND STORAGE

Handling:	Avoid breathing of vapor, avoid contact with eyes, skin and clothing. Keep away from ignition sources, use only electrically grounded handling equipment and ensure adequate ventilation/fume exhaust hoods. Do not eat, drink or smoke while handling.
Storage:	Store in ventilated room or shade below 33°C (90°F) and away from direct sunlight. Keep away from ignition sources and incompatible materials: caustics, ammonia, inorganic acids, chlorinated compounds, strong oxidizers and isocyanates. Follow all precautionary information on container label, product bulletins and solvent cementing literature.

SECTION 8 - PRECAUTIONS TO CONTROL EXPOSURE / PERSONAL PROTECTION

EXPOSURE LIMITS:	Component	ACGIH TLV	ACGIH STEL	OSHA PEL	OSHA STEL:
	Tetrahydrofuran (THF)	50 ppm	100 ppm	200 ppm	
	Methyl Ethyl Ketone (MEK)	200 ppm	300 ppm	200 ppm	
	Cyclohexanone	20 ppm	50 ppm	50 ppm	

Engineering Controls: Use local exhaust as needed.**Monitoring:** Maintain breathing zone airborne concentrations below exposure limits.**Personal Protective Equipment (PPE):****Eye Protection:** Avoid contact with eyes, wear splash-proof chemical goggles, face shield, safety glasses (spectacles) with brow guards and side shields, etc. as may be appropriate for the exposure.**Skin Protection:** Prevent contact with the skin as much as possible. Butyl rubber gloves should be used for frequent immersion.

Use of solvent-resistant gloves or solvent-resistant barrier cream should provide adequate protection when normal adhesive application practices and procedures are used for making structural bonds.

Respiratory Protection: Prevent inhalation of the solvents. Use in a well-ventilated room. Open doors and/or windows to ensure airflow and air changes. Use local exhaust ventilation to remove airborne contaminants from employee breathing zone and to keep contaminants below levels listed above. With normal use, the Exposure Limit Value will not usually be reached. When limits approached, use respiratory protection equipment.



GHS SAFETY DATA SHEET

WELD-ON® 714™ Low VOC Cement for CPVC Plastic Pipe

Date Revised: DEC 2011
Supersedes: NOV 2010

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Orange or gray, heavy syrupy liquid	Odor Threshold:	0.88 ppm (Cyclohexanone)
Odor:	Ketone	Boiling Range:	66 °C (151 °F) to 156 °C (313 °F)
pH:	Not Applicable	Evaporation Rate:	> 1.0 (BUAC = 1)
Melting/Freezing Point:	-108.5 °C (-163.3 °F) Based on first melting component: THF	Flammability:	Category 2
Boiling Point:	66 °C (151 °F) Based on first boiling component: THF	Flammability Limits:	LEL: 1.1% based on Cyclohexanone UEL: 11.8% based on THF
Flash Point:	-20 °C (-4 °F) TCC based on THF	Vapor Pressure:	129 mm Hg @ 20 °C (68 °F) based on THF
Specific Gravity:	0.995 @23 °C (73 °F)	Vapor Density:	>2 (Air = 1)
Solubility:	Solvent portion soluble in water. Resin portion separates out.	Other Data: Viscosity:	Heavy bodied
Partition Coefficient n-octanol/water:	Not Available		
Auto-ignition Temperature:	321 °C (610 °F) based on THF		
Decomposition Temperature:	Not Applicable		
VOC Content:	When applied as directed, per SCAQMD Rule 1168, Test Method 316A, VOC content is: ≤ 490 g/l.		

SECTION 10 - STABILITY AND REACTIVITY

Stability:	Stable
Hazardous decomposition products:	None in normal use. When forced to burn, this product gives off oxides of carbon, hydrogen chloride and smoke.
Conditions to avoid:	Keep away from heat, sparks, open flame and other ignition sources.
Incompatible Materials:	Oxidizers, strong acids and bases, amines, ammonia

SECTION 11 - TOXICOLOGICAL INFORMATION

Likely Routes of Exposure: Inhalation, Eye and Skin Contact

Acute symptoms and effects:

Inhalation:	Severe overexposure may result in nausea, dizziness, headache. Can cause drowsiness, irritation of eyes and nasal passages.		
Eye Contact:	Vapors slightly uncomfortable. Overexposure may result in severe eye injury with corneal or conjunctival inflammation on contact with the liquid.		
Skin Contact:	Liquid contact may remove natural skin oils resulting in skin irritation. Dermatitis may occur with prolonged contact.		
Ingestion:	May cause nausea, vomiting, diarrhea and mental sluggishness.		

Chronic (long-term) effects: None known to humans

Toxicity:

	LD ₅₀	LC ₅₀
Tetrahydrofuran (THF)	Oral: 2842 mg/kg (rat)	Inhalation 3 hrs. 21,000 mg/m ³ (rat)
Methyl Ethyl Ketone (MEK)	Oral: 2737 mg/kg (rat), Dermal: 6480 mg/kg (rabbit)	Inhalation 8 hrs. 23,500 mg/m ³ (rat)
Cyclohexanone	Oral: 1535 mg/kg (rat), Dermal: 948 mg/kg (rabbit)	Inhalation 4 hrs. 8,000 PPM (rat)

Reproductive Effects	Teratogenicity	Mutagenicity	Embryotoxicity	Sensitization to Product	Synergistic Products
Not Established	Not Established	Not Established	Not Established	Not Established	Not Established

SECTION 12 - ECOLOGICAL INFORMATION

Ecotoxicity:	None Known
Mobility:	In normal use, emission of volatile organic compounds (VOC's) to the air takes place, typically at a rate of ≤ 490 g/l.
Degradability:	Biodegradable
Bioaccumulation:	Minimal to none.

SECTION 13 - WASTE DISPOSAL CONSIDERATIONS

Follow local and national regulations. Consult disposal expert.

SECTION 14 - TRANSPORT INFORMATION

Proper Shipping Name:	Adhesives
Hazard Class:	3
Secondary Risk:	None
Identification Number:	UN 1133
Packing Group:	PG II
Label Required:	Class 3 Flammable Liquid
Marine Pollutant:	NO

EXCEPTION for Ground Shipping

DOT Limited Quantity: Up to 5L per inner packaging, 30 kg gross weight per package.
Consumer Commodity: Depending on packaging, these quantities may qualify under DOT as "ORM-D".

TDG INFORMATION	
TDG CLASS:	FLAMMABLE LIQUID 3
SHIPPING NAME:	ADHESIVES
UN NUMBER/PACKING GROUP:	UN 1133, PG II

SECTION 15 - REGULATORY INFORMATION

Precautionary Label Information:	Highly Flammable, Irritant	Ingredient Listings:	USA TSCA, Europe EINECS, Canada DSL, Australia AICS, Korea ECL/TCCL, Japan MITI (ENCS)
Symbols:	F, Xi	R66:	Repeated exposure may cause skin dryness or cracking
Risk Phrases:	R11: Highly flammable. R36/37: Irritating to eyes and respiratory system.	R67:	Vapors may cause drowsiness and dizziness
Safety Phrases:	S2: Keep out of the reach of children S9: Keep container in a well-ventilated place. S16: Keep away from sources of ignition - No smoking.	S25:	Avoid contact with eyes.
		S26:	In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
		S33:	Take precautionary measures against static discharges.

SECTION 16 - OTHER INFORMATION

Specification Information:		
Department issuing data sheet:	IPS, Safety Health & Environmental Affairs	All ingredients are compliant with the requirements of the European Directive on RoHS (Restriction of Hazardous Substances).
E-mail address:	<EHSinfo@ipscorp.com>	
Training necessary:	Yes, training in practices and procedures contained in product literature.	
Reissue date / reason for reissue:	12/14/2011 / Updated GHS Standard Format	
Intended Use of Product:	Solvent Cement for CPVC Plastic Pipe	

This product is intended for use by skilled individuals at their own risk. The information contained herein is based on data considered accurate based on current state of knowledge and experience. However, no warranty is expressed or implied regarding the accuracy of this data or the results to be obtained from the use thereof.



GHS SAFETY DATA SHEET

WELD-ON® P-75 Wet 'R Dry™ Low VOC Primer for PVC Plastic Pipe

Date Revised: DEC 2011

Supersedes: OCT 2010

SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: WELD-ON® P-75 Wet 'R Dry™ Low VOC Primer for PVC Plastic Pipe

PRODUCT USE: Low VOC Primer for PVC Plastic Pipe

SUPPLIER:

MANUFACTURER: IPS Corporation

17109 South Main Street, Carson, CA 90248-3127

P.O. Box 379, Gardena, CA 90247-0379

Tel. 1-310-898-3300

EMERGENCY: Transportation: CHEMTEL Tel. 800.255-3924, 813-248-0585 (International)

Medical: Tel. 800.451.8346, 760.602.8703 3E Company (International)

SECTION 2 - HAZARDS IDENTIFICATION

GHS CLASSIFICATION:

Health		Environmental		Physical	
Acute Toxicity:	Category 4	Acute Toxicity:	None Known	Flammable Liquid	Category 2
Skin Irritation:	Category 3	Chronic Toxicity:	None Known		
Skin Sensitization:	NO				
Eye:	Category 2B				

GHS LABEL:



OR



Signal Word:
Danger

WHMIS CLASSIFICATION: CLASS B, DIVISION 2

Hazard Statements

H225: Highly flammable liquid and vapor
H319: Causes serious eye irritation
H332: Harmful if inhaled
H335: May cause respiratory irritation
H336: May cause drowsiness or dizziness
EUH019: May form explosive peroxides

Precautionary Statements

P210: Keep away from heat/sparks/open flames/hot surfaces – No smoking
P261: Avoid breathing dust/fume/gas/mist/vapors/spray
P280: Wear protective gloves/protective clothing/eye protection/face protection
P304+P340: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
P403+P233: Store in a well ventilated place. Keep container tightly closed
P501: Dispose of contents/container in accordance with local regulation

SECTION 3 - COMPOSITION/INFORMATION ON INGREDIENTS

	CAS#	EINECS #	REACH	CONCENTRATION
			Pre-registration Number	% by Weight
Tetrahydrofuran (THF)	109-99-9	203-726-8	05-2116297729-22-0000	40 - 50
Methyl Ethyl Ketone (MEK)	78-93-3	201-159-0	05-2116297728-24-0000	15 - 40
Acetone	67-64-1	200-662-2	05-2116297713-35-0000	35 - 40

All of the constituents of this adhesive product are listed on the TSCA inventory of chemical substances maintained by the US EPA, or are exempt from that listing.
* Indicates this chemical is subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986 (40CFR372).
indicates that this chemical is found on Proposition 65's List of chemicals known to the State of California to cause cancer or reproductive toxicity.

SECTION 4 - FIRST AID MEASURES

Contact with eyes: Flush eyes immediately with plenty of water for 15 minutes and seek medical advice immediately.
Skin contact: Remove contaminated clothing and shoes. Wash skin thoroughly with soap and water. If irritation develops, seek medical advice.
Inhalation: Remove to fresh air. If breathing is stopped, give artificial respiration. If breathing is difficult, give oxygen. Seek medical advice.
Ingestion: Rinse mouth with water. Give 1 or 2 glasses of water or milk to dilute. Do not induce vomiting. Seek medical advice immediately.

SECTION 5 - FIREFIGHTING MEASURES

Suitable Extinguishing Media: Dry chemical powder, carbon dioxide gas, foam, Halon, water fog.
Unsuitable Extinguishing Media: Water spray or stream.
Exposure Hazards: Inhalation and dermal contact
Combustion Products: Oxides of carbon and smoke

	HMIS	NFPA	
Health	2	2	0-Minimal
Flammability	3	3	1-Slight
Reactivity	0	0	2-Moderate
PPE	B		3-Serious
			4-Severe

Protection for Firefighters: Self-contained breathing apparatus or full-face positive pressure airline masks.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Personal precautions: Keep away from heat, sparks and open flame.
Provide sufficient ventilation, use explosion-proof exhaust ventilation equipment or wear suitable respiratory protective equipment.
Prevent contact with skin or eyes (see section 8).
Environmental Precautions: Prevent product or liquids contaminated with product from entering sewers, drains, soil or open water course.
Methods for Cleaning up: Clean up with sand or other inert absorbent material. Transfer to a closable steel vessel.
Materials not to be used for clean up: Aluminum or plastic containers

SECTION 7 - HANDLING AND STORAGE

Handling: Avoid breathing of vapor, avoid contact with eyes, skin and clothing.
Keep away from ignition sources, use only electrically grounded handling equipment and ensure adequate ventilation/fume exhaust hoods.
Do not eat, drink or smoke while handling.
Storage: Store in ventilated room or shade below 44°C (110°F) and away from direct sunlight.
Keep away from ignition sources and incompatible materials: caustics, ammonia, inorganic acids, chlorinated compounds, strong oxidizers and isocyanates.
Follow all precautionary information on container label, product bulletins and solvent cementing literature.

