

Plumbing MSDS

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Crown 7008 Brite Galvanize Coating 65% Zinc Rich



Canadian Material Safety Data Sheet



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	Specific Gravity: 0.8	Evaporation Rate: Faster than n-Butyl Acetate
Boiling Point: N / AP	Freezing Point: N / AV	Vapor Density (air = 1): Heavier than air
Vapor Pressure (psig): 45 to 55	Odor and Appearance: Hydrocar	bon odor / Metallic gray liquid

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)</th>
 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):

Carcinogenicity: The ingredients a Reproductive Toxicity: N / AV		Mutagenicity: N / AV	Synergistic Products: N / A
Sensitization: N / AV	are not listed on a human sarai		
	i y naon		
Irritancy: Skin, eyes, and respirato	rv tract.		
Isobutane	N / AV - ACGIH 2005		
Aliphatic Petroleum Distillates	N / AV - ACGIH 2005		
n-Butane	800 ppm TWA - ACGIH	2005	
n-Butyl Acetate	150 ppm TWA and 200	ppm STEL - ACGIH 2005	
Zinc	N / AV - ACGIH 2001		
Propane	2500 ppm TWA - ACGI	H 2005	
Acetone	500 ppm TWA and 750 p	om STEL - ACGIH 2005	

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

CE7008MA

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.

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	1650 mg/kg	18000 ppm 4 hours
	200 ppm	Oral (Rat)	Inhalation (Rat)
ACETONE			
15 - 40	67-64-1	9750 mg/kg	16000 ppm 4 hours
	750 ppm	Oral (Rat)	Inhalation (Rat)
METHYL ETHYL KETONE	1		
15 - 40	78-93-3	2737 mg/kg	23500 mg/m3 8 Hours
	200 ppm	Oral (Rat)	Inhalation (Rat)

SECTION 03: HAZARDS IDENTIFICATION

ROUTE OF ENTRY:
SKIN CONTACTCan cause moderate skin irritation,
defatting and dermatitis.
SKIN ABSORPTIONTetrahydrofuran can be absorbed through
the skin resulting in toxic effects.
INHALATIONAs described below.
INHALATION CHRONICCan cause damage to the respiratory
system. Can cause headache, dizziness and nausea.
INGESTIONCan cause gastro-intestinal irritation,
nausea, vomiting and diarrhea.
EYE CONTACTCauses eye burns. Severe irritation,
redness, watering and blurred vision.
EFFECTS OF ACUTE EXPOSURERefer to "ROUTE ENTRY" section.
EFFECTS OF CHRONIC EXPOSUREMay 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.

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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

FLAMMABILITYFlammable. UNDER WHAT CONDITIONSExtremely 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 PROCEDURESA 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)
AUTO IGNITION TEMPERATURE321°C.
UPPER FLAMMABLE LIMIT (% VOL)12.50.
LOWER FLAMMABLE LIMIT (% VOL)11.60.
EXTINGUISHING MEDIAAlcohol foam, CO2 or dry chemical.
HAZARDOUS COMBUSTION PRODUCTSOxides of Carbon (CO and CO2). Hydrogen Chloride.
SENSITIVITY TO MECHANICALUnknown. IMPACT
SENSITIVITY TO STATICMay 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.

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SECTION 08: EXPOSURE CONTROLS / PERSONAL PROTECTION

PROTECTIVE EQUIPMENT:-----

EYE/TYPESafely goggles.
RESPIRATORY/TYPEIf 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/ TYPEWear impervious gloves (Neoprene or Rubber).
CLOTHING/TYPENot available.
FOOTWEAR/TYPESafety boots as specified in workplace regulations.
OTHER/TYPEEye bath and safety shower.
VENTILATION REQUIREMENTSNatural or mechanical (Explosion Proof)
ventilation to keep vapour levels well
below the TLV.

SECTION 09: PHYSICAL AND CHEMICAL PROPERTIES

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PHYSICAL STATELiquid.	
ODOURStrong solvent odour	r.
SPECIFIC GRAVITY0.84 - 0.88.	
ODOUR THRESHOLD (ppm)25 ppm.	
VAPOUR PRESSURE145 mmHg @ 20°C.	
VAPOUR DENSITY (AIR=1)2.50.	
EVAPORATION RATE6.00 (NBUAC = 1).	
BOILING POINT (deg C)65°C.	
pHNot available.	
SOLUBILITY IN WATER (% W/W)Slightly.	
COEFFICIENT OF WATER\OILNot 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 MATERIAL50 Et) ppm for Toluene.200 ppm for Methyl hyl Ketone.200 ppm for Tetrahydrofuran.
IRRITANCY OF MATERIALII	rritant upon prolonged exposure. Eye rritant.
SENSITIZING CAPABILITY OFNo	ot available.
MATERIAL	
CARCINOGENICITY OF MATERIALNo	ot available.
	o information is available and no adverse pratogenicity effects are anticipated.
	o information is available and no adverse atagenicity effects are anticipated.
REPRODUCTIVE EFFECTSNo	ot available.
SYNERGISTIC MATERIALSNo	ot available.

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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 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) 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) 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.

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Preparation Date : May.13.2014





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 Solder Product Use: see Section 3 Formula: Solder Synonyms: Firm Name & Oatey Company 4700 West 160th Street, Cleveland, Ohio 44135 Address: www.oatey.com (216) 267-7100 Firm Phone No: For Emergency First Aid call 1-877-740-5015. For chemical transportation Emergency Phone Nos.: emergencies ONLY, call Chemtrec at 1-800-424-9300. Outside the U.S. 1-703-527-3887. Technical Department Prepared by: 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				
INGREDIENTS:	%wt∕wt :	CAS NUMBER:	ACGIH TLV TWA:	OSHA PEL TWA
Tin	60 - 100%	7440-31-5	2 mg/m3	2 mg/m3
Antimony	3 - 7%	7440-36-0	0.5 mg/m3	0.5 mg/m3
For 95/5 acid core				
INGREDIENTS:	%wt∕wt :	CAS NUMBER:	ACGIH TLV TWA:	OSHA PEL TWA
Tin	60 - 100%	7440-31-5	2 mg/m3	2 mg/m3
Antimony	3 - 7%	7440-36-0	0.5 mg/m3	0.5 mg/m3
Acid Flux	0.1 - 1%	Unknown	None Established	None Established
For 95/5 rosin core				
INGREDIENTS:	%wt∕wt :	CAS NUMBER:	ACGIH TLV TWA:	OSHA PEL TWA
Tin	60 - 100%	7440-31-5	2 mg/m3	2 mg/m3
Antimony	3 - 7%	7440-36-0	0.5 mg/m3	0.5 mg/m3
Rosin Flux	0.1 - 1%	Unknown	None Established	None Established

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 / Not applicable

Flammability: LEL = Not applicable, UEL = Not applicable
Extinguishing Use appropriate means of extinguishing surrounding fire.

Special Fire Not applicable

Procedure: Unusual Fire None known

Method:

Media:

Fighting

Hazards:

And Explosion

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

Section 6 ACCIDENTAL RELEASE MEASURES

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

Section 7 HANDLING AND STORAGE

None

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:

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 For operations where the TLV may be exceeded, a NIOSH approved organic vapor Protection: 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 Wear gloves and long sleeves to avoid direct contact with skin. Protection:

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

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: Reproductive Toxicity:	None of the components have been found to be mutagenic. None of the components are known to cause adverse reproductive effects.
Medical	Persons with pre-existing skin, lung, kidney or liver disorders may be at
Conditions Aggravated By Exposure:	increased risk from exposure to the fumes of this product.

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 None Number: EPA Hazardous Waste None ID Number: EPA Hazard Waste None. Number:

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 Acute and chronic health hazards. Section 311/312:

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

Chemical	CAS #	% wt
Antimony	7440-36-0	3 - 78

CERCLA 103 This product contains no chemicals subject to CERCLA reporting. Reportable Quantity: California This product does not contain any chemicals subject to California Proposition 65: Proposition 65 regulations. TSCA Inventory All of the components of this product are listed on the TSCA inventory. Canadian WHIMS Class D, Division 2, Subdivision B.

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

Disclaimer:

NFPA and HMIS:

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: tmpl-so-el

SECTION: 1

MANUFACTURER:

PRODUCT IDENTIFICATION

Strike First Corporation c/o Steel Fire Equipment 150 Superior Blvd. Mississuaga, ON

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

EMERGENCY PHONE:

Phone: 1-905-564-1500

L5T 2L2

Canutec: 1-613-996-6666

SECTION: 2

HAZARDOUS INGREDIENTS

		%	*ACGIH			*OSHA		
		mg/m3				mg/m3		OTHER
CHEMICAL NAME	CAS #	W/W	TLV	STEL	PEL	STEL	IDLH	
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 particulars, not otherwise classified = 10; OSHA PEL for particulars not otherwise

regulated, Total dust =15 Respirable fraction 5.

NE = Not established

SECTION :3

PHYSICAL DATA

BOILING POINT VAPOR PRESSURE VAPOR DENSITY SOLUBILITY IN WATER SPECIFIC GRAVITY PERCENT VOLATILE BY VOLUME **EVAPORATION RATE** pH: (10% solution) **APPEARANCE &** COLOR

Not applicable Not applicable Not applicable Not soluble. Water repellent coating. Approximately 0.88 Not applicable

Not applicable Approximately 9-10 This material is a finely divided yellow powder.

SECTION: 4	FIRE AND EXPLOSION DATA	
	FLASH POINT FLAMMABLE LIMITS	Not applicable 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 OVEREXPOSUR Acute	RE 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.

SECTION: 5	EMERGENCY FIRST-AID PRO	DCEDURES
	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 INCOMPATIBILITY	Stable Strong acids. Reacts violently with lithium.
	HAZARDOUS DECOMPOSITION PRODUCT	Carbon monoxide and carbon dioxide
	HAZARDOUS POLYMERIZATION	Will not occur
SECTION: 7	TION: 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.

SECTION: 8	SPECIAL PROTECTION IN	IFORMATION		
	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 OTHER PROTECTIVE EQUIPMENT:	Safety glasses. Use body protection appropriate for task.		
SECTION: 9	SPECIAL PRECAUTIONS			
	All employees who handle the safety. Avoid breathing dust	PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE All employees who handle this material should be trained to handle it safety. Avoid breathing dusts generated by this product. Avoid getting chemicals ON YOU or IN YOU.		

OTHER PRECAUTIONS:

SECTION: 10 TRANSPORTATION

Hazard Class or Division:

Fire Extinguisher,

None

Class 2.2 UN 1044

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 Farenheit 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 hamful. 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.