SECTION 8 - PRECAUTIONS TO CONTROL EXPOSURE / PERSONAL PROTECTION

EXPOSURE LIMITS:	Component	ACGIH TLV	ACGIH STEL	OSHA PEL	OSHA STEL:
	Tetrahydrofuran (THF)	50 ppm	100 ppm	200 ppm	
	Methyl Ethyl Ketone (MEK)	200 ppm	300 ppm	200 ppm	
	Acetone	500 ppm	750 ppm	1000 ppm	

Engineering Controls: Use local exhaust as needed.
Monitoring: Maintain breathing zone airborne concentrations below exposure limits.
Personal Protective Equipment (PPE):
Eye Protection: Avoid contact with eyes, wear splash-proof chemical goggles, face shield, safety glasses (spectacles) with brow guards and side shields, etc. as may be appropriate for the exposure.
Skin Protection: Prevent contact with the skin as much as possible. Butyl rubber gloves should be used for frequent immersion.
Use of solvent-resistant gloves or solvent-resistant barrier cream should provide adequate protection when normal adhesive application practices and procedures are used for making structural bonds.
Respiratory Protection: Prevent inhalation of the solvents. Use in a well-ventilated room. Open doors and/or windows to ensure airflow and air changes. Use local exhaust ventilation to remove airborne contaminants from employee breathing zone and to keep contaminants below levels listed above.
With normal use, the Exposure Limit Value will not usually be reached. When limits approached, use respiratory protection equipment.



GHS SAFETY DATA SHEET

WELD-ON® P-75 Wet 'R Dry™ Low VOC Primer for PVC Plastic Pipe

Date Revised: DEC 2011

Supersedes: OCT 2010

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Aqua Blue, thin liquid	Odor Threshold:	2-50 ppm (THF)
Odor:	Ethereal	Boiling Range:	56 °C (133 °F) to 156 °C (313 °F)
pH:	Not Applicable	Evaporation Rate:	> 1.0 (BUAC = 1)
Melting/Freezing Point:	-108.5 °C (-163.3 °F) Based on first melting component: THF	Flammability:	Category 2
Boiling Point:	56 °C (133 °F) Based on first boiling component: Acetone	Flammability Limits:	LEL: 1.1% based on Cyclohexanone
Flash Point:	-20 °C (-4 °F) TCC based on Acetone		UEL: 12.8% based on Acetone
Specific Gravity:	0.834 @23 °C (73 °F)	Vapor Pressure:	190 mm Hg @ 20 °C (68 °F) Acetone
Solubility:	Solvent portion soluble in water. Resin portion separates out.	Vapor Density:	>2.0 (Air = 1)
Partition Coefficient n-octanol/water:	Not Available	Other Data: Viscosity:	Water-thin
Auto-ignition Temperature:	321 °C (610 °F) based on THF		
Decomposition Temperature:	Not Applicable		
VOC Content:	When applied as directed, per SCAQMD Rule 1168, Test Method 316A, VOC content is: ≤ 550 g/l.		

SECTION 10 - STABILITY AND REACTIVITY

Stability:	Stable
Hazardous decomposition products:	None in normal use. When forced to burn, this product gives off oxides of carbon and smoke.
Conditions to avoid:	Keep away from heat, sparks, open flame and other ignition sources.
Incompatible Materials:	Oxidizers, strong acids and bases, amines, ammonia

SECTION 11 - TOXICOLOGICAL INFORMATION

Likely Routes of Exposure: Inhalation, Eye and Skin Contact

Acute symptoms and effects:

Inhalation:	Severe overexposure may result in nausea, dizziness, headache. Can cause drowsiness, irritation of eyes and nasal passages.
Eye Contact:	Vapors slightly uncomfortable. Overexposure may result in severe eye injury with corneal or conjunctival inflammation on contact with the liquid.
Skin Contact:	Liquid contact may remove natural skin oils resulting in skin irritation. Dermatitis may occur with prolonged contact.
Ingestion:	May cause nausea, vomiting, diarrhea and mental sluggishness.

Chronic (long-term) effects: None known to humans

Toxicity:	LD ₅₀	LC ₅₀
Tetrahydrofuran (THF)	Oral: 2842 mg/kg (rat)	Inhalation 3 hrs. 21,000 mg/m ³ (rat)
Methyl Ethyl Ketone (MEK)	Oral: 2737 mg/kg (rat), Dermal: 6480 mg/kg (rabbit)	Inhalation 8 hrs. 23,500 mg/m ³ (rat)
Acetone	Oral: 5800 mg/kg (rat)	Inhalation 50, 100 mg/m ³ (rat)

Reproductive Effects	Teratogenicity	Mutagenicity	Embryotoxicity	Sensitization to Product	Synergistic Products
Not Established	Not Established	Not Established	Not Established	Not Established	Not Established

SECTION 12 - ECOLOGICAL INFORMATION

Ecotoxicity:	None Known
Mobility:	In normal use, emission of volatile organic compounds (VOC's) to the air takes place, typically at a rate of ≤ 550 g/l.
Degradability:	Biodegradable
Bioaccumulation:	Minimal to none.

SECTION 13 - WASTE DISPOSAL CONSIDERATIONS

Follow local and national regulations. Consult disposal expert.

SECTION 14 - TRANSPORT INFORMATION

Proper Shipping Name:	Flammable Liquid, n.o.s. (Acetone, Tetrahydrofuran)
Hazard Class:	3
Secondary Risk:	None
Identification Number:	UN 1993
Packing Group:	PG II
Label Required:	Class 3 Flammable Liquid
Marine Pollutant:	NO

EXCEPTION for Ground Shipping

DOT Limited Quantity: Up to 1L per inner packaging, 30 kg gross weight per package.
Consumer Commodity: Depending on packaging, these quantities may qualify under DOT as "ORM-D".

TDG INFORMATION

TDG CLASS:	FLAMMABLE LIQUID 3
SHIPPING NAME:	Flammable Liquid, n.o.s. (Acetone, Tetrahydrofuran)
UN NUMBER/PACKING GROUP:	UN 1993, PG II

SECTION 15 - REGULATORY INFORMATION

Precautionary Label Information:	Highly Flammable, Irritant	Ingredient Listings:	USA TSCA, Europe EINECS, Canada DSL, Australia AICS, Korea ECL/TCCL, Japan MITI (ENCS)
Symbols:	F, Xi		
Risk Phrases:	R11: Highly flammable. R20: Harmful by inhalation. R36/37: Irritating to eyes and respiratory system.	R66: Repeated exposure may cause skin dryness or cracking R67: Vapors may cause drowsiness and dizziness	
Safety Phrases:	S9: Keep container in a well-ventilated place. S16: Keep away from sources of ignition - No smoking. S25: Avoid contact with eyes.	S26: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S33: Take precautionary measures against static discharges. S46: If swallowed, seek medical advise immediately and show this container or label.	

SECTION 16 - OTHER INFORMATION

Specification Information:		
Department issuing data sheet:	IPS, Safety Health & Environmental Affairs	All ingredients are compliant with the requirements of the European Directive on RoHS (Restriction of Hazardous Substances).
E-mail address:	<EHSinfo@ipscorp.com>	
Training necessary:	Yes, training in practices and procedures contained in product literature.	
Reissue date / reason for reissue:	12/14/2011 / Updated GHS Standard Format	
Intended Use of Product:	Primer for PVC Plastic Pipe	

This product is intended for use by skilled individuals at their own risk. The information contained herein is based on data considered accurate based on current state of knowledge and experience. However, no warranty is expressed or implied regarding the accuracy of this data or the results to be obtained from the use thereof.



GHS SAFETY DATA SHEET

WELD-ON® P-70™ Low VOC Primer for PVC and CPVC Plastic Pipe

Date Revised: DEC 2011

Supersedes: OCT 2010

SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: WELD-ON® P-70™ Low VOC Primer for PVC and CPVC Plastic Pipe**PRODUCT USE:** Low VOC Primer for PVC and CPVC Plastic Pipe**SUPPLIER:****MANUFACTURER:** IPS Corporation

17109 South Main Street, Carson, CA 90248-3127

P.O. Box 379, Gardena, CA 90247-0379

Tel. 1-310-898-3300

EMERGENCY: Transportation: CHEMTEL Tel. 800.255-3924, 813-248-0585 (International)**Medical:** Tel. 800.451.8346, 760.602.8703 3E Company (International)

SECTION 2 - HAZARDS IDENTIFICATION

GHS CLASSIFICATION:

Health		Environmental		Physical	
Acute Toxicity:	Category 4	Acute Toxicity:	None Known	Flammable Liquid	Category 2
Skin Irritation:	Category 3	Chronic Toxicity:	None Known		
Skin Sensitization:	NO				
Eye:	Category 2B				

GHS LABEL:

OR

**Signal Word:**
Danger**WHMIS CLASSIFICATION:** CLASS B, DIVISION 2Hazard Statements

H225: Highly flammable liquid and vapor
 H319: Causes serious eye irritation
 H332: Harmful if inhaled
 H335: May cause respiratory irritation
 H336: May cause drowsiness or dizziness
 EUH019: May form explosive peroxides

Precautionary Statements

P210: Keep away from heat/sparks/open flames/hot surfaces – No smoking
 P261: Avoid breathing dust/fume/gas/mist/vapors/spray
 P280: Wear protective gloves/protective clothing/eye protection/face protection
 P304+P340: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
 P403+P233: Store in a well ventilated place. Keep container tightly closed
 P501: Dispose of contents/container in accordance with local regulation

SECTION 3 - COMPOSITION/INFORMATION ON INGREDIENTS

	CAS#	EINECS #	REACH	CONCENTRATION
			Pre-registration Number	% by Weight
Tetrahydrofuran (THF)	109-99-9	203-726-8	05-2116297729-22-0000	45 - 59
Methyl Ethyl Ketone (MEK)	78-93-3	201-159-0	05-2116297728-24-0000	19 - 29
Cyclohexanone	108-94-1	203-631-1	05-2116297718-25-0000	5 - 15
Acetone	67-64-1	200-662-2	05-2116297713-35-0000	5 - 20

All of the constituents of this adhesive product are listed on the TSCA inventory of chemical substances maintained by the US EPA, or are exempt from that listing.

* Indicates this chemical is subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986 (40CFR372).

indicates that this chemical is found on Proposition 65's List of chemicals known to the State of California to cause cancer or reproductive toxicity.

SECTION 4 - FIRST AID MEASURES

Contact with eyes: Flush eyes immediately with plenty of water for 15 minutes and seek medical advice immediately.
Skin contact: Remove contaminated clothing and shoes. Wash skin thoroughly with soap and water. If irritation develops, seek medical advice.
Inhalation: Remove to fresh air. If breathing is stopped, give artificial respiration. If breathing is difficult, give oxygen. Seek medical advice.
Ingestion: Rinse mouth with water. Give 1 or 2 glasses of water or milk to dilute. Do not induce vomiting. Seek medical advice immediately.

SECTION 5 - FIREFIGHTING MEASURES

Suitable Extinguishing Media: Dry chemical powder, carbon dioxide gas, foam, Halon, water fog.
Unsuitable Extinguishing Media: Water spray or stream.
Exposure Hazards: Inhalation and dermal contact
Combustion Products: Oxides of carbon and smoke

	HMIS	NFPA	
Health	2	2	1-Slight
Flammability	3	3	2-Moderate
Reactivity	0	0	3-Serious
PPE	B		4-Severe

Protection for Firefighters: Self-contained breathing apparatus or full-face positive pressure airline masks.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Personal precautions: Keep away from heat, sparks and open flame.
 Provide sufficient ventilation, use explosion-proof exhaust ventilation equipment or wear suitable respiratory protective equipment.
 Prevent contact with skin or eyes (see section 8).
Environmental Precautions: Prevent product or liquids contaminated with product from entering sewers, drains, soil or open water course.
Methods for Cleaning up: Clean up with sand or other inert absorbent material. Transfer to a closable steel vessel.
Materials not to be used for clean up: Aluminum or plastic containers

SECTION 7 - HANDLING AND STORAGE

Handling: Avoid breathing of vapor, avoid contact with eyes, skin and clothing.
 Keep away from ignition sources, use only electrically grounded handling equipment and ensure adequate ventilation/fume exhaust hoods.
 Do not eat, drink or smoke while handling.
Storage: Store in ventilated room or shade below 44 °C (110 °F) and away from direct sunlight.
 Keep away from ignition sources and incompatible materials: caustics, ammonia, inorganic acids, chlorinated compounds, strong oxidizers and isocyanates.
 Follow all precautionary information on container label, product bulletins and solvent cementing literature.