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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

MANUFACTURERS	LUYTER COMPANY LTD.
3	75 Steelcase Road East
М	larkham, Ontario L3R 1G3
C	anada
Т	el (905) 475-6011
PRODUCT NAMEA	BS 55Y-LV (Solvent Cement).
PRODUCT USESF	or welding plastic pipes and fittings.
CHEMICAL FAMILYA	crylonitrile-Butadiene Styrene.

SECTION 02: COMPOSITION / INFORMATION ON INGREDIENTS

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

SECTION 03: HAZARDS IDENTIFICATION

ROUTE OF ENTRY:
SKIN CONTACTCan cause moderate skin irritation,
defatting and dermatitis.
SKIN ABSORPTIONNot applicable.
INHALATIONAs described below.
INHALATION CHRONICBreathing of high vapour concentrations could cause dizziness, headache or even unconsciousness .May be anesthetic which could result in other central nervous system effects.
INGESTIONCan 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 CONTACTContains 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 EXPOSUREMay cause damage to the central nervous system. Prolonged or repeated skin contact may cause drying or cracking of the skin.

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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.
	-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

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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/TYPESafety glasses.
RESPIRATORY/TYPENone required for normal use if adequate ventilation is maintained. Use NIOSH/MSHA approved respirator if the TLV is exceeded.
GLOVES/ TYPEWear impervious gloves (Neoprene or Rubber).
CLOTHING/TYPENot applicable.
FOOTWEAR/TYPENot applicable.
OTHER/TYPEEye bath and safety shower.
VENTILATION REQUIREMENTSNatural or mechanical (Explosion Proof) ventilation to keep vapour levels well below the TLV.

SECTION 09: PHYSICAL AND CHEMICAL PROPERTIES

ODOURAromatic Solvent odour. SPECIFIC GRAVITY0.86 - 0.90.
SPECIFIC GRAVITY0.86 - 0.90.
ODOUR THRESHOLD (ppm)25 ppm.
VAPOUR PRESSURE22 mmHg @ 20°C.
VAPOUR DENSITY (AIR=1)>1.00.
EVAPORATION RATE1.80 (NBUAC = 1).
BOILING POINT (deg C)110°C.
pHNot applicable.
SOLUBILITY IN WATER (% W/W)Negligible.
COEFFICIENT OF WATER\OILNot available.
DISTRIBUTION
FREEZING POINT <0°C.
MELTING POINT (deg C)Not applicable.
MOLECULAR WEIGHTNot 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 OFStyrene and Acrylonitrile monomer. Oxides		
DECOMPOSITION	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-----Not available. MATERIAL 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.

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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.

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

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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	
37	75 Steelcase Road East
Ма	arkham, Ontario L3R 1G3
Ca	anada
Te	≥l (905) 475-6011
PRODUCT NAMEAF	3S 66Y (Solvent Cement).
PRODUCT USESFo	or welding plastic pipes and fittings.
CHEMICAL FAMILYAc	crylonitrile-Butadiene Styrene.

SECTION 02: COMPOSITION / INFORMATION ON INGREDIENTS

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

SECTION 03: HAZARDS IDENTIFICATION

ROUTE OF ENTRY:
SKIN CONTACTCan cause moderate skin irritation,
defatting and dermatitis.
SKIN ABSORPTIONNot applicable.
INHALATIONAs described below.
INHALATION CHRONICBreathing of high vapour concentrations
could cause dizziness, headache or even
unconsciousness .May be anesthetic which
could result in other central nervous
system effects.
INGESTIONCan 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 CONTACTContains 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 EXPOSUREMay cause damage to the central nervous
system. Prolonged or repeated skin contact
may cause drying or cracking of the skin.

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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.
	Do NOT induce vomiting. Get immediate medical attention. Contact your local poison control centre.

SECTION 05: FIRE FIGHTING MEASURES

FLAMMABILITYFlammable. UNDER WHAT CONDITIONSExtremely 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 PROCEDURESA 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)	
SENSITIVITY TO MECHANICALNot available. IMPACT SENSITIVITY TO STATICMay 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 PROCEDURESAvoid	skin and eye contact. Avoid breathing
vapour	s. Use adequate ventilation. Keep away
from h	eat, sparks and open flame.
STORAGE NEEDSStore	away from all sources of heat and
igniti	on. Store in well ventilated

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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/TYPESafety glasses.
RESPIRATORY/TYPENone 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/TYPENot applicable.
FOOTWEAR/TYPENot applicable.
OTHER/TYPEEye bath and safety shower.
VENTILATION REQUIREMENTSNatural or mechanical (Explosion Proof)
ventilation to keep vapour levels well
below the TLV.

SECTION 09: PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATELiquid.
ODOURAromatic Solvent odour.
SPECIFIC GRAVITY0.86 - 0.90.
ODOUR THRESHOLD (ppm)25 ppm.
VAPOUR PRESSURE22 mmHg @ 20°C.
VAPOUR DENSITY (AIR=1)>1.00.
EVAPORATION RATE1.80 (NBUAC = 1).
BOILING POINT (deg C)110°C.
pHNot applicable.
SOLUBILITY IN WATER (% W/W)Negligible.
COEFFICIENT OF WATER\OILNot available.
DISTRIBUTION
FREEZING POINT <0°C.
MELTING POINT (deg C)Not applicable.
MOLECULAR WEIGHTNot 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-----Styrene and Acrylonitrile monomer. Oxides DECOMPOSITION of Carbon (CO and CO2). Toxic fumes. Smoke.

SECTION 11: TOXICOLOGICAL INFORMATION

EXPOSURE LIMIT OF MATERIALSee "HAZARDOUS INGREDIENTS" in SECTION 2. IRRITANCY OF MATERIALModerate. SENSITIZING CAPABILITY OFNot available. MATERIAL
CARCINOGENICITY OF MATERIALReversible 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 and no adverse

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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) 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

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

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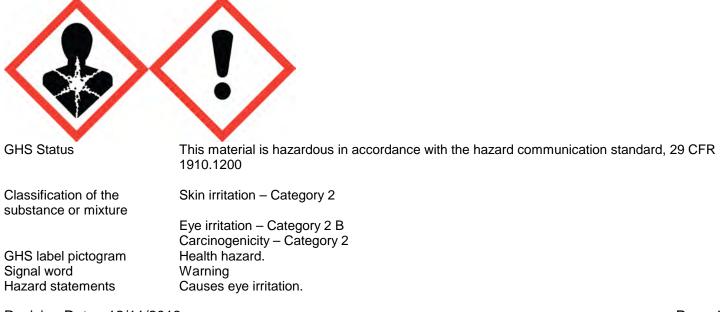
SAFETY DATA SHEET

	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.





SAFETY DATA SHEET

Precautionary statements	Causes skin irritation. Suspected of causing cancer if inhaled.
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	Keep away from intense heat, flames. Store locked up.
Disposal	Dispose of in accordance with local regulations.
Hazards not otherwise classified	None known.
Relevant routes of exposure	Skin, eyes, inhalation.
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	May cause allergic reaction.
Eye contact	No data available.
Ingestion	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/m3	None Established for ABS Particulates not otherwise classified: 10 mg/m3 (inhalable fraction)	None established
Corn oil CAS 8001-30-7	0 - 3	Vegetable oil: 5 mg/m3 (PEL, respirable fraction) 15 mg/m3 (PEL, total dust)	10 mg/m3 (8- hour TWA)	Vegetable oil mist: 10 mg/m3 (total TWA)
Carbon black CAS 1333-86-4	0 - 2	3.5 mg/m3 (TWA)	3.0 mg/m3 (TWA)	3.5 mg/m3 (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.

CHARLOTTE SAFETY DATA SHEET

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 attention. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention attention immediately. Loosen tight clothing, such as collar, tie, belt, or waistband.

<u>Notes to physician</u>: 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

PIPE AND FOUNDRY COMPANY

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



SAFETY DATA SHEET

Methods and materials for containm	environmental pollution (sewers, waterways, soil, or air).
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
hygieneadequate ventilation or wear appropriate respirator.
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 manufacture'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



SAFETY DATA SHEET

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:



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.



SAFETY DATA SHEET

Carcinogenicity

May cause cancer. Risk of cancer depends on duration and level of exposure.

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.		



SAFETY DATA SHEET

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		

DISCLAIMER

NO WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE, OR WARRANTY OR GUARANTY OF ANY OTHER KIND, EXPRESS OR IMPLIED, IS MADE REGARDING PERFORMANCE, SAFETY, SUITABILITY, STABILITY OR OTHERWISE FOR THE ABS MATERIALS AS REPRESENTED IN THIS MSDS SHEET. Charlotte Pipe and Foundry assumes no liability whatsoever for the use of or reliance upon this information. The information and data contained in this MSDS has been compiled from information believed to be accurate and is offered for your consideration, investigation and verification. Buyer assumes all risk of use, storage, handling and disposal of the product in compliance with applicable federal, state, and local laws and regulations.



Material Safety Data Sheet

Printing date 03/19/2012 Ver	sion 6 Reviewed or	n 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 Pse ensure that this MSDS is received by the approp Information department: Customer Service Centre: 	1	
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)

HEALTH2Health = 2FIRE4Fire = 4REACTIVITY2Reactivity = 2

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Trade name: Acetylene

· NFPA ratings (scale 0 - 4)



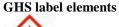
· Information pertaining to particular dangers for man and environment:

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.





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.

Stanages

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

(Contd. of page 2)

6 Accidental release measures

· Person-related safety precautions:

Wear protective equipment. Keep unprotected persons away. Ensure adequate ventillation.

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 ventillation.

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.

\cdot 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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(Contd. of page 3)

· Additional information about design of technical systems:			
Adequate local ventillation.			
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 se contained breathing apparatus: demand or pressure-demand or combination supplied-air with auxiliary se contained air supply atmosphere-supplying respirator) in case of insufficient ventilation.			



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	- 90 8°C
Melting point/Melting range Boiling point/Boiling range:	
· 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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Trade name: Acetylene

Solubility in / Miscibility with Water at 20°C:

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

1.185 g/l

- · Primary irritant effect:
- \cdot on the skin: No irritating effect.
- on the eye: No irritating effect.
- \cdot 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

		(Contd. of pag
	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 IAT	'A-DGR:	
· ICAO/IATA Class:	2	
UN/ID Number:	1001	
· Label	2.1	
Packaging group:	-	

15 Regulations

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· 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

· Cancerogenity categories

· EPA (Environmental Protection Agency)

	8 .		
Substance is not liste			
NTP (National Toxi	ology Program)		
Substance is not liste			
TLV (Threshold Lin	uit Value established by	ACGIH)	
Substance is not liste			
NIOSH-Ca (Nationa	Institute for Occupation	onal Safety and Health	ı)
Substance is not liste			
OSHA-Ca (Occupat	onal Safety & Health A	dministration)	
Substance is not liste			
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.