SECTION 8 - PRECAUTIONS TO CONTROL EXPOSURE / PERSONAL PROTECTION

EXPOSURE LIMITS:	Component	ACGIH TLV	ACGIH STEL	OSHA PEL	OSHA STEL:
	Tetrahydrofuran (THF)	50 ppm	100 ppm	200 ppm	
	Methyl Ethyl Ketone (MEK)	200 ppm	300 ppm	200 ppm	
	Cyclohexanone	20 ppm	50 ppm	50 ppm	
	Acetone	500 ppm	750 ppm	1000 ppm	

Engineering Controls: Use local exhaust as needed.**Monitoring:** Maintain breathing zone airborne concentrations below exposure limits.**Personal Protective Equipment (PPE):****Eye Protection:** Avoid contact with eyes, wear splash-proof chemical goggles, face shield, safety glasses (spectacles) with brow guards and side shields, etc. as may be appropriate for the exposure.**Skin Protection:** Prevent contact with the skin as much as possible. Butyl rubber gloves should be used for frequent immersion.
Use of solvent-resistant gloves or solvent-resistant barrier cream should provide adequate protection when normal adhesive application practices and procedures are used for making structural bonds.**Respiratory Protection:** Prevent inhalation of the solvents. Use in a well-ventilated room. Open doors and/or windows to ensure airflow and air changes. Use local exhaust ventilation to remove airborne contaminants from employee breathing zone and to keep contaminants below levels listed above.
With normal use, the Exposure Limit Value will not usually be reached. When limits approached, use respiratory protection equipment.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Clear or purple, thin liquid	Odor Threshold:	0.88 ppm (Cyclohexanone)
Odor:	Ethereal	Boiling Range:	56 °C (133 °F) to 156 °C (313 °F)
pH:	Not Applicable	Evaporation Rate:	> 1.0 (BUAC = 1)
Melting/Freezing Point:	-108.5 °C (-163.3 °F) Based on first melting component: THF	Flammability:	Category 2
Boiling Point:	56 °C (133 °F) Based on first boiling component: Acetone	Flammability Limits:	LEL: 1.1% based on Cyclohexanone UEL: 12.8% based on Acetone
Flash Point:	-20 °C (-4 °F) TCC based on Acetone	Vapor Pressure:	190 mm Hg @ 20 °C (68 °F) Acetone
Specific Gravity:	0.858 @23 °C (73 °F)	Vapor Density:	>2.0 (Air = 1)
Solubility:	Solvent portion soluble in water. Resin portion separates out.	Other Data: Viscosity:	Water-thin
Partition Coefficient n-octanol/water:	Not Available		
Auto-ignition Temperature:	321 °C (610 °F) based on THF		
Decomposition Temperature:	Not Applicable		
VOC Content:	When applied as directed, per SCAQMD Rule 1168, Test Method 316A, VOC content is: ≤ 550 g/l.		

SECTION 10 - STABILITY AND REACTIVITY

Stability:	Stable
Hazardous decomposition products:	None in normal use. When forced to burn, this product gives off oxides of carbon and smoke.
Conditions to avoid:	Keep away from heat, sparks, open flame and other ignition sources.
Incompatible Materials:	Oxidizers, strong acids and bases, amines, ammonia

SECTION 11 - TOXICOLOGICAL INFORMATION

Likely Routes of Exposure: Inhalation, Eye and Skin Contact

Acute symptoms and effects:

Inhalation:	Severe overexposure may result in nausea, dizziness, headache. Can cause drowsiness, irritation of eyes and nasal passages.
Eye Contact:	Vapors slightly uncomfortable. Overexposure may result in severe eye injury with corneal or conjunctival inflammation on contact with the liquid.
Skin Contact:	Liquid contact may remove natural skin oils resulting in skin irritation. Dermatitis may occur with prolonged contact.
Ingestion:	May cause nausea, vomiting, diarrhea and mental sluggishness.

Chronic (long-term) effects: None known to humans

Toxicity:	LD ₅₀	LC ₅₀
Tetrahydrofuran (THF)	Oral: 2842 mg/kg (rat)	Inhalation 3 hrs. 21,000 mg/m ³ (rat)
Methyl Ethyl Ketone (MEK)	Oral: 2737 mg/kg (rat), Dermal: 6480 mg/kg (rabbit)	Inhalation 8 hrs. 23,500 mg/m ³ (rat)
Cyclohexanone	Oral: 1535 mg/kg (rat), Dermal: 948 mg/kg (rabbit)	Inhalation 4 hrs. 8,000 PPM (rat)
Acetone	Oral: 5800 mg/kg (rat)	Inhalation 50,100 mg/m ³ (rat)

Reproductive Effects	Teratogenicity	Mutagenicity	Embryotoxicity	Sensitization to Product	Synergistic Products
Not Established	Not Established	Not Established	Not Established	Not Established	Not Established

SECTION 12 - ECOLOGICAL INFORMATION

Ecotoxicity:	None Known
Mobility:	In normal use, emission of volatile organic compounds (VOC's) to the air takes place, typically at a rate of ≤ 550 g/l.
Degradability:	Biodegradable
Bioaccumulation:	Minimal to none.

SECTION 13 - WASTE DISPOSAL CONSIDERATIONS

Follow local and national regulations. Consult disposal expert.

SECTION 14 - TRANSPORT INFORMATION

Proper Shipping Name:	Flammable Liquid, n.o.s. (Acetone, Tetrahydrofuran)
Hazard Class:	3
Secondary Risk:	None
Identification Number:	UN 1993
Packing Group:	PG II
Label Required:	Class 3 Flammable Liquid
Marine Pollutant:	NO

EXCEPTION for Ground Shipping

DOT Limited Quantity: Up to 1L per inner packaging, 30 kg gross weight per package.
Consumer Commodity: Depending on packaging, these quantities may qualify under DOT as "ORM-D" .

TDG INFORMATION

TDG CLASS:	FLAMMABLE LIQUID 3
SHIPPING NAME:	Flammable Liquid, n.o.s. (Acetone, Tetrahydrofuran)
UN NUMBER/PACKING GROUP:	UN 1993, PG II

SECTION 15 - REGULATORY INFORMATION

Precautionary Label Information:	Highly Flammable, Irritant	Ingredient Listings:	USA TSCA, Europe EINECS, Canada DSL, Australia
Symbols:	F, Xi		AICS, Korea ECL/TCCL, Japan MITI (ENCS)
Risk Phrases:	R11: Highly flammable. R20: Harmful by inhalation. R36/37: Irritating to eyes and respiratory system.		R66: Repeated exposure may cause skin dryness or cracking R67: Vapors may cause drowsiness and dizziness
Safety Phrases:	S9: Keep container in a well-ventilated place. S16: Keep away from sources of ignition - No smoking. S25: Avoid contact with eyes.		S26: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S33: Take precautionary measures against static discharges. S46: If swallowed, seek medical advise immediately and show this container or label.

SECTION 16 - OTHER INFORMATION

Specification Information:		
Department issuing data sheet:	IPS, Safety Health & Environmental Affairs	All ingredients are compliant with the requirements of the European
E-mail address:	<EHSinfo@ipscorp.com>	Directive on RoHS (Restriction of Hazardous Substances).
Training necessary:	Yes, training in practices and procedures contained in product literature.	
Reissue date / reason for reissue:	12/14/2011 / Updated GHS Standard Format	
Intended Use of Product:	Primer for PVC and CPVC Plastic Pipe	

This product is intended for use by skilled individuals at their own risk. The information contained herein is based on data considered accurate based on current state of knowledge and experience. However, no warranty is expressed or implied regarding the accuracy of this data or the results to be obtained from the use thereof.



GHS SAFETY DATA SHEET

WELD-ON® 660™ Vinyl Shower Pan Liner Cement

Date Revised: **JUL 2012**
Supersedes: **DEC 2011**

SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: WELD-ON® 660™ Vinyl Shower Pan Liner Cement
PRODUCT USE: Solvent Cement for Vinyl Shower Pan Liner

MANUFACTURER: IPS Corporation
17109 South Main Street, Gardena, CA 90248-3127
P.O. Box 379, Gardena, CA 90247-0379
Tel. 1-310-898-3300

EMERGENCY: Transportation: CHEMTEL Tel. 800.255-3924, 813-248-0585 (International) **Medical:** Tel. 800.451.8346, 760.602.8703 3E Company (International)

SECTION 2 - HAZARDS IDENTIFICATION

GHS CLASSIFICATION:

Health		Environmental		Physical	
Acute Toxicity:	Category 4	Acute Toxicity:	None Known	Flammable Liquid	Category 2
Skin Irritation:	Category 3	Chronic Toxicity:	None Known		
Skin Sensitization:	NO				
Eye:	Category 2A				

GHS LABEL:



Signal Word:
Danger

WHMIS CLASSIFICATION: CLASS B, DIVISION 2
CLASS D, DIVISION 2B

Hazard Statements

H225: Highly flammable liquid and vapor
H319: Causes serious eye irritation
H335: May cause respiratory irritation
H336: May cause drowsiness or dizziness
EUH019: May form explosive peroxides

Precautionary Statements

P210: Keep away from heat/sparks/open flames/hot surfaces – No smoking
P261: Avoid breathing dust/fume/gas/mist/vapors/spray
P280: Wear protective gloves/protective clothing/eye protection/face protection
P337+P313: Get medical advice/attention
P403+P233: Store in a well ventilated place. Keep container tightly closed
P501: Dispose of contents/container in accordance with local regulation

SECTION 3 - COMPOSITION/INFORMATION ON INGREDIENTS

	CAS#	EINECS #	REACH	CONCENTRATION
			Pre-registration Number	% by Weight
Tetrahydrofuran (THF)	109-99-9	203-726-8	05-2116297729-22-0000	3 - 8
Methyl Ethyl Ketone (MEK)	78-93-3	201-159-0	05-2116297728-24-0000	76 - 87

All of the constituents of this adhesive product are listed on the TSCA inventory of chemical substances maintained by the US EPA, or are exempt from that listing.
* Indicates this chemical is subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986 (40CFR372).
indicates that this chemical is found on Proposition 65's List of chemicals known to the State of California to cause cancer or reproductive toxicity.

SECTION 4 - FIRST AID MEASURES

Contact with eyes: Flush eyes immediately with plenty of water for 15 minutes and seek medical advice immediately.
Skin contact: Remove contaminated clothing and shoes. Wash skin thoroughly with soap and water. If irritation develops, seek medical advice.
Inhalation: Remove to fresh air. If breathing is stopped, give artificial respiration. If breathing is difficult, give oxygen. Seek medical advice.
Ingestion: Rinse mouth with water. Give 1 or 2 glasses of water or milk to dilute. Do not induce vomiting. Seek medical advice immediately.

SECTION 5 - FIREFIGHTING MEASURES

Suitable Extinguishing Media: Dry chemical powder, carbon dioxide gas, foam, Halon, water fog.
Unsuitable Extinguishing Media: Water spray or stream.
Exposure Hazards: Inhalation and dermal contact
Combustion Products: Oxides of carbon, hydrogen chloride and smoke

	HMIS	NFPA	
Health	2	2	0-Minimal
Flammability	3	3	1-Slight
Reactivity	0	0	2-Moderate
PPE	B		3-Serious
			4-Severe

Protection for Firefighters: Self-contained breathing apparatus or full-face positive pressure airline masks.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Personal precautions: Keep away from heat, sparks and open flame.
Provide sufficient ventilation, use explosion-proof exhaust ventilation equipment or wear suitable respiratory protective equipment.
Prevent contact with skin or eyes (see section 8).
Environmental Precautions: Prevent product or liquids contaminated with product from entering sewers, drains, soil or open water course.
Methods for Cleaning up: Clean up with sand or other inert absorbent material. Transfer to a closable steel vessel.
Materials not to be used for clean up: Aluminum or plastic containers

SECTION 7 - HANDLING AND STORAGE

Handling: Avoid breathing of vapor, avoid contact with eyes, skin and clothing.
Keep away from ignition sources, use only electrically grounded handling equipment and ensure adequate ventilation/fume exhaust hoods.
Do not eat, drink or smoke while handling.
Storage: Store in ventilated room or shade below 27°C (80°F) and away from direct sunlight.
Keep away from ignition sources and incompatible materials: caustics, ammonia, inorganic acids, chlorinated compounds, strong oxidizers and isocyanates.
Follow all precautionary information on container label, product bulletins and solvent cementing literature.