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

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Trade na	me: Acetylene
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	(Contd. of page
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	

CRC MATERIAL SAFETY DATA SHEET

Section 1: Product & Company I dentification

Product Name: Air Tool Oil

Product Number (s): SL2531, SL2533, 74095

Product Use: Iubricant for pneumatic equipment

Manufacturer / Supplier Contact Information:

In United States: CRC Industries, Inc. 885 Louis Drive Warminster, PA 18974 <u>www.crcindustries.com</u> 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 <u>www.crc-canada.ca</u> 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 I dentification

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:

	OS	SHA	AC	GIH	0	THER	
COMPONENT	TWA	STEL	TWA	STEL	TWA	SOURCE	UNIT
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:amberOdor:mild petroleumOdor Threshold:NDSpecific Gravity:0.91

Product Name:	Air Tool O	il	Pro	oduct Numbe	er (s): S	L2531, SL2533, 74095
Vapor Density: Evaporation Rate:	> 360°F ND ND > 1 slow ble in water	(air = 1)				
Coefficient of water/o pH: NA Volatile Organic Con		ND <u>/t %</u> : 0	<u>g/L:</u>	0	<u>lbs./gal</u> :	0

Section 10: Stability and Reactivity

Stability:	Stable			
Conditions to	Avoid:	Sources of ig	gnition	
Incompatible	ncompatible Materials: Strong acids and oxidizers			
Hazardous D	ecompositior	Products:	Oxides of carbon, sulfur and phosphorus	
Possibility of	Hazardous R	eactions:	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> Hydrotreated light naphthenic distillates	<u>Oral LD50</u> (rat) > 5000 mg/kg	Dermal LD50 (rabbit) > 2000 mg/kg	Inhalation LC50 (rat) 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:

OSHA	IARC	NTP		
Carcinogen	Carcinogen	<u>Carcinogen</u>	Irritant	<u>Sensitizer</u>
No	No	No	E (mild) /	Unknown
			S (mild)	
No	No	No	Unknown	Unknown
No	No	No	Unknown	Unknown
	Carcinogen No No	Carcinogen NoCarcinogen NoNoNo	Carcinogen NoCarcinogen NoCarcinogen NoNoNoNo	Carcinogen No Carcinogen No Carcinogen E (mild) / S (mild) No No No

Reproductive Toxicity:
Teratogenicity:No information available
No information available
No information available
No information available
No information available
No information available
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.

E – Eye

S – Skin

R - Respiratory

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 / Degr	adability:	No information available	
Bioaccumulation /	Accumulation:	No information available	
Mobility in Environ	ment:	No information available	

Section 13: Disposal Considerations

<u>Waste Classification</u>: 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:

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Toxic Substances Control Act (TSCA):
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All ingredients are either listed on the TSCA inventory or are exempt.

<u>Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)</u>: 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

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)

<u>Consumer Products VOC Regulations</u>: 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:

<u>RoHS Compliance</u>: 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.

NFPA

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Additional Regulatory Information: None

Section 16: Other Information

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

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
- CAS: Chemical Abstract Service
- CFR: Code of Federal Regulations
- DOT: Department of Transportation
- DSL: Domestic Substance List
- g/L: grams per Liter
- HMIS: Hazardous Materials Identification System
- IARC: International Agency for Research on Cancer
- IATA: International Air Transport Association
- ICAO: International Civil Aviation Organization
- IMDG: International Maritime Dangerous Goods
- IMO: International Maritime Organization
- lbs./gal: pounds per gallon
- LC: Lethal Concentration
- LD: Lethal Dose

- NA: Not Applicable
- ND: Not Determined
- NIOSH: National Institute of Occupational Safety & Health
- NFPA: National Fire Protection Association
- NTP: National Toxicology Program
- OSHA: Occupational Safety and Health Administration
- PMCC: Pensky-Martens Closed Cup
- PPE: Personal Protection Equipment
- ppm: Parts per Million
- RoHS: Restriction of Hazardous Substances
- STEL: Short Term Exposure Limit
- TCC: Tag Closed Cup
- TWA: Time Weighted Average
- WHMIS: Workplace Hazardous Materials Information System



WHMIS (Pictograms)

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WHMIS (Classification)

Class D-1B: Material causing immediate and serious toxic effects (Toxic).

Class D-2A: Material causing other toxic effects (Very toxic).

Personal protective equipment

Affairs Department

(905) 878-5544



Class D-2B: Material causing other toxic effects (Toxic). Section 1. Product and Company Identification Product Associated name / 15-408H52 **Product's Item** All Season Windshield Washer Trade name Code Mixture. CAS # Not available. Synonym Validation date Apr. 05 2011 Not available. **Chemical family** Not available. Chemical formula L Print date Apr. 05 2011 Manufacturer/Supplier Recochem Inc. Recochem Inc. In case of 850 Montee de Liesse Communications and Regulatory emergency

Class B-2: Flammable liquid

Consumer products: Windshield de-icing fluid. Material uses

Montreal, Quebec

514-341-3550

Section 2. Hazard	Is 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					
anada					
Name	CAS number	Conc. (% w/w)			
<i>I</i> lethanol	67-56-1	40 - 50			
There are no ingredients present which, within the current know concentrations applicable, are classified as hazardous to health eporting in this section.	• • • • • • • • • • • • • • • • • • • •				

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Section 4. First a	id 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. Accider	ntal release	measures
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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.

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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. Exposu	re 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 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
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.
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.
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
United States	
Product name	Exposure limits
Methanol	ACGIH TLV (United States, 1/2008). Absorbed through skin. TWA: 200 ppm 8 hour(s). TWA: 262 mg/m ³ 8 hour(s). STEL: 250 ppm 15 minute(s). STEL: 328 mg/m ³ 15 minute(s). OSHA PEL 1989 (United States, 3/1989). Absorbed through skin. TWA: 200 ppm 8 hour(s). TWA: 260 mg/m ³ 8 hour(s). STEL: 250 ppm 15 minute(s). STEL: 325 mg/m ³ 15 minute(s). NIOSH REL (United States, 6/2008). Absorbed through skin. TWA: 200 ppm 10 hour(s). TWA: 260 mg/m ³ 10 hour(s).
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Validated on Apr.	05 2011
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Validated on	All Season Windshield Washer								Page: 4/8		
			STEL: SHA P TWA: 2 TWA: 2 SHA (TWA: 2	250 pp 325 mg PEL (Ur 200 ppn 260 mg, United 200 ppn 260 mg,	y/m ³ 1 nited n 8 ho /m ³ 8 State n 8 ho	5 minu States bur(s). hour(s) es, 200 bur(s).	te(s). , 11/200). 3).	06).			
Canada Occupational exposure limits			(8 hour	s)	STEL	(15 min	s)	Ceilir	ng		
Ingredient	List name	ppm	mg/m³	Other	ppm	mg/m³	Other	ppm	mg/m³	Other	Notations
Methanol	US ACGIH 1/2008 AB 6/2008 BC 6/2008 ON 6/2008 QC 6/2008	200 200 200 200 200	262 262 - 260 262	- - - -	250 250 250 250 250	328 328 - 325 328	- - - -	- - - -	- - - -	- - - -	[1] [1] [1] [1] [1]
[1]Absorbed through	skin										

[1]Absorbed through skin.

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 temperatu	re 385°C (725°F)					
Flash point	Closed cup: 28°C (82.4°F) [Taglia	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

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 decompositi products	ion Under normal conditions of storage and use, hazardous decomposition products should not be produced.			

Section 11. Toxicological Information

Ca	nao	at

Canada						
Acute toxicity						
Product/ingredient name	Result		Species	Dose		Exposure
Methanol	LC50 Inhalation Gas. LD50 Dermal LD50 Dermal		Rat Rabbit Rabbit	64000 pp 15800 m 15840 m	g/kg	4 hours - -
Conclusion/Summary	LD50 Oral LD50 Oral Not available.		Rat Rat	5600 mg 5600 mg		-
Chronic toxicity						
Conclusion/Summary	Not available.					
Carcinogenicity						
Conclusion/Summary	May be fatal or cause b	lindness if	swallowed.			
Classification						
Product/ingredient name Methanol	ACGIH A5	IARC 4	EPA -	NIOSH -	NTP -	OSHA None.
Mutagenicity						
Conclusion/Summary	: Not available.					
Teratogenicity						
Conclusion/Summary	: Not available.					
Reproductive Toxicity						
Neproductive Toxicity						

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All Season Windshield Washer

	accidental discharges into the environment, see Souctions.	ection 6:"Accidental Release Measures" f	or suggested
Ecotoxicity	: No known significant effects or critical ha	azards.	
<u>Canada</u>			
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	Dn	
Class	Not applicable.	No placard (handling and hazard label) required.
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.	
Continued on next p	page	

Validated on Apr. 0	5 2011 All Season Windshield Washer	Page: 7/8
IMDG Classification		
Class	Class 3: Flammable liquid.	
Subsidiary class	-	3
Proper Shipping Name IMDG	Alcohols, n.o.s. (Methanol)	
UN number	UN 1987	No placard (handling and hazard label) required.
Packing Group	111	
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".	
United States DOT (Class	sification)	
Class	Class 3: Flammable liquid.	
Subsidiary class	-	FLAMMABLE LIQUD
Proper Shipping Name (United States) DOT	Alcohols, n.o.s. (Methanol)	3
UN number	UN 1987	
Packing Group	Ш	
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 regulation IATA Dangerous Goods Regulations.	ons, please refer to the latest edition of

Section 15. Regul	atory 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 p	page	

Validated on Apr. 05 2011				- Page: 8/8
		All	Season Windshield Washer	
Hazardous Material	Health	2	National Fire	Flammability
Information System	Flammability	3	Protection Association	Health 2 0 Reactivity
(U.S.A.)	Reactivity	0		
	Personal protection	B	(U.S.A.)	Specific hazard