SECTION 8 - PRECAUTIONS TO CONTROL EXPOSURE / PERSONAL PROTECTION

EXPOSURE LIMITS:	Component	ACGIH TLV	ACGIH STEL	OSHA PEL	OSHA STEL:
	Tetrahydrofuran (THF)	50 ppm	100 ppm	200 ppm	200 ppm
Methyl Ethyl Ketone (MEK)	200 ppm	300 ppm	200 ppm	200 ppm	

Engineering Controls: Use local exhaust as needed.
Monitoring: Maintain breathing zone airborne concentrations below exposure limits.
Personal Protective Equipment (PPE):
Eye Protection: Avoid contact with eyes, wear splash-proof chemical goggles, face shield, safety glasses (spectacles) with brow guards and side shields, etc. as may be appropriate for the exposure.
Skin Protection: Prevent contact with the skin as much as possible. Butyl rubber gloves should be used for frequent immersion.
Use of solvent-resistant gloves or solvent-resistant barrier cream should provide adequate protection when normal adhesive application practices and procedures are used for making structural bonds.
Respiratory Protection: Prevent inhalation of the solvents. Use in a well-ventilated room. Open doors and/or windows to ensure airflow and air changes. Use local exhaust ventilation to remove airborne contaminants from employee breathing zone and to keep contaminants below levels listed above.
With normal use, the Exposure Limit Value will not usually be reached. When limits approached, use respiratory protection equipment.



GHS SAFETY DATA SHEET

WELD-ON® 660™ Vinyl Shower Pan Liner Cement

Date Revised: **JUL 2012**
Supersedes: **DEC 2011**

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Clear, medium syrupy liquid	Odor Threshold:	1 ppm (MEK)
Odor:	Ketone	Boiling Range:	66 °C (151 °F) to 80 °C (176 °F)
pH:	Not Applicable	Evaporation Rate:	> 1.0 (BUAC = 1)
Melting/Freezing Point:	-108 °C (-162 °F) Based on first melting component: THF	Flammability:	Category 2
Boiling Point:	66 °C (151 °F) Based on first boiling component: THF	Flammability Limits:	LEL: 2.0 based on THF
Flash Point:	-20 °C (4 °F) TCC based on THF	UEL: 11.8 based on THF	
Specific Gravity:	0.848 @23 °C (73 °F)	Vapor Pressure:	160 mm Hg @ 20 °C (68 °F) THF
Solubility:	Solvent portion soluble in water. Resin portion separates out.	Vapor Density:	>2.0 (Air = 1)
Partition Coefficient n-octanol/water:	Not Available	Other Data: Viscosity:	Medium bodied
Auto-ignition Temperature:	321 °C (609.8 °F) based on THF		
Decomposition Temperature:	Not Applicable		
VOC Content:	When applied as directed, per SCAQMD Rule 1168, Test Method 316A, VOC Max. is: ≤ 600 g/l.		

SECTION 10 - STABILITY AND REACTIVITY

Stability:	Stable
Hazardous decomposition products:	None in normal use. When forced to burn, this product gives off oxides of carbon, hydrogen chloride and smoke.
Conditions to avoid:	Keep away from heat, sparks, open flame and other ignition sources.
Incompatible Materials:	Oxidizers, strong acids and bases, amines, ammonia

SECTION 11 - TOXICOLOGICAL INFORMATION

Likely Routes of Exposure: Inhalation, Eye and Skin Contact

Acute symptoms and effects:

Inhalation: Severe overexposure may result in nausea, dizziness, headache. Can cause drowsiness, irritation of eyes and nasal passages.

Eye Contact: Vapors slightly uncomfortable. Overexposure may result in severe eye injury with corneal or conjunctival inflammation on contact with the liquid.

Skin Contact: Liquid contact may remove natural skin oils resulting in skin irritation. Dermatitis may occur with prolonged contact.

Ingestion: May cause nausea, vomiting, diarrhea and mental sluggishness.

Chronic (long-term) effects: None known to humans

Toxicity:

	LD ₅₀	LC ₅₀
Tetrahydrofuran (THF)	Oral: 2842 mg/kg (rat)	Inhalation 3 hrs. 21,000 mg/m ³ (rat)
Methyl Ethyl Ketone (MEK)	Oral: 2737 mg/kg (rat), Dermal: 6480 mg/kg (rabbit)	Inhalation 8 hrs. 23,500 mg/m ³ (rat)

Reproductive Effects	Teratogenicity	Mutagenicity	Embryotoxicity	Sensitization to Product	Synergistic Products
Not Established	Not Established	Not Established	Not Established	Not Established	Not Established

SECTION 12 - ECOLOGICAL INFORMATION

Ecotoxicity: None Known

Mobility: In normal use, emission of volatile organic compounds (VOC's) to the air takes place. Typically at a rate of max ≤ 600 g/l.

Degradability: Biodegradable

Bioaccumulation: Minimal to none.

SECTION 13 - WASTE DISPOSAL CONSIDERATIONS

Follow local and national regulations. Consult disposal expert.

SECTION 14 - TRANSPORT INFORMATION

DOT, IATA, ADR, IMO/MDG SHIPPING INFORMATION

Proper Shipping Name:	Adhesives
Hazard Class:	3
Secondary Risk:	None
Identification Number:	UN 1133
Packing Group:	PG II
Label Required:	Flammable Liquid
Marine Pollutant:	NO

EXCEPTION for Ground Shipping

DOT Limited Quantity: Up to 5L per inner packaging, 30 kg gross weight per package.
Consumer Commodity: Depending on packaging, these quantities may qualify under DOT as "ORM-D".

TDG INFORMATION

TDG CLASS:	FLAMMABLE LIQUID 3
SHIPPING NAME:	ADHESIVES
UN NUMBER/PACKING GROUP:	UN 1133, PG II

SECTION 15 - REGULATORY INFORMATION

Precautionary Label Information:	Highly Flammable, Irritant	Ingredient Listings:	USA TSCA, Europe EINECS, Canada DSL, Australia AICS, Korea ECL/TCCL, Japan MITI (ENCS)
Symbols:	F, Xi		
Risk Phrases:	R11: Highly flammable. R36/37: Irritating to eyes and respiratory system.		R66: Repeated exposure may cause skin dryness or cracking R67: Vapors may cause drowsiness and dizziness
Safety Phrases:	S2: Keep out of the reach of children S9: Keep container in a well-ventilated place. S16: Keep away from sources of ignition - No smoking. S19: May form explosive peroxides.		S25: Avoid contact with eyes. S26: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S29: Do not empty into drains. S33: Take precautionary measures against static discharges.

SECTION 16 - OTHER INFORMATION

Specification Information:

Department issuing data sheet:	IPS, Safety Health & Environmental Affairs	All ingredients are compliant with the requirements of the European Directive on RoHS (Restriction of Hazardous Substances).
E-mail address:	<EHSinfo@ipscorp.com>	
Training necessary:	Yes, training in practices and procedures contained in product literature.	
Reissue date / reason for reissue:	7/9/2012 / Updated GHS Standard Format	
Intended Use of Product:	Solvent Cement for Vinyl Shower Pan Liner	

This product is intended for use by skilled individuals at their own risk. The information contained herein is based on data considered accurate based on current state of knowledge and experience. However, no warranty is expressed or implied regarding the accuracy of this data or the results to be obtained from the use thereof.

SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION**PRODUCT NAME:** XIRTEC 7 CLR Low VOC Primer for PVC and CPVC Plastic Pipe**PRODUCT USE:** Low VOC Primer for PVC and CPVC Plastic Pipe**SUPPLIER:** IPEX Inc.
807 Pharmacy Avenue
Scarborough, Ontario M1L 3K2, CAN**MANUFACTURER:** IPS Corporation
17109 South Main Street, Gardena, CA 90248-3127
P.O. Box 379, Gardena, CA 90247-0379
Tel. 1-310-898-3300**EMERGENCY:** Transportation: CHEMTEL Tel. 800.255-3924, 813-248-0585 (International)**Medical:** CHEMTEL Tel. 800.255-3924, 813-248-0585 (International)**SECTION 2 - HAZARDS IDENTIFICATION****GHS CLASSIFICATION:**

Health		Environmental		Physical	
Acute Toxicity:	Category 4	Acute Toxicity:	None Known	Flammable Liquid	Category 2
Skin Irritation:	Category 3	Chronic Toxicity:	None Known		
Skin Sensitization:	NO				
Eye:	Category 2B				

GHS LABEL:

OR

**Signal Word:**
Danger**WHMIS CLASSIFICATION:** CLASS B, DIVISION 2**Hazard Statements**

H225: Highly flammable liquid and vapor
 H319: Causes serious eye irritation
 H332: Harmful if inhaled
 H335: May cause respiratory irritation
 H336: May cause drowsiness or dizziness
 EUH019: May form explosive peroxides

Precautionary Statements

P210: Keep away from heat/sparks/open flames/hot surfaces – No smoking
 P261: Avoid breathing dust/fume/gas/mist/vapors/spray
 P280: Wear protective gloves/protective clothing/eye protection/face protection
 P304+P340: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
 P403+P233: Store in a well ventilated place. Keep container tightly closed
 P501: Dispose of contents/container in accordance with local regulation

SECTION 3 - COMPOSITION/INFORMATION ON INGREDIENTS

	CAS#	EINECS #	REACH	CONCENTRATION
			Pre-registration Number	% by Weight
Tetrahydrofuran (THF)	109-99-9	203-726-8	05-2116297729-22-0000	45 - 59
Methyl Ethyl Ketone (MEK)	78-93-3	201-159-0	05-2116297728-24-0000	19 - 29
Acetone	67-64-1	200-662-2	05-2116297713-35-0000	5 - 20
Cyclohexanone	108-94-1	203-631-1	05-2116297718-25-0000	5 - 15

All of the constituents of this adhesive product are listed on the TSCA inventory of chemical substances maintained by the US EPA, or are exempt from that listing.

* Indicates this chemical is subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986 (40CFR372).

indicates that this chemical is found on Proposition 65's List of chemicals known to the State of California to cause cancer or reproductive toxicity.

SECTION 4 - FIRST AID MEASURES

Contact with eyes: Flush eyes immediately with plenty of water for 15 minutes and seek medical advice immediately.
Skin contact: Remove contaminated clothing and shoes. Wash skin thoroughly with soap and water. If irritation develops, seek medical advice.
Inhalation: Remove to fresh air. If breathing is stopped, give artificial respiration. If breathing is difficult, give oxygen. Seek medical advice.
Ingestion: Rinse mouth with water. Give 1 or 2 glasses of water or milk to dilute. Do not induce vomiting. Seek medical advice immediately.

SECTION 5 - FIREFIGHTING MEASURES

Suitable Extinguishing Media: Dry chemical powder, carbon dioxide gas, foam, Halon, water fog. HMIS 2, NFPA 2, 0-Minimal
Unsuitable Extinguishing Media: Water spray or stream. Health 2, 2, 1-Slight
Exposure Hazards: Inhalation and dermal contact. Flammability 3, 3, 2-Moderate
Combustion Products: Oxides of carbon and smoke. Reactivity 0, 0, 3-Serious
 PPE B, 4-Severe

Protection for Firefighters: Self-contained breathing apparatus or full-face positive pressure airline masks.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Personal precautions: Keep away from heat, sparks and open flame.
 Provide sufficient ventilation, use explosion-proof exhaust ventilation equipment or wear suitable respiratory protective equipment.
 Prevent contact with skin or eyes (see section 8).
Environmental Precautions: Prevent product or liquids contaminated with product from entering sewers, drains, soil or open water course.
Methods for Cleaning up: Clean up with sand or other inert absorbent material. Transfer to a closable steel vessel.
Materials not to be used for clean up: Aluminum or plastic containers

SECTION 7 - HANDLING AND STORAGE

Handling: Avoid breathing of vapor, avoid contact with eyes, skin and clothing.
 Keep away from ignition sources, use only electrically grounded handling equipment and ensure adequate ventilation/fume exhaust hoods.
 Do not eat, drink or smoke while handling.
Storage: Store in ventilated room or shade below 44°C (111°F) and away from direct sunlight.
 Keep away from ignition sources and incompatible materials: caustics, ammonia, inorganic acids, chlorinated compounds, strong oxidizers and isocyanates.
 Follow all precautionary information on container label, product bulletins and solvent cementing literature.