Section 16. Other information

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

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

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

		Product Identificat	tion & 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
WHMIS Class	D2A, D2B				L4Y 1Z7
				Phone	(905) 279-5460
Material Use	Manufacture of Ar	ticles		Toll Free	1-800-26SAMUEL
				Fax	(905) 279-9658
Section 2	Hazaro	lous Ingredients (OF	=oxide fumes/DF	-dust and f	ume/TD=Ti dioxide)
ELEMENT	C.A.S.#	% weight	OSHA PE	EL (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 chror	me 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	I0 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 oxid	le fume	10 oxide fume
Lead	7439-92-1	<0.40-0.7 0.05 DF		0.15 DF	
Eodd		<0.40-0.7	0.00		0.15 DI
Vanadium	7440-62-2	0.05 max	0.05c dust	, 0.ic fume	0.05 dust & 0.05 fume
Vanadium	e comprised of various nay be present in min uminum alloys. Va Odour: N/a Evap Freezing point: N/a Boiling point: N/a	0.05 max s combinations of the ute quantities. No per lues shown are applic Physical D oration Rate: N/a Coefficient wtr/oil Appearance: slvr g Fire & Explosic	0.05c dust elements shown missable exposu able to componen ata Boiling point: N distribution: N gry Specific Gr on Data	above. In ac re limits (PE nt elements. N/a Vapour I/a Ph: N/a ravity:H20=	0.05 dust & 0.05 fume dition, L) or treshold limit pressure: N/a =1(approx. 2.5-2.9)
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Vanadium Note: Aluminum alloys will be other alloying elements r values (TLV) exist for alu Section 3 Physical state: Solid Vapour density: N/a 1 Ddour threshold: N/a Section 4 Means of extiction: D Section 5 Not applicable Che Reactivity & under wi generate explosive Hydro oxic or irritating airborne Section 6 Route of entry:Prolon, inhalation of alloy par or machining may pos	e comprised of various may be present in minuminum alloys. Va Odour: N/a Evap Freezing point: N/a Boiling point: N/a mical Stability: yes hat condition: Sodi ogen Mixtures. Hazar particulate, including Tr ged skin contact wi triculate or elementa se acute or chronic e ation of overexpose ms) appears to 6 ho	0.05 max s combinations of the ute quantities. No per lues shown are applic Physical D oration Rate: N/a Coefficient wtr/oil Appearance: slvr g Fire & Explosic *NOTE: do not use Reactivity D Incompatibility to um Hydroxide& Ha dous Decomposition I Alloy Oxide Oxicological Propert th coated products r al oxide fumes gene effects. are may cause metal purs after exposure of	0.05c dust elements shown missable exposu able to component ata Boiling point: I distribution: N gry Specific Gr on Data water or Halog Data o other substance logen ACIDS i Products: extreme ties of Material may cause skin erated during wo	above. In ac re limits (PE nt elements. N/a Vapour I/a Ph: N/a ravity:H20= gen on moli ces: yes n contact w e heat may p irritation in elding, bur aracterised ong term ef	0.05 dust & 0.05 fume dition, L) or treshold limit pressure: N/a =1(approx. 2.5-2.9) ten Aluminum Flash with Aluminum may produce n sensitive individuals ning, grinding by fever and fects.

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 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.

AMERLOCK[®] 400

	September 2013 Revision of May 2013
DESCRIPTION	High Solids Epoxy Coating
PRINCIPAL CHARACTERISTICS	- 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 Amercoat 880 glass flake additive
COLOR AND GLOSS	Semi-gloss
	 Standard primer colors and custom colors * 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.
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 Ameriock 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 ft²/gal @ 5 mils dft 266 ft²/gal
Components	2
Dry Temperature Resistance*	Continuous — 250°F Intermittent — 350°F (<5% of the time, max 24 hours) * Color will drift at elevated temperatures.
Shelf Life	3 years from date of manufacture
SURFACE PREPARATION	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.
Mild Steel	 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 at- tention to horizontal surfaces and recesses.
Concrete	 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.

AMERCOAT°

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 ac dense 1.5-4.0 mil ar as necessary based 	 Abrasive blast in accordance with SSPC SP-16 guidelines to achieve a uniform a dense 1.5-4.0 mil anchor profile. Size and hardness of abrasive should be adjust 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-immersi 					
Aged coatings	products or chalky r compatible over mos	 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. <i>Amerlock</i> 400 is compatible over most types of properly applied and tightly adhering coatings, however, a test patch is recommended to confirm compatibility. 					
Repair			ce preparation specifi ve dust or abrasive re	cations, feathering esidue 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 optimum performance, s temperature.						
Surface temperature	40°F to 122°F (5°C to 50 20°F to 122 °F (-6°C to 5 * Ameriock 400 may be applie Ameriock 400 to surfaces bet	 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 har	dener					
	Pre-mix pigmented comp homogenize the contain minutes until completely	oonents with a pneur er. Add hardener to b					
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, 0.0 Can be sprayed with plu		cation equipment.				
Air spray	Thin up to 20%, standar						
Brush & roll	Use a high quality natura brush / roller is well load achieve adequate film bu	ed to avoid air entrai					
Thinner	Amercoat 65, Amercoat 101						



AMERLOCK 400

Cleaning solvent

Safety precautions

Primers Topcoats

Amercoat 12 Cleaner or Amercoat 65 thinner (xylene)
Direct to substrate; Dimetcote series primers, Amercoat 68HS
<i>Amercoat</i> 450 Series Polyurethanes, Amershield, <i>PSX</i> 700, <i>PSX</i> One, <i>Amercoat</i> 220 Series Acrylics, <i>Pitthane</i> Polyurethanes, <i>PittTech</i> Acrylics

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, <i>PSX</i>	30 days	30 days	30 days	15 days
Cure to immersion factory colors only	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, <i>PSX</i>	30 days	30 days	21 days	14 days	5 days
Cure to immersion factory colors only	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.ppgamercoatus.ppgpmc.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	AK2-72OxiAK2-81SafAK2-81DetAK2-T1DetAK2-T2LigAK2-T3NetAK2-T4RetAK2-T5HigAK400-BHatAK400ALAmAK400AL-BAm	nite ick arl Gray ide Red fety Yellow ep Tint base* ht Tint base* utral Tint base* d Tint base* d Tint base* gh Hiding Yellow Tint base* rdener component <i>berlock</i> 400 Aluminum base (Refer to Amerlock 400AL Data Sheet) <i>berlock</i> 400 Aluminum hardener (Refer to Amerlock 400AL Data Sheet)		
	* Tintable using UC	CD V-Line colorants only.		
Worldwide statement	While it is always the aim of PPG Protective & Marine Coatings to supply the sa on a worldwide basis, slight modification of the product is sometimes necessary with local or national rules/circumstances. Under these circumstances an altern data sheet is used.			

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.





Date of issue 29 December 2011 12

Version

Product and company identification 1.

Product name	: AMERLOCK 400AL RESIN
Code	: AK400AL
Supplier	: PPG Industries, Inc. One PPG Place Pittsburgh, PA 15272
<u>Emergency telephone</u> <u>number</u>	: (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/sympton	3

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** Name **CAS number** % Epoxy Resin (MW<=700)</p> 30 - 60 25068-38-6 Aluminium powder (stabilized) 7429-90-5 10 - 302,3-epoxypropyl neodecanoate 26761-45-5 10 - 30Stoddard 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.

> United States - Canada - Mexico Page: 1/7



Product name AMERLOCK 400AL RESIN

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 innitian and flack back.
<u> </u>	confined areas or travel a considerable distance to a source of ignition and flash back.
Extinguishing media	
Suitable	: Use dry chemical, CO ₂ , 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.

United States - Canada - Mexico



Page: 2/7

Product name AMERLOCK 400AL RESIN

Accidental release measures 6

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.

Exposure controls/personal protection 8.

Name	Result	ACGIH	OSHA	Ontario	Mexico	PPG
Muminium powder (stabilized)	TWA	1 mg/m ³ R	5 mg/m³ (as	1 mg/m ³ R	5 mg/m³	Not
			AI) R 15 mg/m³ (as AI) TD		5 mg/m³	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
ethanol		established	Not	established	Not	

Key to abbreviations

= Acceptable Maximum Peak

- ACGIH = American Conference of Governmental Industrial Hygienists.
 - = Ceiling Limit
 - = Fume

C F

- IPEL = Internal Permissible Exposure Limit
- OSHA = Occupational Safety and Health Administration.
 - = Respirable R

Ζ = OSHA 29CFR 1910.1200 Subpart Z - Toxic and Hazardous Substances

- = Potential skin absorption
- = Respiratory sensitization SR SS
 - = Skin sensitization
- STEL = Short term Exposure limit values TD
 - = Total dust

S

- = Threshold Limit Value TLV
- TWA = Time Weighted Average



Product code AK400AL

Product name AMERLOCK 400AL RESIN

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	: L ower: 1.1%
Color	: Not available.
Odor	: Not available.
рН	: Not available.
Boiling/condensation point	: >37.78°C (>100°F)
Melting/freezing point	: Not available.
Specific gravity	: 1.2
Density(Ibs / gal)	: 10.01
Vapor pressure	:
Vapor density	: Not available.
Volatility	: 16% (v/v), 10.48% (w/w)
Evaporation rate	: 🕅 23 (butyl acetate = 1)
Partition coefficient: n- octanol/water	: Not available.
% Solid. (w/w)	: 89.52



Product code AK400AL

Product name AMERLOCK 400AL RESIN

10. Stability and reactivity

Stability Conditions to avoid	 The product may not be stable under certain conditions of storage or use. 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 Hazardous polymerization	 Under normal conditions of storage and use, hazardous decomposition products should not be produced. Under normal conditions of storage and use, hazardous polymerization will not occur.

11. Toxicological information

Acute toxicity

Product/ingredient name			Result		Species	Dose		Exposure
₽poxy Resin (MW<=700)			LD50 Ora	I	Rat	>2 g/kg		-
			LD50 Der	mal	Rabbit	>2 g/kg		-
2,3-epoxypropyl neodecanoa	ate		LD50 Ora	1	Rat	9.6 g/kg		-
Stoddard solvent			LD50 Ora		Rat	>5 g/kg		-
ethanol			LD50 Ora	1	Rat	7 g/kg		-
			LC50 Inha	alation	Rat	124700 mg	g/m3	4 hours
Conclusion/Summary	:	Not availa	ble.					
Chronic toxicity								
Conclusion/Summary	:	Not availa	ble.					
Defatting irritant	1	•	Prolonged or repeated contact can defat the skin and lead to irritation, cracking and/or dermatitis.					
<u>Farget organs</u>	:	cornea. Contains	material whic	ch may ca	use damage t	e following orgar o the following o skin, central ner	rgans: k	idneys, lungs, the
Carcinogenicity								
Classification								
Product/ingredient name			ACGIH	IARC	EPA	NIOSH	NTP	OSHA

12. Ecological information

Environmental effects

Aluminium powder (stabilized)

: 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

A4



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Product name AMERLOCK 400AL RESIN

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

Regulation **UN number Proper shipping name Classes** PG* **Additional information** UN 1263 PAINT 3 Ш IMDG 1263 PAINT. Marine pollutant (Epoxy Resin 3 Ш (MW<=700), 2,3-epoxypropyl neodecanoate) PAINT 3 DOT 1263 Ш Remarks USA Only: Can be reclassified

14. Transport information

PG* : Packing group

Reportable quantity RQ : CERCLA: Hazardous substances.: No products were found.