SECTION 8 - PRECAUTIONS TO CONTROL EXPOSURE / PERSONAL PROTECTION

EXPOSURE LIMITS:	Component	ACGIH TLV	ACGIH STEL	OSHA PEL	OSHA STEL:
	Tetrahydrofuran (THF)	50 ppm	100 ppm	200 ppm	
	Methyl Ethyl Ketone (MEK)	200 ppm	300 ppm	200 ppm	
	Cyclohexanone	20 ppm	50 ppm	50 ppm	
	Acetone	500 ppm	750 ppm	1000 ppm	

Engineering Controls: Use local exhaust as needed.

Monitoring: Maintain breathing zone airborne concentrations below exposure limits.

Personal Protective Equipment (PPE):

Eye Protection: Avoid contact with eyes, wear splash-proof chemical goggles, face shield, safety glasses (spectacles) with brow guards and side shields, etc. as may be appropriate for the exposure.

Skin Protection: Prevent contact with the skin as much as possible. Butyl rubber gloves should be used for frequent immersion.
 Use of solvent-resistant gloves or solvent-resistant barrier cream should provide adequate protection when normal adhesive application practices and procedures are used for making structural bonds.

Respiratory Protection: Prevent inhalation of the solvents. Use in a well-ventilated room. Open doors and/or windows to ensure airflow and air changes. Use local exhaust ventilation to remove airborne contaminants from employee breathing zone and to keep contaminants below levels listed above.
 With normal use, the Exposure Limit Value will not usually be reached. When limits approached, use respiratory protection equipment.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Clear, thin liquid	Odor Threshold:	0.88 ppm (Cyclohexanone)
Odor:	Ethereal	Boiling Range:	56°C (133°F) to 156°C (313°F)
pH:	Not Applicable	Evaporation Rate:	> 1.0 (BUAC = 1)
Melting/Freezing Point:	-108.5°C (-163.3°F) Based on first melting component: THF	Flammability:	Category 2
Boiling Point:	56°C (133°F) Based on first boiling component: Acetone	Flammability Limits:	LEL: 1.1% based on Cyclohexanone UEL: 12.8% based on Acetone
Flash Point:	-20°C (-4°F) TCC based on Acetone	Vapor Pressure:	190 mm Hg @ 20°C (68°F) Acetone
Specific Gravity:	0.858 @23°C (73°F)	Vapor Density:	>2.0 (Air = 1)
Solubility:	Solvent portion soluble in water. Resin portion separates out.	Other Data: Viscosity:	Water-thin
Partition Coefficient n-octanol/water:	Not Available		
Auto-ignition Temperature:	321°C (610°F) based on THF		
Decomposition Temperature:	Not Applicable		
VOC Content:	When applied as directed, per SCAQMD Rule 1168, Test Method 316A, VOC content is: ≤ 550 g/l.		

SECTION 10 - STABILITY AND REACTIVITY

Stability:	Stable
Hazardous decomposition products:	None in normal use. When forced to burn, this product gives off oxides of carbon and smoke.
Conditions to avoid:	Keep away from heat, sparks, open flame and other ignition sources.
Incompatible Materials:	Oxidizers, strong acids and bases, amines, ammonia

SECTION 11 - TOXICOLOGICAL INFORMATION

Likely Routes of Exposure: Inhalation, Eye and Skin Contact

Acute symptoms and effects:

Inhalation:	Severe overexposure may result in nausea, dizziness, headache. Can cause drowsiness, irritation of eyes and nasal passages.
Eye Contact:	Vapors slightly uncomfortable. Overexposure may result in severe eye injury with corneal or conjunctival inflammation on contact with the liquid.
Skin Contact:	Liquid contact may remove natural skin oils resulting in skin irritation. Dermatitis may occur with prolonged contact.
Ingestion:	May cause nausea, vomiting, diarrhea and mental sluggishness.

Chronic (long-term) effects: None known to humans

Toxicity:	LD ₅₀	LC ₅₀
Tetrahydrofuran (THF)	Oral: 2842 mg/kg (rat)	Inhalation 3 hrs. 21,000 mg/m ³ (rat)
Methyl Ethyl Ketone (MEK)	Oral: 2737 mg/kg (rat), Dermal: 6480 mg/kg (rabbit)	Inhalation 8 hrs. 23,500 mg/m ³ (rat)
Cyclohexanone	Oral: 1535 mg/kg (rat), Dermal: 948 mg/kg (rabbit)	Inhalation 4 hrs. 8,000 PPM (rat)
Acetone	Oral: 5800 mg/kg (rat)	Inhalation 50,100 mg/m ³ (rat)

Reproductive Effects	Teratogenicity	Mutagenicity	Embryotoxicity	Sensitization to Product	Synergistic Products
Not Established	Not Established	Not Established	Not Established	Not Established	Not Established

SECTION 12 - ECOLOGICAL INFORMATION

Ecotoxicity:	None Known
Mobility:	In normal use, emission of volatile organic compounds (VOC's) to the air takes place, typically at a rate of ≤ 550 g/l.
Degradability:	Biodegradable
Bioaccumulation:	Minimal to none.

SECTION 13 - WASTE DISPOSAL CONSIDERATIONS

Follow local and national regulations. Consult disposal expert.

SECTION 14 - TRANSPORT INFORMATION

Proper Shipping Name:	Flammable Liquid, n.o.s. (Acetone, Tetrahydrofuran)
Hazard Class:	3
Secondary Risk:	None
Identification Number:	UN 1993
Packing Group:	PG II
Label Required:	Class 3 Flammable Liquid
Marine Pollutant:	NO

EXCEPTION for Ground Shipping

DOT Limited Quantity: Up to 1L per inner packaging, 30 kg gross weight per package.
Consumer Commodity: Depending on packaging, these quantities may qualify under DOT as "ORM-D".

TDG INFORMATION

TDG CLASS:	FLAMMABLE LIQUID 3
SHIPPING NAME:	Flammable Liquid, n.o.s. (Acetone, Tetrahydrofuran)
UN NUMBER/PACKING GROUP:	UN 1993, PG II

SECTION 15 - REGULATORY INFORMATION

Precautionary Label Information:	Highly Flammable, Irritant	Ingredient Listings: USA TSCA, Europe EINECS, Canada DSL, Australia AICS, Korea ECL/TCCL, Japan MITI (ENCS)
Symbols:	F, Xi	
Risk Phrases:	R11: Highly flammable. R20: Harmful by inhalation. R36/37: Irritating to eyes and respiratory system.	R66: Repeated exposure may cause skin dryness or cracking R67: Vapors may cause drowsiness and dizziness
Safety Phrases:	S9: Keep container in a well-ventilated place. S16: Keep away from sources of ignition - No smoking. S25: Avoid contact with eyes.	S26: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S33: Take precautionary measures against static discharges. S46: If swallowed, seek medical advise immediately and show this container or label.

SECTION 16 - OTHER INFORMATION

Specification Information:	All ingredients are compliant with the requirements of the European Directive on RoHS (Restriction of Hazardous Substances).	
Department issuing data sheet:	Safety Health & Environmental Affairs	
Training necessary:	Yes, training in practices and procedures contained in product literature.	
Reissue date / reason for reissue:	6/12/2013 / Updated GHS Standard Format	
Intended Use of Product:	Primer for PVC and CPVC Plastic Pipe	

This product is intended for use by skilled individuals at their own risk. The information contained herein is based on data considered accurate based on current state of knowledge and experience. However, no warranty is expressed or implied regarding the accuracy of this data or the results to be obtained from the use thereof.

MATERIAL SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT

Product Name: XYLENE
Product Description: Aromatic Hydrocarbon
MSDS Number: 4562

Intended Use: Chemical feedstock, Solvent

COMPANY IDENTIFICATION

Supplier: IMPERIAL OIL CHEMICALS DIVISION
240 4th Avenue S.W.
CALGARY, ALBERTA. T2P 3M9 Canada
24 Hour Environmental / Health Emergency Telephone 1-866-232-9563
Transportation Emergency Phone Number 1-866-232-9563
Product Technical Information 1-800-663-4109

SECTION 2 COMPOSITION / INFORMATION ON INGREDIENTS

Reportable Hazardous Substance(s) or Complex Substance(s)

Name	CAS#	Concentration*	Acute Toxicity
Mixed Xylenes	1330-20-7	100 %	Oral Lethality: LD50 > 5000 mg/kg (Rat)

Hazardous Constituent(s) Contained in Complex Substance(s)

Name	CAS#	Concentration*	Acute Toxicity
ETHYL BENZENE	100-41-4	10 - 20%	Inhalation Lethality: LC50 17.8 mg/l (Rat); Oral Lethality: LD50 3.5 g/kg (Rat)

* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

SECTION 3 HAZARDS IDENTIFICATION

This material is considered to be hazardous according to regulatory guidelines (see (M)SDS Section 15).

PHYSICAL/CHEMICAL EFFECTS

FLAMMABLE. In use, may form flammable/explosive vapour-air mixture. Material can release vapours that readily form flammable mixtures. Vapour accumulation could flash and/or explode if ignited. Material can accumulate static charges which may cause an ignition.

HEALTH EFFECTS

Irritating to skin. May cause cancer. May cause harm to the unborn child. If swallowed, may be aspirated and cause lung damage. May be irritating to the eyes, nose, throat, and lungs.

Target Organs: Skin |

NFPA Hazard ID: Health: 2 Flammability: 3 Reactivity: 0
HMIS Hazard ID: Health: 2* Flammability: 3 Reactivity: 0

NOTE: This material should not be used for any other purpose than the intended use in Section 1 without expert advice. Health studies have shown that chemical exposure may cause potential human health risks which may vary from person to person.

SECTION 4 FIRST AID MEASURES

INHALATION

Remove from further exposure. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. If respiratory irritation, dizziness, nausea, or unconsciousness occurs, seek immediate medical assistance. If breathing has stopped, assist ventilation with a mechanical device or use mouth-to-mouth resuscitation.

SKIN CONTACT

Wash contact areas with soap and water. Remove contaminated clothing. Launder contaminated clothing before reuse.

EYE CONTACT

Flush thoroughly with water for at least 15 minutes. Get medical assistance.

INGESTION

Seek immediate medical attention. Do not induce vomiting.

NOTE TO PHYSICIAN

If ingested, material may be aspirated into the lungs and cause chemical pneumonitis. Treat appropriately. This light hydrocarbon material, or a component, may be associated with cardiac sensitisation following very high exposures (well above occupational exposure limits) or with concurrent exposure to high stress levels or heart-stimulating substances like epinephrine. Administration of such substances should be avoided.

SECTION 5 FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA

Appropriate Extinguishing Media: Use water fog, foam, dry chemical or carbon dioxide (CO₂) to extinguish flames.

Inappropriate Extinguishing Media: Straight streams of water

FIRE FIGHTING

Fire Fighting Instructions: FLAMMABLE. Evacuate area. If a leak or spill has not ignited, use water spray to disperse the vapours and to protect personnel attempting to stop a leak. Prevent run-off from fire control or dilution from entering streams, sewers or drinking water supply. Fire-fighters should use standard protective equipment and in enclosed spaces, self-contained breathing apparatus (SCBA). Use water spray to cool fire exposed surfaces and to protect personnel.

Unusual Fire Hazards: Hazardous material. Firefighters should consider protective equipment indicated in Section 8.

Hazardous Combustion Products: Smoke, Fume, Incomplete combustion products, Oxides of carbon

FLAMMABILITY PROPERTIES

Flash Point [Method]: >23°C (73°F) [ASTM D-56]

Flammable Limits (Approximate volume % in air): LEL: 0.9 UEL: 7.0

Autoignition Temperature: 432°C (810°F) - 528°C (982°F) [Technical literature]

SECTION 6	ACCIDENTAL RELEASE MEASURES
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NOTIFICATION PROCEDURES

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations.