15. Regulatory information

<u>Chemical name</u>	<u>CAS #</u>	<u>Acute</u>	<u>Chronic</u>	<u>Fire</u>	Reactive	<u>Pressure</u>
SARA 311/312 MSDS Distributior	- Chemical Inve	entory - Hazard	Identification:			
SARA 302/304 emergency pla SARA 302/304/311/312 hazar CERCLA: Hazardous substanc	dous chemicals:	Stoddard solver			zed)	
SARA 302/304/311/312 extrem						
U.S. Federal regulations :						
United States						
Philippines inventory (PICCS)	: All compon	ents are listed o	r exempted.			
New Zealand (NZIoC)	: All compon	ents are listed o	r exempted.			
Korea inventory (KECI)	: All compon	ents are listed o	r exempted.			
Japan inventory (ENCS)	: All compon	ents are listed o	r exempted.			
Europe inventory (REACH)	: Please con	itact your supplie	r for information	on the inver	ntory status of th	is material.
China inventory (IECSC)	: All compon	ents are listed o	r exempted.			
Canada inventory (DSL)	: All compon	ents are listed o	r exempted.			
Australia inventory (AICS)	: All compon	ents are listed o	r exempted.			
United States inventory (TSCA 8	b) : All compon	ients are listed o	r exemptea.			



as Combustible Liquid. Non-Bulk highway shipments (Less than or Equal to 450Liters) can be shipped as non-regulated.

Product code AK400AL			Date of issue	29 December 20	11 Version	2
Product name AMERLOC	K 400AL RESIN					
15. Regulatory ir	formation					
Zpoxy Resin (MW<=700)	25068-38-6	Y	N	N	N	N
Aluminium powder (stabilize	d) 7429-90-5	N Y	Ν	N N	Y N	Ν
2,3-epoxypropyl neodecanoa	te 26761-45-5		N			N
Stoddard solvent	8052-41-3	Y	N	Y	Ν	N
F	Product as-supplied :	Y	Ν	Y	Y	Ν
SARA 313	Chemical name		<u>CAS number</u>	Concentration		
Supplier notification :	plier notification : Aluminium powder (stabilized)			7429-90-5	10 - 30	
Additional environmental inf be obtained from your PPG ı		the En	vironmental Da	ata Sheet for this	product, whi	ch can
Canada						
Canada						
WHMIS (Canada)	: Class B-3: Combustible (200°F). Class D-2B: N					3.3°C
WHMIS (Canada)						3.3°C
						3.3°C

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 : 2Flammability : 2Instability : 1Date of previous issue: 5/22/2011.Organization that prepared: EHS

Organization that prepared : El the MSDS

✓ 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.



SIGMA-ALDRICH

sigma-aldrich.com

SAFETY DATA SHEET

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

1. PRODUCT AND COMPANY IDENTIFICATION

Product name	3	Antimony		
Product Number Brand Product Use		266329 Aldrich For laboratory research purposes.		
Supplier	;	Sigma-Aldrich Canada Co. 2149 Winston Park Drive OAKVILLE ON L6H 6J8 CANADA	Manufactur er	Sigma-Aldrich Corporation 3050 Spruce St. St. Louis, Missouri 63103 USA
Telephone	:	+1 9058299500		
Fax	2	+1 9058299292		
Emergency Phone # (For both supplier and manufacturer)	4	1-800-424-9300		
Preparation Information	ţ	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 H411 Precautionary statement(s)

Toxic to aquatic life with long lasting effects.

P273

Avoid release to the environment.

Harmful if swallowed or if inhaled

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

н

Physical hazards:	0
otential 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 Molecular Weight	: Sb : 121.76 g/mol		
CAS-No.	EC-No.	Index-No.	Concentration
Antimony			
7440-36-0	231-146-5	- 1 H H	<=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/m3	Canada. Alberta, Occupational Health and Safety Code (table 2: OEL)
Remarks			limit is based on is not required	irritation effects and its adjustment to compensate for
		TWA	0.5 mg/m3	Canada. British Columbia OEL
5		TWAEV	0.5 mg/m3	Canada. Ontario OELs
		TWAEV	0.5 mg/m3	Québec. Regulation respecting occupational health and safety, Schedule 1, Part 1: Permissible exposure values for airborne contaminants

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:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact Material: Nitrile rubber Minimum layer thickness: 0.11 mm Break through time: 480 min Material tested:Dermatril® (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
S	afety data	
	рН	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/cm3 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
	Evapouration 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 Proper shipping name: Antimony powder Reportable Quantity (RQ): 5000 lbs Marine pollutant: No Poison Inhalation Hazard: No

UN number: 2871 Class: 6.1

Packing group: III

EMS-No: F-A, S-A

IATA

IMDG

UN number: 2871 Class: 6.1 Proper shipping name: Antimony powder

Proper shipping name: ANTIMONY POWDER

Packing group: III

Packing group: III

15. REGULATORY INFORMATION

Marine pollutant: No

WHMIS Classification

D1B

Toxic by inhalation. Toxic Material Causing Immediate and Serious **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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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 MSDS #	 argon, compressed; Cryogenic Liquid Argon, Liquid Argon 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 ef	fects
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>	Exposure limits
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 : Use an extinguishing agent suitable for the surrounding fire. instructions	
	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	itable protect	ntact emergency personnel. Keep unnecessary personnel away. Use tive equipment (section 8). Shut off gas supply if this can be done safely. til gas has dispersed.
Environmental precautions	void dispersa nd sewers.	of spilled material and runoff and contact with soil, waterways, drains
Methods for cleaning up		ntact emergency personnel. Stop leak if without risk. Note: see section 1 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 (ft ³ /lb)	: 9.70874
Gas Density (lb/ft ³)	: 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

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I OXICITY 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).	PROFILINGELE CAS	<u>Limited</u> quantity Yes.
	UN1951	Argon, refrigerated liquid				Packaging instruction Passenger aircraft Quantity limitation: 75 kg
						Cargo aircraft Quantity limitation: 150 kg
TDG Classification	UN1006 UN1951	ARGON, COMPRESSED Argon, refrigerated liquid	2.2	Not applicable (gas).		Explosive Limit and Limited Quantity Index 0.125
						Passenger Carrying Road or Rail Index 75
						<mark>Special</mark> provisions 42
Mexico Classification	UN1006	ARGON, COMPRESSED	2.2	Not applicable (gas).	NON-PLANMABLE CAS	-
	UN1951	Argon, refrigerated liquid				

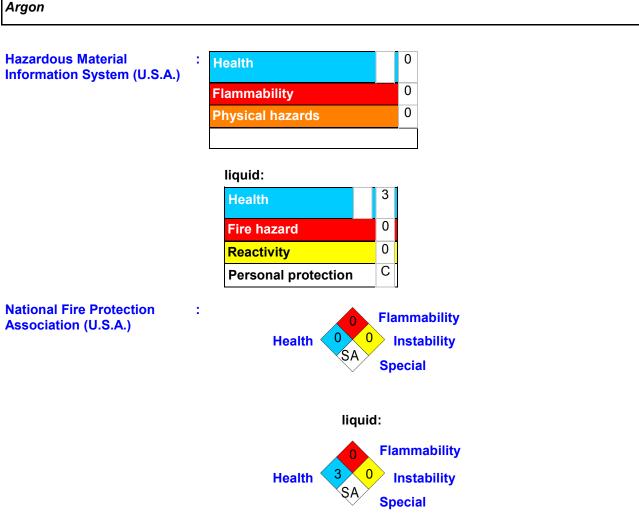
"Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product."

Section 15. Regulatory information

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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. Mew 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. New York Toxic Chemical Release Reporting: This material is not listed. Rhode Island Hazardous Substances: This material is not listed. 			
<u>Canada</u>				
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

: 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.
: Class A: Compressed gas.



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.



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.

MATERIAL SAFETY DATA SHEET

ARSENIC

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. Inhlation 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.

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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 samllest 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



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

MATERIAL SAFETY DATA SHEET

BISMUTH

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, lastitude, 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.

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BISMUTH

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

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

MATERIAL SAFETY DATA SHEET Page 2 of 6 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.

<u>Skin</u>

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.

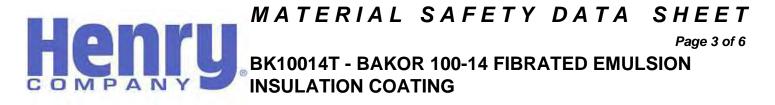
6. Accidental Release Measures

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.



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

<u>Odor</u>

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



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



Page 5 of 6

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 attapulgite 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) Bentonite (1302-78-9) Kaolin (1337-58-7) Water (7732-18-5) Attapulgite (12174-11-7) 05-2114366982-36-0000 05-2114501887-43-0000 05-2114366993-33-0000 NA - Naturally Occurring Substance NA - Naturally Occurring Substance

WHMIS - Canada (Pictograms)





118410

MATERIAL SAFETY DATA SHEET

Page 6 of 6

BK10014T - BAKOR 100-14 FIBRATED EMULSION INSULATION COATING



HMIS	
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).

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

<u>Eye Hazards</u> May cause eye irritation.

Skin Hazards

May cause skin irritation and contact dermatitis upon prolonged contact.

MATERIAL SAFETY DATA SHEET Page 2 of 6 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.

<u>Skin</u>

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.

MATERIAL SAFETY DATA SHEET Page 3 of 6 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

<u>Odor</u>

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

MATERIAL SAFETY DATA SHEET Page 4 of 6 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.