PROTECTIVE MEASURES

Avoid contact with spilled material. Warn or evacuate occupants in surrounding and downwind areas if required, due to toxicity or flammability of the material. See Section 5 for fire fighting information. See the Hazard Identification Section for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for advice on the minimum requirements for personal protective equipment. Additional protective measures may be necessary, depending on the specific circumstances and/or the expert judgment of the emergency responders.

SPILL MANAGEMENT

Land Spill: Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak if you can do so without risk. All equipment used when handling the product must be grounded. Do not touch or walk through spilled material. Prevent entry into waterways, sewer, basements or confined areas. A vapour-suppressing foam may be used to reduce vapour. Use clean non-sparking tools to collect absorbed material. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. Large Spills: Water spray may reduce vapour, but may not prevent ignition in enclosed spaces. Recover by pumping or with suitable absorbent.

Water Spill: Stop leak if you can do so without risk. Eliminate sources of ignition. Warn other shipping. If the Flash Point exceeds the Ambient Temperature by 10 deg C or more, use containment booms and remove from the surface by skimming or with suitable absorbents when conditions permit. If the Flash Point does not exceed the Ambient Air Temperature by at least 10C, use booms as a barrier to protect shorelines and allow material to evaporate. Seek the advice of a specialist before using dispersants.

Water spill and land spill recommendations are based on the most likely spill scenario for this material; however, geographic conditions, wind, temperature, (and in the case of a water spill) wave and current direction and speed may greatly influence the appropriate action to be taken. For this reason, local experts should be consulted. Note: Local regulations may prescribe or limit action to be taken.

ENVIRONMENTAL PRECAUTIONS

Large Spills: Dyke far ahead of liquid spill for later recovery and disposal. Prevent entry into waterways, sewers, basements or confined areas.

SECTION 7	HANDLING AND STORAGE
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HANDLING

Avoid contact with skin. Avoid contact with eyes. Prevent exposure to ignition sources, for example use non-

sparking tools and explosion-proof equipment. Prevent small spills and leakage to avoid slip hazard. Material can accumulate static charges which may cause an electrical spark (ignition source). Use proper bonding and/or ground procedures. However, bonding and grounds may not eliminate the hazard from static accumulation. Consult local applicable standards for guidance. Additional references include American Petroleum Institute 2003 (Protection Against Ignitions Arising out of Static, Lightning and Stray Currents) or National Fire Protection Agency 77 (Recommended Practice on Static Electricity) or CENELEC CLC/TR 50404 (Electrostatics - Code of practice for the avoidance of hazards due to static electricity).

Loading/Unloading Temperature: [Ambient]

Transport Temperature: [Ambient]

Transport Pressure: [Ambient]

Static Accumulator: This material is a static accumulator. A liquid is typically considered a nonconductive, static accumulator if its conductivity is below 100 pS/m (100x10E-12 Siemens per meter) and is considered a semiconductive, static accumulator if its conductivity is below 10,000 pS/m. Whether a liquid is nonconductive or semiconductive, the precautions are the same. A number of factors, for example liquid temperature, presence of contaminants, anti-static additives and filtration can greatly influence the conductivity of a liquid.

STORAGE

Ample fire water supply should be available. A fixed sprinkler/deluge system is recommended. The container choice, for example storage vessel, may effect static accumulation and dissipation. Keep container closed. Handle containers with care. Open slowly in order to control possible pressure release. Store in a cool, well-ventilated area. Outside or detached storage preferred. Storage containers should be earthed and bonded. Fixed storage containers, transfer containers and associated equipment should be grounded and bonded to prevent accumulation of static charge.

Storage Temperature: [Ambient]

Storage Pressure: [Ambient]

Suitable Containers/Packing: Tankers; Drums; Tank Trucks; Barges; Tank Cars

Suitable Materials and Coatings (Chemical Compatibility): Carbon Steel; Polyester; Stainless Steel; Teflon

Unsuitable Materials and Coatings: Natural Rubber; Butyl Rubber; Ethylene-propylene-diene monomer (EPDM); Polystyrene; Polyethylene; Polypropylene; PVC; Polyvinyl Alcohol; Polyacrylonitrile; Compatibility with plastics will vary

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Substance Name	Form	Limit/Standard			Note	Source
ETHYL BENZENE		TWA	20 ppm			ACGIH
Mixed Xylenes	Vapour.	RCP - TWA	434 mg/m ³	100 ppm	Total Hydrocarbons	Supplier
Mixed Xylenes		STEL	150 ppm			ACGIH
Mixed Xylenes		TWA	100 ppm			ACGIH

NOTE: Limits/standards shown for guidance only. Follow applicable regulations.

ENGINEERING CONTROLS

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Control measures to consider:

Adequate ventilation should be provided so that exposure limits are not exceeded. Use explosion-proof ventilation equipment.

PERSONAL PROTECTION

Personal protective equipment selections vary based on potential exposure conditions such as applications, handling practices, concentration and ventilation. Information on the selection of protective equipment for use with this material, as provided below, is based upon intended, normal usage.

Respiratory Protection: If engineering controls do not maintain airborne contaminant concentrations at a level which is adequate to protect worker health, an approved respirator may be appropriate. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. Types of respirators to be considered for this material include:

Half-face filter respirator

For high airborne concentrations, use an approved supplied-air respirator, operated in positive pressure mode. Supplied air respirators with an escape bottle may be appropriate when oxygen levels are inadequate, gas/vapour warning properties are poor, or if air purifying filter capacity/rating may be exceeded.

Hand Protection: Any specific glove information provided is based on published literature and glove manufacturer data. Glove suitability and breakthrough time will differ depending on the specific use conditions. Contact the glove manufacturer for specific advice on glove selection and breakthrough times for your use conditions. Inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:

Chemical resistant gloves are recommended.

Eye Protection: If contact is likely, safety glasses with side shields are recommended.

Skin and Body Protection: Any specific clothing information provided is based on published literature or manufacturer data. The types of clothing to be considered for this material include:

Chemical/oil resistant clothing is recommended.

Specific Hygiene Measures: Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practise good housekeeping.

ENVIRONMENTAL CONTROLS

Comply with applicable environmental regulations limiting discharge to air, water and soil. Protect the environment by applying appropriate control measures to prevent or limit emissions.

SECTION 9	PHYSICAL AND CHEMICAL PROPERTIES
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Note: Physical and chemical properties are provided for safety, health and environmental considerations only and may not fully represent product specifications. Contact the Supplier for additional information.

GENERAL INFORMATION

Physical State: Liquid

Form: Clear

Colour: Colourless
Odour: Aromatic
Odour Threshold: N/D

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

Relative Density (at 15 °C): 0.869 [Technical literature]
Density (at 15 °C): 870 kg/m³ (7.26 lbs/gal, 0.87 kg/dm³) [ISO 12185]
Flash Point [Method]: >23°C (73°F) [ASTM D-56]
Flammable Limits (Approximate volume % in air): LEL: 0.9 UEL: 7.0
Autoignition Temperature: 432°C (810°F) - 528°C (982°F) [Technical literature]
Boiling Point / Range: 136°C (277°F) - 145°C (292°F) [Technical literature]
Vapour Density (Air = 1): < 1 at 101 kPa [Technical literature]
Vapour Pressure: 0.8 kPa (6 mm Hg) at 20°C [Calculated]
Evaporation Rate (n-butyl acetate = 1): 0.85 [In-house method]
pH: N/D
Log Pow (n-Octanol/Water Partition Coefficient): 3.12 - 3.16 [Technical literature]
Solubility in Water: Negligible
Viscosity: [N/D at 40 °C] | 0.79 cSt (0.79 mm²/sec) at 20°C [ASTM D7042]
Oxidizing Properties: See Hazards Identification Section.

OTHER INFORMATION

Freezing Point: -54°C (-65°F) [Technical literature]
Melting Point: -39°C (-39°F) [Technical literature]
Pour Point: -95°C (-139°F) - 13°C (56°F) [Technical literature]
Molecular Weight: 106 G/MOLE [Calculated]
Hygroscopic: No
Coefficient of Thermal Expansion: 0.00105 V/V/DEG C [Calculated] [In-house method]
Decomposition Temperature: N/D

SECTION 10	STABILITY AND REACTIVITY
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STABILITY: Material is stable under normal conditions.

CONDITIONS TO AVOID: Avoid heat, sparks, open flames and other ignition sources.

MATERIALS TO AVOID: Strong oxidizers

HAZARDOUS DECOMPOSITION PRODUCTS: Material does not decompose at ambient temperatures.

HAZARDOUS POLYMERIZATION: Will not occur.

SECTION 11	TOXICOLOGICAL INFORMATION
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ACUTE TOXICITY

<u>Route of Exposure</u>	<u>Conclusion / Remarks</u>
Inhalation	
Toxicity (Rat): LC50 > 20 mg/l	Minimally Toxic. Based on test data for the material.
Irritation: No end point data for material.	Elevated temperatures or mechanical action may form vapours, mist, or fumes which may be irritating to the eyes, nose, throat, or lungs.
Ingestion	

Toxicity (Rat): LD50 > 3523 mg/kg	Minimally Toxic. Based on test data for the material.
Skin	
Toxicity (Rabbit): LD50 > 4200 mg/kg	Minimally Toxic. Based on test data for the material.
Irritation: Data available.	Irritating to the skin. Based on test data for the material.
Eye	
Irritation: Data available.	Moderately irritating to the eyes. Based on test data for structurally similar materials.

CHRONIC/OTHER EFFECTS

For the product itself:

Vapour concentrations above recommended exposure levels are irritating to the eyes and the respiratory tract, may cause headaches and dizziness, are anaesthetic and may have other central nervous system effects. Small amounts of liquid aspirated into the lungs during ingestion or from vomiting may cause chemical pneumonitis or pulmonary edema. Very high exposure (confined spaces / abuse) to light hydrocarbons may result in abnormal heart rhythm (arrhythmias). Concurrent high stress levels and/or co-exposure to high levels of hydrocarbons (above occupational exposure limits), and to heart-stimulating substances like epinephrine, nasal decongestants, asthma drugs, or cardiovascular drugs may initiate arrhythmias.

Contains:

ETHYLBENZENE: Caused cancer in laboratory animal studies. The relevance of these findings to humans is uncertain.

XYLENES: High exposures to xylenes in some animal studies have been reported to cause health effects on the developing embryo/fetus. These effects were often at levels toxic to the mother. The significance of these findings to humans has not been determined.

CMR Status:

Chemical Name	CAS Number	List Citations
ETHYL BENZENE	100-41-4	3, 4
Mixed Xylenes	1330-20-7	4

--REGULATORY LISTS SEARCHED--

1 = IARC 1
2 = IARC 2A

3 = IARC 2B
4 = ACGIH ALL

5 = ACGIH A1
6 = ACGIH A2

SECTION 12 ECOLOGICAL INFORMATION

The information given is based on data available for the material, the components of the material, and similar materials.

ECOTOXICITY

Material -- Expected to be toxic to aquatic organisms.

Material -- Not expected to demonstrate chronic toxicity to aquatic organisms.

MOBILITY

Material -- Highly volatile, will partition rapidly to air. Not expected to partition to sediment and wastewater solids.

PERSISTENCE AND DEGRADABILITY

Biodegradation:

Material -- Expected to be readily biodegradable.

Hydrolysis:

Material -- Transformation due to hydrolysis not expected to be significant.

Photolysis:

Material -- Transformation due to photolysis not expected to be significant.

Atmospheric Oxidation:

Material -- Expected to degrade rapidly in air

BIOACCUMULATION POTENTIAL

Material -- Potential to bioaccumulate is low.

OTHER ECOLOGICAL INFORMATION

VOC (EPA Method 24): 7.252 lbs/gal

SECTION 13	DISPOSAL CONSIDERATIONS
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Disposal recommendations based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

DISPOSAL RECOMMENDATIONS

Product is suitable for burning in an enclosed controlled burner for fuel value or disposal by supervised incineration at very high temperatures to prevent formation of undesirable combustion products.

REGULATORY DISPOSAL INFORMATION

Empty Container Warning Empty Container Warning (where applicable): Empty containers may contain residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions. Empty drums should be completely drained and safely stored until appropriately reconditioned or disposed. Empty containers should be taken for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. **DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION. THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.**

SECTION 14	TRANSPORT INFORMATION
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LAND (TDG)

Proper Shipping Name: FLAMMABLE LIQUIDS, N.O.S. (Xylenes, Ethylbenzene)
Hazard Class & Division: 3
UN Number: 1993
Packing Group: III
Special Provisions: 16

LAND (DOT)

Proper Shipping Name: FLAMMABLE LIQUIDS, N.O.S. (Xylenes, Ethylbenzene)
Hazard Class & Division: 3
ID Number: 1993
Packing Group: III
Product RQ: 100 LBS - Mixed Xylenes
ERG Number: 128

Label(s): 3
Transport Document Name: UN1993, FLAMMABLE LIQUIDS, N.O.S. (Xylenes, Ethylbenzene), 3, PG III

SEA (IMDG)

Proper Shipping Name: XYLENES
Hazard Class & Division: 3
EMS Number: F-E, S-D
UN Number: 1307
Packing Group: III
Label(s): 3
Transport Document Name: UN1307, XYLENES, 3, PG III, (>23°C c.c.)

AIR (IATA)

Proper Shipping Name: XYLENES
Hazard Class & Division: 3
UN Number: 1307
Packing Group: III
Label(s) / Mark(s): 3
Transport Document Name: UN1307, XYLENES, 3, PG III

SECTION 15	REGULATORY INFORMATION
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WHMIS Classification: Class B, Division 2: Flammable Liquids Class D, Division 2, Subdivision A: Very Toxic Material Class D, Division 2, Subdivision B: Toxic Material

This product has been classified in accordance with hazard criteria of the Controlled Products Regulations and the (M)SDS contains all the information required by the Controlled Products Regulations.

CEPA: All components of this material are either on the Canadian Domestic Substances List (DSL), exempt, or have been notified under CEPA.

Complies with the following national/regional chemical inventory requirements: AICS, DSL, ENCS, IECSC, KECI, PICCS, TSCA

The Following Ingredients are Cited on the Lists Below:

Chemical Name	CAS Number	List Citations
ETHYL BENZENE	100-41-4	6
Mixed Xylenes	1330-20-7	6

--REGULATORY LISTS SEARCHED--

1 = TSCA 4	3 = TSCA 5e	5 = TSCA 12b
2 = TSCA 5a2	4 = TSCA 6	6 = NPRI

SECTION 16	OTHER INFORMATION
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N/D = Not determined, N/A = Not applicable

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:

Revision Changes:

Section 06: Protective Measures was modified.
Section 09: Boiling Point C(F) was modified.
Section 09: Pour Point C(F) was modified.
Section 09: Density - Header was modified.
Section 09: Density kg/m³(lbs/gal) was modified.
Section 08: Comply with applicable regulations phrase was modified.
Section 09: Vapour Pressure was modified.
Section 11: Inhalation Irritation Test Data was modified.
Section 09: Relative Density - Header was modified.
Section 09: Flash Point C(F) was modified.
Section 09: Autoignition Temperature was modified.
Section 09 Viscosity was modified.
Section 09 Viscosity was modified.
Section 14: Transport Document Name was modified.
Section 15: National Chemical Inventory Listing was modified.
Section 11: Additional Health Information was modified.
Section 16: MSN, MAT ID was modified.
Section 09: Freezing Point °C(°F) was modified.
Section 09: Melting Point C(F) was modified.
Composition: Component table was modified.
Composition: Component table was modified.
Section 08: Exposure Limits Table was modified.
Section 15: Canadian List Citations Table was modified.
Section 01: Company Contact Methods Sorted by Priority was modified.
Section 11: Tox List Cited Table was modified.
Section 16: CA Contains was added.
Section 16: CA Contains - Header was added.

PRECAUTIONARY LABEL TEXT:

Contains: Mixed Xylenes

WHMIS Classification: Class B, Division 2: Flammable Liquids Class D, Division 2, Subdivision A: Very Toxic Material
Class D, Division 2, Subdivision B: Toxic Material

HEALTH HAZARDS

Irritating to skin. May cause cancer. May cause harm to the unborn child. If swallowed, may be aspirated and cause lung damage.

Target Organs: Skin |

PHYSICAL HAZARDS

In use, may form flammable/explosive vapour-air mixture. Material can accumulate static charges which may cause an ignition. **FLAMMABLE.**

PRECAUTIONS

Avoid contact with skin. Avoid contact with eyes. Prevent exposure to ignition sources, for example use non-sparking tools and explosion-proof equipment. Use proper bonding and/or earthing procedures. However, bonding and earthing may not eliminate the hazard from static accumulation.

FIRST AID

Eye: Flush thoroughly with water for at least 15 minutes. Get medical assistance.

Oral: Seek immediate medical attention. Do not induce vomiting.

Skin: Wash contact areas with soap and water. Remove contaminated clothing. Launder contaminated clothing before reuse.

FIRE FIGHTING MEDIA

Use water fog, foam, dry chemical or carbon dioxide (CO₂) to extinguish flames.

SPILL/LEAK

Land Spill: Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak if you can do so without risk. Prevent entry into waterways, sewer, basements or confined areas. A vapour-suppressing foam may be used to reduce vapour. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers.

Water Spill: Stop leak if you can do so without risk. Eliminate sources of ignition. Warn other shipping. Report spills as required to appropriate authorities. If the Flash Point exceeds the Ambient Temperature by 10 deg C or more, use containment booms and remove from the surface by skimming or with suitable absorbents when conditions permit. If the Flash Point does not exceed the Ambient Air Temperature by at least 10C, use booms as a barrier to protect shorelines and allow material to evaporate. Seek the advice of a specialist before using dispersants.

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Prepared by: Imperial Oil Limited, Solvents

ZINC METAL MATERIAL SAFETY DATA SHEET

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product Identity: Zinc Metal

NOTE: In the form in which it is sold this product is not regulated. This MSDS is provided for information purposes only.

Manufacturer:

Teck Metals Ltd.
Trail Operations
Trail, British Columbia
V1R 4L8
Emergency Telephone: 250-364-4214

Supplier:

Teck Metals Ltd.
#1700 – 11 King Street West
Toronto, Ontario
M5H 4C7

MSDS Preparer:

Teck Metals Ltd.
Suite 3300 – 550 Burrard Street
Vancouver, British Columbia
V6C 0B3

Date of Last Review: January 23, 2013.

Date of Last Edit: January 23, 2013.

Product Use: Zinc metal is used to coat steel for corrosion protection (galvanizing, electroplating, electrogalvanizing), as an alloying element in bronze, brass, aluminum and other metal alloys, for zinc die casting alloys, for zinc dry cell and zinc/air batteries, for the production of zinc sheet for architectural and coinage applications, as a reducing agent in organic chemistry and for other chemical applications.

SECTION 2. COMPOSITION / INFORMATION ON INGREDIENTS

Ingredient	Approximate Percent by Weight	CAS Number	Occupational Exposure Limits (OELs)	LD ₅₀ / LC ₅₀ Species and Route
Zinc	99+%	7440-66-6	OSHA PEL None established ACGIH TLV None established NIOSH REL None established	LD ₅₀ , mouse, oral >5,000 mg/kg

NOTE: OELs for individual jurisdictions may differ from OSHA PELs. Check with local authorities for the applicable OELs in your jurisdiction. OSHA - Occupational Safety and Health Administration. ACGIH - American Conference of Governmental Industrial Hygienists. NIOSH - National Institute for Occupational Safety and Health. OEL – Occupational Exposure Limit. PEL – Permissible Exposure Limit. TLV – Threshold Limit Value. REL – Recommended Exposure Limit.

NOTE: While there is no established OEL for zinc as such, there are OELs for zinc oxide which may be formed during burning, welding or other fuming processes.

The OSHA PEL final rule limits for zinc oxide dust are 10 mg/m³ (total) and 5 mg/m³ (respirable); the OSHA PEL final rule limit for zinc oxide fume is 5 mg/m³. Note that the OSHA PEL final rule limits are currently non-enforceable due to a court decision. The OSHA PEL transitional limits therefore remain in force at present. They are 15 mg/m³ (total) and 5 mg/m³ (respirable) while the transitional PEL for zinc oxide fume is 5 mg/m³. The ACGIH TLV for zinc oxide is 2 mg/m³ (respirable fraction) with a Short Term Exposure Limit (STEL) of 10 mg/m³ (respirable fraction). The NIOSH REL for zinc oxide (dust or fume) is 5 mg/m³ 10 hr TWA with a 15 mg/m³ ceiling limit (15 minute sample) for zinc oxide dust and a 10 mg/m³ STEL for zinc oxide fume (15 minute sample).

Trade Names and Synonyms: High Grade Zinc; Special High Grade Zinc; Zinc, Zn.

SECTION 3. HAZARDS IDENTIFICATION

Emergency Overview: A lustrous bluish-silver metal that does not burn in bulk but may form explosive mixtures if dispersed in air as a fine powder. Zinc oxide fume is formed when zinc metal is heated to or near the boiling point, or is burned. Contact with acids or alkalis generates flammable hydrogen gas which can accumulate in poorly ventilated areas. Do NOT use water or foam on burning zinc metal. Apply dry chemical, sand or special powder extinguishing media. Zinc is relatively non-toxic and poses little immediate hazard to the health of emergency response personnel or the environment in an emergency situation.

Potential Health Effects: Zinc is essentially non-toxic to humans. However, zinc oxide fumes may cause mild local irritation to eyes, nose, throat and upper airways. Acute over-exposure to zinc oxide fume may cause metal fume fever, characterized by flu-like symptoms such as chills, fever, nausea, and vomiting which may be delayed 3 – 10 hours in onset. In most cases, dermal exposure to zinc or zinc compounds does not result in any noticeable toxic effects. Zinc is not listed as a carcinogen by OSHA, NTP, IARC, ACGIH or the EU (See Toxicological Information, Section 11).

Potential Environmental Effects: Zinc metal has relatively low bioavailability and poses no immediate ecological risks. Depending on physico-chemical characteristics (e.g., pH, water hardness), compounds of zinc metal can be toxic, particularly in the aquatic environment. Zinc also has the potential to bioaccumulate in plants and animals in both aquatic and terrestrial environments (see Ecological Information, Section 12).

EU GHS CLP Classification: Zinc metal is not classified.

SECTION 4. FIRST AID MEASURES

Eye Contact: Do not allow victim to rub eye(s). Let the eye(s) water naturally for a few minutes. If particle/dust does not dislodge, flush with lukewarm, gently flowing water for 5 minutes or until particle/dust is removed, while holding eyelid(s) open. If irritation persists, obtain medical attention. DO NOT attempt to manually remove anything stuck to the eye.

Skin Contact: No health effects expected. If irritation does occur, flush with lukewarm, gently flowing water for 5 minutes. If irritation persists, obtain medical advice. *Molten Metal:* Flush contact area to solidify and cool but do not attempt to remove encrusted material or clothing. Cover burns and seek medical attention immediately.

Inhalation: If symptoms are experienced remove source of contamination or move victim from exposure area to fresh air immediately and obtain medical advice. NOTE: Metal fume fever may develop 3-10 hours after exposure to zinc oxide fumes. If symptoms of metal fume fever (flu-like symptoms) develop, obtain medical attention.

Ingestion: If swallowed, no specific intervention is indicated as this material is not likely to be hazardous by ingestion. However, if irritation or discomfort occurs, obtain medical advice.

SECTION 5. FIRE FIGHTING MEASURES

Fire and Explosion Hazards: Massive metal is difficult to ignite and is not considered a serious fire hazard. However, finely-divided metallic dust may form flammable or explosive dust clouds when dispersed in the air at high concentrations and exposed to heat, flame, or other ignition sources. Bulk dust in a damp state may heat spontaneously and ignite on exposure to air. Contact with acids and alkali hydroxides results in evolution of hydrogen gas which is potentially explosive. Mixtures with potassium chlorate or fused ammonium nitrate may explode on impact.

Extinguishing Media: Apply dry chemical, dry sand, or special powder extinguishing (Class D) media. Do NOT use water, carbon dioxide or foam on molten metals. Water may be ineffective for extinguishing a fire but should be used to keep fire-exposed billets, ingots and castings cool.