MATERIAL SAFETY DATA SHEET Page 5 of 6 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

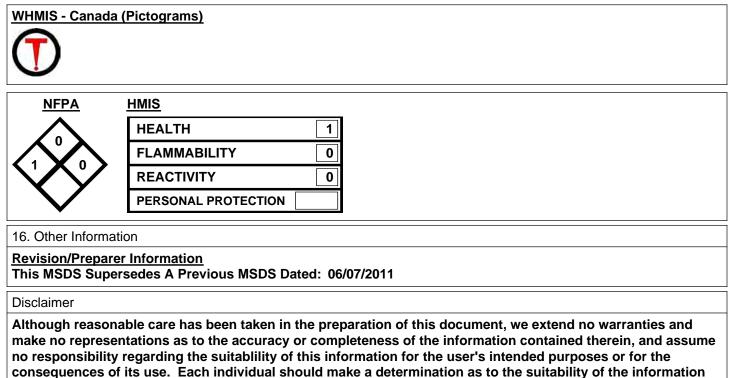
Ingredient(s) - Canadian Regulatory Information

ethylene glycol WHMIS - Ingredient Disclosure List silica, quartz WHMIS - Ingredient Disclosure List titanium dioxide WHMIS - Ingredient Disclosure List



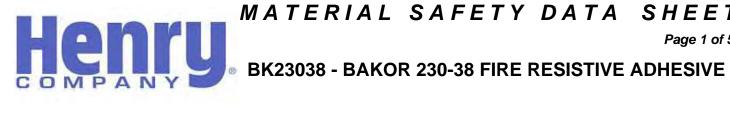
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BK12009 - BAKOR 120-09 FIRE RESISTIVE LAGGING COATING HEAVY DUTY



for their particular purposes(s).

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Page 1 of 5

HENRY COMPANY 999 N. Sepulveda Blvd., Suite 800 El Segundo, CA 90245-2716	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		
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: 02/11/2014 Product Name: BK23038 - BAKOR 230-38 FIRE RESISTI Product Code: BK23038 Product/Material Uses	VE ADHESIVE		
Fire-resistant adhesive.			
Fire-resistant adhesive.	CAS Number	Percent Of Total Weight	
Fire-resistant adhesive. 2. Composition/Information On Ingredients Ingredient Name			
Fire-resistant adhesive. 2. Composition/Information On Ingredients Ingredient Name hydrocarbon resins	Number	Total Weight	
Fire-resistant adhesive. 2. Composition/Information On Ingredients Ingredient Name hydrocarbon resins Iong chain chlorinated paraffins	Number NA - Mixture	Total Weight 5 - 11 5 - 11	
Fire-resistant adhesive. 2. Composition/Information On Ingredients Ingredient Name hydrocarbon resins long chain chlorinated paraffins trichloroethylene	Number NA - Mixture 63449-39-8	Total Weight 5 - 15	

3. Hazards Identification

Primary Routes(s) Of Entry

Inhalation

<u>Eye Hazard</u>s

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.



Page 2 of 5

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.

<u>Skin</u>

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.



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BK23038 - BAKOR 230-38 FIRE RESISTIVE ADHESIVE

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

<u>Odor</u>

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.



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BK23038 - BAKOR 230-38 FIRE RESISTIVE ADHESIVE

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/TDGUN1710, Trichloroethylene, mixture, 6.1, IIIIMDGUN1710, 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)





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BK23038 - BAKOR 230-38 FIRE RESISTIVE ADHESIVE

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

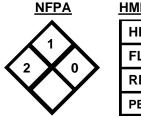
This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR. WHMIS Classification: Class D, Div 1 - Poisonous or Infectious Material: immediate and serious toxic effects, Class D, Div 2, Subdivision A - Materials Causing 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)





IMIS	
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).

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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	

None known.

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

HAZARDS IDENTIFICATION 3.

Toxicity:

May irritate the eyes. May irritate respiratory system upon frequent or prolonged use.

Primary Routes of Entry: Signs and Symptoms of Exposure: Eye and skin contact, ingestion, inhalation

None under normal conditons 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	<2	male rat-equivocal		Group 3; Monograph 77, 2000
102-71-6		evidence; female rat-		
		no evidence; male		
		mice-inadequate;		
		female mice-		
		inadequate		

Aggravated Medical Condition:

A FIDST AID MEASURES

4. TINGTAD WLAGUNLG	
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.

FIRE FIGHTING MEASURES 5.

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 Rinse away with water or wipe up with a towel.

Spill Procedures:

7. HANDLING AND STORAGE

Storage:

Handling:

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

Follow all general safety precautions.

EXPOSURE CONTROLS/PERSONAL PROTECTION 8.

Eyes: Skin: Ventilation: **Respiratory Protection:**

Not required. Not required. None under normal use. 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: Hazardous Polymerization: Incompatabilities: **Conditions to Avoid:** Hazardous Products of Combustion:

Stable at normal conditions Will not occur None known Freezing Oxides of carbon

11. TOXICOLOGICAL INFORMATION

See Section 3

ECOLOGICAL INFORMATION 12.

No data available

13. DISPOSAL CONSIDERATIONS

Recommended Method of Disposal: Disposal should be made in accordance with federal, state and local regulations NH - Not a RCRA Hazardous Waste Material **US EPA Waste Number:**

14. TRANSPORTATION INFORMATION

DOT (49CFR 172)

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

0.0. Department of Transportati	011 - 201 - 43
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

Marine Pollutant:

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 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	Revision Date: October 04, 2012
Company:	ITW Permatex 10 Columbus Blvd. Hartford, CT USA 06106	Revision Number: 4
Telephone No.:	1-87-Permatex (877) 376-2839	

Copper-Phosphorus Brazing Alloys Safety Data Sheet 1. Product and Company Identification -----Suppliers and Manufacturers _____ Lucas Milhaupt, Inc. Lucas-Milhaupt Toronto 290 Carlingview Drive 5656 South Pennsylvania Avenue Cudahy, WI 53110 USA Rexdale, ON M9W 5G1, Canada Telephone: 414-769-6000 Telephone: 416-675-1860 www.lucasmilhaupt.com 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 1	Number	00
Copper		744(0-50-8	91-95
Phosphorus		7723	3-14-0	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.

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 finelydivided forms of product. Avoid flammable fabrics.

Respiratory Protection

If an exposure level exceeds an applicable exposure standard, use a NIOSHapproved 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)

9. Physical and Chemical Properties _____ Appearance: copper-yellow alloys, various physical forms Odor: No odor Chemical Type: alloy Physical State: solid Melting Point: 1115-12250F./600-6650C. 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: Revision #: 2.4

BRITE REGULAR FLUX LIQUID

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} For Fume - ACGIH: TWA = 10mg\m ³ STEL = 20mg\m ³ EPA: CERCLA RQ = 5000 lbs. <u>CAS No.</u> 12125-02-9 <u>%</u> 5 - 10

(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** Eves: 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 Page 1 of 5

BRITE REGULAR FLUX LIQUID

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 COMMISION 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 firefighting 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.

Page 2 of 5

Product Name: Revision #: 2.4

BRITE REGULAR FLUX LIQUID

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.

BRITE REGULAR FLUX LIQUID

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. 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>U.S.A.</u>

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

BRITE REGULAR FLUX LIQUID

Date Prepared: June 3, 1993

Date Revised: February 4, 2013

EPA (CEPA) Domestic Substances List (DSL).

<u>E.U.</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 Cl#: 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.

lonicity (in Water): Not available.

Dispersion Properties: Not available.

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 Indutrial 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 dangeureuses au canada. Centre de conformité internatinal Ltée. 1986.

Other Special Considerations: Not available.

Created: 10/09/2005 04:29 PM

Last Updated: 05/21/2013 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

	Section 1 - Chemical Produc	ct and Company Identification		
MSDS Name: Carbon Dioxide Activity Standard				
Catalog Numbers:	nbers: 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:	oun	201-796-7100		
CHEMTREC Phone Numb	er, US:	800-424-9300		
	Section 2 - Composition,	Information on Ingredients		
sk Phrases:				
AS#:	144-55-8			
hemical Name:	Sodium bicarbonate			
: INECS#:	<1.0 205-633-8			
	200-033-8			
azard Symbols:				
sk Phrases:				
AS#:	7732-18-5			
hemical Name:	Water			
:	Balance			
INECS#:	231-791-2			
azard Symbols:				
ext for R-phrases: see Sectio	n 16			
Hazard Symbols	None listed			
Risk Phrases:	None listed			
	Section 3 - Haza	ards Identification		
	-	YOVERVIEW		
Caution! This is expected		industrial handling. May cause irritation. Target Organs: one.		
Potential Health Effects				
Eye: May cause eye	irritation			

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		
Seneral Information			ntained breathing apparat		
	MSHA/NIOSH (approved or equivalent), and full protective gear.				
0 0			; use agent most appropria	ate to extinguish surrounding fire	
Autoigr Tempera	nition Not a ature:	avaliable.			
-	Point: Not a	available			
Explosion Li		available			
	ower:	ovoilabla			
Explosion Li U	pper:	avaliable			
NFPA Ra	ating: heal	th: 1; flammability: 0; ins	stability: 0;		
		Section 6 - Acc	cidental Release Measure	es	
General nformation:	Use p	proper personal protectiv	ve equipment as indicated	in Section 8.	
Spills/Leaks:	Absoi conta	•	al (e.g. vermiculite, sand or	r earth), then place in suitable	
			Handling and Storage		
clothin	ng. Keep co	after handling. Use with ontainer tightly closed. A			
clothin	ng. Keep co	after handling. Use with ntainer tightly closed. A ry, well-ventilated area a	adequate ventilation. Avo	on. Ibstances.	
clothin Storage: Store i	ng. Keep co in a cool, d	after handling. Use with ontainer tightly closed. A ry, well-ventilated area a Section 8 - Exposur	a adequate ventilation. Aver void ingestion and inhalati away from incompatible su e Controls, Personal Pro	on. Ibstances. Itection	
Clothin Storage: Store i Chemical N Sodium bicar	ng. Keep co in a cool, d Name rbonate	after handling. Use with intainer tightly closed. A ry, well-ventilated area a Section 8 - Exposur 	a adequate ventilation. Aver void ingestion and inhalati away from incompatible su e Controls, Personal Pro	on. Ibstances. Itection OSHA - Final PELs	

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: NaOHCI 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 MaterialsNot availableHazardous Decomposition ProductsChlorine, sodium oxide.Hazardous PolymerizationHas not been reported.		Incompatible materials. Not available Chlorine, sodium oxide.			
	Section 1	1 - Toxicological Information			
RTECS#:	CAS# 144-55-8: VZ0950000 CAS# 7732-18-5: ZC0110000				
LD50/LC50:	RTECS: CAS# 144-55-8: Draize tes Oral, mouse: LD50 = 3360 Oral, rat: LD50 = 4220 mg/l				
	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				
mutagementy.	utagenicity: Not available				

Not available

Other:

Section 12 - Ecological Information

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:

Not available

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	None of the chemicals in this product are under a Chemical Test Rule.				
Section 12b	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	None of the chemicals in this product have a TPQ.				
Section 313	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 R	egulations				
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 i	CAS# 144-55-8 is listed on Canada's DSL List				
CAS# 7732-18-5	is listed on Canada's DSL List				
Canadian WHMI	S Classifications: Not controlled.				
This product has Regulations and	been classified in accordance with the hazard criteria of the Controlled Products 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 merchantibility 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.