Fire Fighting: If possible, move material not yet involved in the fire from the fire area. If this is not possible, cool fire-exposed zinc by applying hose streams or fogs. Apply only dry chemical, sand, or special powder extinguishing media to any molten or burning zinc metal. Take extreme caution to prevent contact of water with molten or burning zinc. Zinc foil in particular may ignite in the presence of water. Zinc oxide fumes may evolve in fires. Fire fighters should be fully trained and wear full protective clothing including an approved, self-contained breathing apparatus which supplies a positive air pressure within a full face-piece mask.

Flashpoint and Method: Not Applicable.

Upper and Lower Flammable Limit: Lower Flammable Limit (Zinc Dust): 500 g/m³; Upper Flammable Limit: Not Applicable.

Autoignition Temperature: Approximately 680°C (dust cloud in air), 460°C (dust layer).

SECTION 6. ACCIDENTAL RELEASE MEASURES

Procedures for Cleanup: Control source of release if possible to do so safely. Clean up spilled material immediately observing precautions in Section 8, Personal Protection. Molten metal should be allowed to cool and harden before cleanup. Once solidified wear gloves, pick up and return to process. Powder or dust should be cleaned up by sweeping/shoveling, etc. Solid metal is recyclable. Return uncontaminated spilled material to the process if possible. Place contaminated material in clean, dry, suitably labelled containers for later recovery or disposal. Treat or dispose of waste material in accordance with all local, state/provincial, and national requirements.

Personal Precautions: Protective clothing, gloves, and a respirator are recommended for persons responding to an accidental release (see also Section 8). Close-fitting safety goggles may be necessary in some circumstances to prevent eye contact with zinc dust and fume. Where molten metal is involved, wear heat-resistant gloves and suitable clothing for protection from hot-metal splash.

Environmental Precautions: Zinc metal has relatively low bioavailability and poses no immediate ecological risks. Depending on physico-chemical characteristics (e.g., pH, water hardness), compounds of zinc metal can be toxic, particularly in the aquatic environment. Zinc also has the potential to bioaccumulate in plants and animals in both aquatic and terrestrial environments. Releases of the product to water and soil should be prevented.

SECTION 7. HANDLING AND STORAGE

Store zinc in a DRY covered area, separate from incompatible materials. Zinc ingots suspected of containing moisture should be THOROUGHLY DRIED before being added to a molten bath. Ingots may contain cavities that collect moisture. Entrained moisture will expand explosively when immersed in a molten bath. Always practice good personal hygiene. Refrain from eating, drinking, or smoking in work areas. Thoroughly wash hands before eating, drinking, or smoking in appropriate designated areas. No special packaging materials are required.

EU GHS CLP Precautionary Statements: Zinc metal is not classified.

SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Protective Clothing: Gloves and coveralls, shop coat or other work clothing are recommended to prevent prolonged or repeated direct skin contact when zinc is processed. Eye protection should be worn where fume or dust is generated. Respiratory protection may be required where zinc oxide fume is generated. Where hot or molten metal is handled, heat-resistant gloves, face shield, and clothing to protect from hot metal splash should be worn. Safety type boots are recommended.

Ventilation: Use adequate local or general ventilation to maintain the concentration of zinc oxide fumes in the working environment well below recommended occupational exposure limits. Supply sufficient replacement air to make up for air removed by the exhaust system. Where metallic particles of zinc are being collected and transported by a ventilation system, use a non-sparking, grounded ventilation system separate from other exhaust ventilation systems. Locate dust collectors and fans outdoors if possible and provide dust collectors with explosion vents or blow out panels. Refer to appropriate NFPA Standards 484, 654, and/or 68 for specific guidance.

Respirators: Where zinc oxide dust or fumes are generated and cannot be controlled to within acceptable levels, use appropriate NIOSH-approved respiratory protection equipment (a 42CFR84 Class N, R or P-95 particulate filter cartridge).

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Bluish-silver lustrous metal	Odour: None	Physical State: Solid	pH: Not Applicable
Vapour Pressure: 1 mm at 487°C Negligible at 20°C	Vapour Density: Not Applicable	Boiling Point/Range: 908° C	Melting Point/Range: 420° C
Specific Gravity: 7.1	Evaporation Rate: Not Applicable	Coefficient of Water/Oil Distribution: Log P (oct) = -0.47 (estimated)	Odour Threshold: None
Solubility: Insoluble in Water			

SECTION 10. STABILITY AND REACTIVITY

Stability & Reactivity: Massive metal is stable and not considered reactive under normal temperatures and pressures. Hazardous polymerization or runaway reactions will not occur. Zinc metal slowly becomes covered with a white coating of a hydrated basic zinc carbonate on exposure to moist air. Fine, condensed zinc dust or powder may heat spontaneously and ignite on exposure to air when damp. Zinc metal will react with acids and strong alkalis to generate hydrogen gas. A violent, explosive reaction may occur when powdered zinc is heated with sulphur. Powdered zinc will become incandescent or ignite in the presence of fluorine, chlorine, bromine or interhalogens (e.g., chlorine trifluoride). Powdered zinc can also react explosively with halogenated hydrocarbons if heated. Mixtures with potassium chlorate or fused ammonium nitrate may explode on impact.

Incompatibilities: Contact with acids and alkalis will generate highly flammable hydrogen gas. Contact with acidic solutions of arsenic and antimony compounds may evolve highly toxic ARSINE or STIBINE gas. Incompatible with strong oxidizing agents such as chlorine, fluorine, bromine, sodium, potassium or barium peroxide, sodium or potassium chlorate, chromium trioxide and fused ammonium nitrate. Also incompatible with elemental sulphur dust, halogenated hydrocarbons or chlorinated solvents, chlorinated rubber, and ammonium sulphide or calcium disulphide.

Hazardous Decomposition Products: High temperature operations such as oxy-acetylene cutting, electric arc welding or overheating a molten bath will generate zinc oxide fume which, on inhalation in sufficient quantity, can produce metal fume fever, a transient influenza-like illness.

SECTION 11. TOXICOLOGICAL INFORMATION

General: Zinc, especially in the metal form, is relatively non-toxic. However, it can react with other materials, such as oxygen or acids, to form compounds that can be potentially toxic. The primary route of exposure would be through the generation and inhalation of zinc oxide fume.

Acute:

Skin/Eye: In most cases, dermal exposure to zinc or zinc compounds does not result in any noticeable toxic effects. Zinc metal is not chemically irritating to the eyes.

Inhalation: If excessive quantities of zinc oxide fume are inhaled, it can result in the condition called metal fume fever. The symptoms of metal fume fever will occur within 3 to 10 hours, and include immediate dryness and irritation of the throat, tightness of the chest and coughing, which may later be followed by flu-like symptoms of fever, malaise, perspiration, frontal headache, muscle cramps, low back pain, occasionally blurred vision, nausea, and vomiting. The symptoms are temporary and generally disappear, without medical intervention, within 24 to 48 hours of onset. There are no recognized complications, after effects, or chronic effects that result from this condition.

Ingestion: Zinc is not expected to be harmful if ingested. When ingested in excessive quantities, zinc can irritate the stomach resulting in nausea, vomiting, abdominal pain and diarrhea. Ingestion is not a typical route of occupational exposure.

Chronic: There is no chronic form of metal fume fever but in rare instances an acute incident may be followed by complaints such as bronchitis or pneumonia. Some workers may develop a short-term immunity (resistance) so that repeated exposure to zinc oxide fumes does not cause metal fume fever. This immunity (resistance) however is quickly lost after short absences from work (weekends or vacations). Workers exposed to finely-divided metallic zinc for up to 35 years revealed no acute or chronic illnesses attributable to zinc. Prolonged or repeated skin contact with zinc dust or powder may cause dryness, irritation and cracking (dermatitis) since zinc is astringent and may tend to draw moisture from the skin. Zinc is not listed as a human carcinogen by the Occupational Safety and Health Administration (OSHA), the National Toxicology Program (NTP), the International Agency for Research on Cancer (IARC), the American Conference of Governmental Industrial Hygienists (ACGIH) or the European Union (EU).

SECTION 12. ECOLOGICAL INFORMATION

Zinc metal is relatively insoluble; however, processing of the product or extended exposure in aquatic and terrestrial environments may lead to the release of zinc compounds in bioavailable forms. Zinc is highly mobile, and can be toxic in the aquatic environment with water hardness, pH and dissolved organic carbon content being major regulating factors. Zinc also has the potential to bioaccumulate in plants and animals in both aquatic and terrestrial environments. In soils, zinc is moderately mobile in accordance with soil properties (e.g., cation exchange capacity, pH, redox potential, chemical species); these properties also influence its bioavailability to terrestrial plants.

SECTION 13. DISPOSAL CONSIDERATIONS

If material cannot be returned to process or salvage, dispose of in accordance with applicable regulations.

SECTION 14. TRANSPORT INFORMATION

PROPER SHIPPING NAME Not applicable – not regulated.
U.S. DOT AND TRANSPORT CANADA HAZARD CLASSIFICATION Not applicable
U.S. DOT AND TRANSPORT CANADA PID Not applicable
MARINE POLLUTANT No
IMO CLASSIFICATION Not regulated

SECTION 15. REGULATORY INFORMATION

U.S.
INGREDIENT LISTED ON TSCA INVENTORY Yes

HAZARDOUS UNDER HAZARD COMMUNICATION STANDARDNo

CERCLA SECTION 103 HAZARDOUS SUBSTANCES.....Zinc YesRQ: 1,000 lb. (454 kg.)*
* reporting not required when diameter of the pieces of solid metal released is equal to or exceeds 100 micrometers (0.004 inches).

EPCRA SECTION 302 EXTREMELY HAZARDOUS SUBSTANCE No

EPCRA SECTION 311/312 HAZARD CATEGORIES No Hazard Categories Apply

EPCRA SECTION 313 Toxic Release Inventory: This product does not contain any toxic chemicals subject to the Toxic Release reporting requirements. However, potential by-products from working with this product - "Zinc (Fume or Dust)" CAS 7440-66-6 are reportable.

CANADIAN:

INGREDIENTS LISTED ON DOMESTIC SUBSTANCES LIST Yes

WHMIS CLASSIFICATION: Not applicable. Zinc is not a Controlled Product under CPR.

EUROPEAN UNION:

LISTED ON THE EUROPEAN INVENTORY OF EXISTING

COMMERCIAL CHEMICAL SUBSTANCES (EINECS) Yes

EU GHS CLP CLASSIFICATION: Zinc metal is not classified.

SECTION 16. OTHER INFORMATION

The information in this Material Safety Data Sheet is based on the following references:

- American Conference of Governmental Industrial Hygienists, 2004, Documentation of the Threshold Limit Values and Biological Exposure Indices, 7th Edition plus updates.
- American Conference of Governmental Industrial Hygienists, 2012, Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices.
- American Conference of Governmental Industrial Hygienists, 2012, Guide to Occupational Exposure Values.
- Bretherick's Handbook of Reactive Chemical Hazards, 20th Anniversary Edition (P. G. Urban, Ed), 1995.
- Canadian Centre for Occupational Health and Safety (CCOHS) Hamilton, ON, CHEMINFO Record No. 239 – Zinc Metal.
- European Economic Community, Commission Directives 91/155/EEC and 67/548/EEC.
- Industry Canada, SOR/88-66, Controlled Products Regulations, as amended.
- International Agency for Research on Cancer (IARC), Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man, 1972 – present, (multi-volume work), World Health Organization, Geneva.
- Merck & Co., Inc., 2001, The Merck Index, An Encyclopedia of Chemicals, Drugs, and Biologicals, 13th Edition.
- National Library of Medicine, National Toxicology Information Program, Hazardous Substance Data Bank (on-line version).
- Oak Ridge National Laboratory, Oak Ridge, Tennessee – Toxicity Summary for Zinc and Zinc Compounds, April 1992.
- Patty's Toxicology, 5th Edition, 2001 E. Bingham, B. Cohrssen & CH Powell (Eds.).
- U.S. Dept. of Health and Human Services, National Institute of Environmental Health Sciences, National Toxicology Program (NTP), 12th Report on Carcinogens, June 2011.
- U.S. Dept. of Health and Human Services, National Institute for Occupational Safety and Health, NIOSH Pocket Guide to Chemical Hazards (on-line edition).
- U.S. Dept. of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry, Toxicological Profile for Zinc - August 2005.
- U.S. Dept. of Health and Human Services, National Institute for Occupational Safety and Health, Registry of Toxic Effects of Chemical Substances (RTECS), CCOHS on-line version.
- U.S. Occupational Safety and Health Administration, 1989, Code of Federal Regulations, Title 29, Part 1910.

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