Product Name:

Carbon dioxide Liquid Carbon dioxide

Praxair Material Safety Data Sheet

Product Name:	oduct Name: Carbon dioxide Liquid Carbon dioxide		Carbon dioxide, Medipure® Liquid Carbon dioxide	
Product Use:	Many			
Chemical Name:	Carbon dioxide	Synonym:	Carbon anhydride, Carbonic acid gas	
Chemical Formula: CO2		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 unconciousness. 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:

MSDS# E-4574-L

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	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:

Product Name: Carbon dioxide Liquid Carbon dioxide

Gas cannot catch fire. Container may rutpure 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

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)	LC50 (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.

Product Name:	Carbon dioxide Liquid Carbon dioxide	MSDS#	E-4574-L	Date: Oct. 15, 2013
	EYE PROTECTION:	Wear safety glasses		
	Select in accordance with the current CSA standard Z94.3, "Industrial Eye and Face Protection", and any provincial regulations, local bylaws or guidelines.			
OTHER PRO	TECTIVE EQUIPMENT:	needed. Cuffless trou Select in accordance	cylinder handling. Protective clothing sers should be worn outside the sho with the current CSA standard Z195 r", and any provincial regulations, lo	bes.

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.	J.	
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 & OL	OUR: Colourless.	Odourless gas. It is fo	elt by some to have a s	light, pungent odour and bitin	g taste.

10. Stability and Reactivity STABILITY: The product is stable. CONDITIONS OF CHEMICAL INSTABILITY: Not applicable. INCOMPATIBILITY (materials to avoid): Alkali metats, 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:

Product Name:	Carbon dioxide Liquid Carbon dioxide	MSDS#	E-4574-L	Date: Oct. 15, 2013
EFFECTS: Breathing rate i	ncreases slightly.			CO2 CONCENTRATION: 1%
Breathing rate i tiredness.	ncreases to 50% above norma	l level. Prolonge	d exposure can cause headache,	2%
	ases to twice normal rate and t che, increased blood pressure		Weak narcotic effect. Impaired	3%
	ases to approximately four time ght choking may be felt.	es normal rate, sy	mptoms of intoxication become	4 - 5%
	ars. Judgment may be impaire		neadache, visual impairment, and minutes by loss of	5 - 10%
00110010000110000.				50 - 100%
	ss occurs more rapidly above may eventually result in death			
	/E EFFECTS: A single study h carbon dioxide in air for 24 hou		ease in heart defects in rats nes during gestation. There is no	

evidence that carbon dixoide is tetragenic in humans.

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.				
j .		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.	
SHIPPING LABEL(s)): No	on-flammable, non-corrosive and non-tox	ic gas	
PLACARD (When Re	equired): No	on-flammable, non-corrosive and non-tox	ic 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 Regulation	ons:
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

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 nformation, (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 hazards and safety information.

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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* * *

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.

Material Name: CARBON MONOXIDE

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.

Material Name: CARBON MONOXIDE

SDS ID: 00232334

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* * *

v

Physical State:	Gas
Color:	colorless
Odor:	odorless
Taste:	tasteless
Melting/Freezing Point:	-205 °C
Decomposition:	Not available
LEL:	>=12.5 % by volume
Vapor Pressure:	760 mmHg @ -191 °C
Density:	1.250 g/L @ 0 °C
Log KOW:	Not available
Viscosity:	0.01657 cP @0 °C
Molecular Formula:	C-O

Not available
gas
Not available
Not available
-191.5 °C
Not available
74 % by volume
0.968
2.3 % @ 20 °C
700 °C
28.01

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

Material Name: CARBON MONOXIDE

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)

Material Name: CARBON MONOXIDE

* * *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:

ö 1 11	0					
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

Material Name: CARBON MONOXIDE

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	Classification	Classification	
Blueshield	CSA:	AWS:	
LA S-3/LA HI TENSILE;	ER480S-3/ ER49S-3;	ER70S-3;	
STRAIGHT WELD LA S-3;	ER480S-3/ ER49S-3;	ER70S-3;	
LA S-6/LA 75G;	ER480S-6/ ER49S-6;	ER70S-6;	
STRAIGHT WELD LA S-6;	ER480S-6/ ER49S-6;	ER70S-6;	
Description	: GMAW - Carbon Steel Solid Wires.	Generic Code	AL-T-007-0
n case of emergency	1 -514-878-1667	Date of issue	01/13/2014
Supplier	: Air Liquide Canada Inc., 1250, René-Lévesque Ouest, Suite 1700, Montréal, QC H3B 5E6		

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 MATERIA THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA.
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 MATERIA THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA.
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 MATERIA 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 clothi 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 consid 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 pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure 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 bazardous	This MSDS is written for workers using th	asa alactrodas		

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.
1-800-817-7697	AIR LIQUIDE Page: 1/4



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. Accide	ental 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 of the contaminated surface and dispose of according to local and regional authority requirements.

Storage

Section 8. Exposure Controls, Personal Protection

:

: Use only with adequate ventilation. If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local **Engineering controls** exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

(60°F) and 30°C (80°F) and 50% maximum relative humidity.

Eyes : Safety glasses with side shields. Face shield with radiation shielding.

Personal protection

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.

All filler metals in their original, unopened containers should be kept in a relatively dry storage area at temperatures between 15°C

Feet : Metal cap, safety boots.

Occupational exposure limit	<u>s</u>	TWA (8 hours)	STEL	(15 mins	5)	Ceilin	g		
Ingredient	List name	ppm	mg/m³	Other	ppm	mg/m³	Other	ppm	mg/m³	Other	Notations
	US ACGIH 6/2013 AB 4/2009 BC 7/2013	- - -	0.1 0.2 0.2 0.2	- - -	- - -	- - -	- - -	- - -	- - -	-	[a] [b]
	ON 1/2013 QC 12/2012 US ACGIH	- -	0.2 1 10	- -	- -	- 3 -	- - -	- - -	- - -	-	[c] [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 Melting/freezing point Specific gravity Solubility	:::::::::::::::::::::::::::::::::::::::	Only known value: 7.8 (Water = 1) (iron)

Section 10. Stability and Reactivity

Stability and reactivity	The product is stable.	
Hazardous decomposition products	: Metallic oxides. carbon oxides (CO, CO ₂) 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

	Species	Dose	Exposure
Dral	Rat	9 g/kg	-
Di	ral	ral Rat	

effects on humans 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 Manganese	Acute EC50 3700 µg/l Fresh water Acute LC50 33000 to 100000 µg/l Marine water Acute LC50 6.48 µg/l Marine water 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	Aquatic plants - Lemna minor Crustaceans - Crangon crangon Fish - Periophthalmus waltoni - Adult Algae - Glenodinium halli Aquatic plants - Lemna minor Daphnia - Daphnia magna Fish - Pimephales promelas	4 days 48 hours 96 hours 72 hours 4 days 48 hours 96 hours

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	

<u>SARA 313</u>

	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.					



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

Label requirements	ee Section 2.
Hazardous Material Information	n (U.S.A.) : Health: 2* Fire: 0 Reactivity: 0
National Fire Protection Associa	J.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, G Canadian Transport of Dangerous Goods, Regulations and Schedules, Clear Language version 2005 CRC Handbook of remistry and physics, 67th edition. CRC Press inc., Boca Raton, Florida Manufacturer's Material Safety Data Sheet. ANSI Z400 MSDS Standard, 2004. ANSI Z49.1 Safety in Welding and Cutting, The American Welding Society, P.O. Box 351040, Miami, FL 3135. Canadian Standard Association, CSA W117.2, Code for Safety in Welding and Cutting, 2003.
Abbreviations and acronyms	CGIH: American Conference of Governmental Industrial Hygiene. CGIH-A1-Confirmed Human Carcinogen. CGIH-A2-Suspected Human Carcinogen. CGIH-A3-Animal Carcinogen. CGIH-A5-Not Classifiable as a Human Carcinogen. CGIH-A5-Not suspected as a Human Carcinogen. RC: International Agency for Research on Cancer. RC 1: Proven. RC 2A: Probable for human. RC 2B: Possible for human. RC 3: Not classifiable for human. RC 3: Not classifiable for human. IOSH: National Institute of Occupational Safety and Health. IOSH + : Proven. IOSH + : Proven. IOSH : None. U: European Union arc. 1A : May cause cancer (Known) arc. 1B : May cause cancer (Presumed) arc. 2 : Suspected of causing cancer TP: National Toxicology program. TP 1: Known to be human carcinogens. TP 2: Reasonably Anticipated to be human carcinogens.
Responsible name	IS
Date of previous issue	1/15/2011
Version	
Version	

Notice to reader

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SAFETY DATA SHEET

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	AI	С	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
<u>OK</u>									
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
<u>ESAB</u>									
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

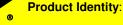
10. STABILITY AND REACTIVITY

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
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 <u>www.esabna.com</u> 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 <u>www.aws.org</u>.

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

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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 !	527 388	37 (other countries)
	INGREDIENTS AND EX	KPOSURE LIMITS		
Ingredients:	CAS Number:	TLV: P	EL:	STEL:
Acetone	67-64-1	500 ppm 10	000 ppn	n 750 ppm
Isopropyl alcohol	67-63-0		00 ppm	
Isobutane	75-28-5 74-98-6	NE N		NE n NE
Propane	ermissible Exposure Limit. TLV =		000 ppn	
Limit. $NE = None Established. NA$			uue. 3	
	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.
		•		
Flash Point:	0° F (- 18° C)	Flammable Limits:		1.4 – 13.0%
Extinguishing Media:	Water spray, CO ₂ , Dry Chemical,			
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.				
	REACTIVIT	(DATA		
Stability:	Stable.	Hazardous Polymerizatio	on:	Will not occur.
Incompatibility:	Strong oxidizing agents, acids, ar	nd bases. Extreme heat / fire	e.	
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 HAZA	RD DATA		
Known Hazards:	Acute: Skin irritation. Eye irr	itation. Central nervous sy	/stem (CNS) depressant. Chronic:
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 c	or OSH/	۹.
Medical Conditions Aggravated by Exposure:	Eye, skin, and respiratory condition	ons.		

	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.
CO	NTROL 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

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	-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	>2 g/kg	8000 ppm 8 hours
	200 ppm	Skin (Rabbit)	Inhalation (Rat)
ACETONE			
20 - 30	67-64-1	9750 mg/kg	16000 ppm 4 hours
	750 ppm	Oral (Rat)	Inhalation (Rat)
METHYL ETHYL KETON	1E		
10 - 15	78-93-3	2737 mg/kg	23500 mg/m3 8 Hours
	200 ppm	Oral (Rat)	Inhalation (Rat)

SECTION 03: HAZARDS IDENTIFICATION

ROUTE OF ENTRY:
SKIN CONTACTCan cause moderate skin irritation,
defatting and dermatitis.
SKIN ABSORPTIONNot available.
INHALATIONSee "EFFECTS OF CHRONIC EXPOSURE", below.
INHALATION CHRONICBreathing of high vapour concentrations
could cause dizziness, headache or even
unconsciousness. May be anesthetic which
could result in other central nervous system effects.
INGESTIONCan 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 CONTACTContains materials that are moderately
irritating to the eyes.
EFFECTS OF ACUTE EXPOSURERefer to "ROUTE ENTRY" section.
EFFECTS OF CHRONIC EXPOSUREProduct is believed to have low toxicity
for other chronic exposures. Prolonged or
repeated skin contact may cause drying or
cracking of the skin.

Ref: 00000296

Preparation Date : June.21.2013

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)	-
AUTO IGNITION TEMPERATURE	
UPPER FLAMMABLE LIMIT (% VOL)	
LOWER FLAMMABLE LIMIT (% VOL)	
	-Alcohol foam, CO2 or dry chemical.
	-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 PROCEDURESA	void skin and eye contact. Avoid breathing
va	apours. Use adequate ventilation. Keep away
fi	rom heat, sparks and open flame.
STORAGE NEEDSSt	tore in a cool area, away from all
S	ources of heat and ignition. Keep
C	ontainer closed and out of reach from
cl	hildren and pets when not in use. Store in
a	dry, well ventilated area.

Ref: 00000296

Preparation Date : June.21.2013

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

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SECTION 08: EXPOSURE CONTROLS / PERSONAL PROTECTION

PROTECTIVE EQUIPMENT:
EYE/TYPESafety glasses.
RESPIRATORY/TYPEIf 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/TYPENot applicable.
FOOTWEAR/TYPENot applicable.
OTHER/TYPEEye bath and safety shower.
VENTILATION REQUIREMENTSNatural or mechanical (Explosion Proof) ventilation to keep vapour levels well below the TLV.

SECTION 09: PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATELiquid.
ODOURSolvent odour.
SPECIFIC GRAVITY0.80 - 0.90.
ODOUR THRESHOLD (ppm)Not available.
VAPOUR PRESSURE145 mmHg @ 20°C.
VAPOUR DENSITY (AIR=1)>1.00.
EVAPORATION RATE6.00 (NBUAC = 1).
BOILING POINT (deg C)65°C.
pHNot applicable.
SOLUBILITY IN WATER (% W/W)Negligible.
COEFFICIENT OF WATER\OILNot available.
DISTRIBUTION
FREEZING POINT <0°C.
MELTING POINT (deg C)Not applicable.
MOLECULAR WEIGHTNot 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

XPOSURE LIMIT OF MATERIALSee "HAZARDOUS INGREDIENTS" in SECTION 2.
RRITANCY OF MATERIALModerate.
ENSITIZING CAPABILITY OFNot available.
ATERIAL
ARCINOGENICITY OF MATERIALNo information is available and no adverse
carcinogenic effects are anticipated.
ERATOGENICITY no information is available and no adverse
teratogenicity effects are anticipated.
UTAGENICITY no information is available and no adverse
mutagenicity effects are anticipated.
EPRODUCTIVE EFFECTSNo information is available and no adverse
reproductive effects are anticipated.
YNERGISTIC MATERIALSNot available.

Ref: 00000296

Preparation Date : June.21.2013

MATERIAL SAFETY DATA SHEET CLEANER 33

Page:4

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	
	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) 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 COMPLIANCETh	is product has been classified in
ac	cordance with the hazard criteria of the
CP	R and the MSDS contains all the
in	formation required by the CPR.
WHMIS CLASSIFICATIONCl	ass B Div.2 Flammable Liquid Class D
Di	v.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

Ref: 00000296

Preparation Date : June.21.2013

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





Health	2
Fire	1
Reactivity	0
Personal Protection	Е

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

Cl#: 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: Kame 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.

lonicity (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.

Ĵ_i	<u>okisch</u>	Material Safety Data Sheet according to ANSI Z400.1-2004	Intercon Enterprises Inc.
		Concentrate W2 OP	
Print date: 21.0	2.2012	Product code: 002	Page 1 of
SECTION 1: I	dentification of th	ne substance/mixture and of the company/ur	ndertaking
Product identi	fier		
	Concentrate W2 O	P	
Chemical cl	haracterization (M	lixture)	
Datalla af the a		to data abast	
Company na	supplier of the safe	Intercon Enterprises Inc.	
Street:	ame.	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	
	Department:	Manufacturer:	
		Jokisch GmbH, Germany Industriestraße 5, D-33813 Oerlinghausen Phone: +49.5202.9734-0 Fax: +49.5202.9734-49	
Emergency tel	ephone:	Giftnotruf Berlin: +49 (0) 30 / 30 686 790	
	1	41	
SECTION 2: H	lazards identifica	tion	
SECTION 2: H Route(s) of		tion	
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Route(s) of Signs and S	Entry Symptoms of Expo		
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Route(s) of Signs and S Carcinogenia Carcinogenia Carcinogenia SECTION 3: C Mixtures Hazardous co CAS No 68155-20-4	Entry Symptoms of Exposicity (NTP): city (IARC): city (OSHA): Composition/Infor Components Components 4 Amide, Tallol-fett-, N	sure mation on ingredients	5 - 10 %
Route(s) of Signs and S Carcinogenia Carcinogenia Carcinogenia SECTION 3: C Mixtures Hazardous co CAS No 68155-20-4 85535-85-8	Entry Symptoms of Exposicity (NTP): city (IARC): city (OSHA): Composition/infor mponents Components 4 Amide, Tallol-fett-, N 9 alkanes, C14-17, ch	Sure rmation on ingredients I,N-Bis(hydroxyethyl) Ioro; chlorinated paraffins, C14-17	5 - 10 % 5 - 10 %
Route(s) of Signs and S Carcinogenia Carcinogenia Carcinogenia SECTION 3: C Mixtures Hazardous co CAS No 68155-20-4 85535-85-5 68920-66-1	Entry Symptoms of Exposicity (NTP): city (IARC): city (OSHA): Composition/infor mponents Components Amide, Tallol-fett-, N alkanes, C14-17, ch Fettalkoholpolyglyko	sure mation on ingredients I,N-Bis(hydroxyethyl) loro; chlorinated paraffins, C14-17 olether	5 - 10 % 5 - 10 % 1 - 5 %
Route(s) of Signs and S Carcinogenia Carcinogenia Carcinogenia SECTION 3: C Mixtures Hazardous co CAS No 68155-20-4 85535-85-5 68920-66-1	Entry Symptoms of Exposicity (NTP): city (IARC): city (OSHA): Composition/Infor mponents Components 4 Amide, Tallol-fett-, N alkanes, C14-17, ch Fettalkoholpolyglyko 2 2,2'-iminodiethanol,	sure mation on ingredients I,N-Bis(hydroxyethyl) loro; chlorinated paraffins, C14-17 olether	5 - 10 % 5 - 10 % 1 - 5 % 1 - 5 %
Route(s) of Signs and S Carcinogenia Carcinogenia Carcinogenia SECTION 3: C Mixtures Hazardous co CAS No 68155-20-4 85535-85-5 68920-66-1 111-42-2	Entry Symptoms of Exposicity (NTP): city (IARC): city (IARC): city (OSHA): Composition/infor mponents Components Amide, Tallol-fett-, N alkanes, C14-17, ch Fettalkoholpolyglyko 2,2,2'-iminodiethanol, Fettsäureamid	sure mation on ingredients I,N-Bis(hydroxyethyl) loro; chlorinated paraffins, C14-17 olether	5 - 10 % 5 - 10 % 1 - 5 % 1 - 5 % 1 - 5 %
Route(s) of Signs and S Carcinogenia Carcinogenia Carcinogenia SECTION 3: C Mixtures Hazardous co CAS No 68155-20-4 85535-85-9 68920-66-1 111-42-2 102-71-6	Entry Symptoms of Exposicity (NTP): city (IARC): city (IARC): city (OSHA): Composition/infor mponents Components Amide, Tallol-fett-, N alkanes, C14-17, ch Fettalkoholpolyglyko 2 2,2'-iminodiethanol, Fettsäureamid Triethanolamin	Sure rmation on ingredients A,N-Bis(hydroxyethyl) loro; chlorinated paraffins, C14-17 olether diethanolamine	5 - 10 % 5 - 10 % 1 - 5 % 1 - 5 % 1 - 5 % 1 - 5 %
Route(s) of Signs and S Carcinogenia Carcinogenia Carcinogenia SECTION 3: C Mixtures Hazardous co CAS No 68155-20-4 85535-85-5 68920-66-1 111-42-2 102-71-6 3302-10-1	Entry Symptoms of Exposicity (NTP): city (IARC): city (IARC): city (OSHA): Composition/infor mponents Components Amide, Tallol-fett-, N alkanes, C14-17, ch Fettalkoholpolyglyko 2,2'-iminodiethanol, Fettsäureamid Triethanolamin 3,5,5-Trimethylherar	sure mation on ingredients I,N-Bis(hydroxyethyl) Ioro; chlorinated paraffins, C14-17 Dether diethanolamine Insäure	5 - 10 % 5 - 10 % 1 - 5 %
Route(s) of Signs and S Carcinogenia Carcinogenia Carcinogenia SECTION 3: C Mixtures Hazardous co CAS No 68155-20-4 85535-85-5 68920-66-1 111-42-2 102-71-6 3302-10-1 112-34-5	Entry Symptoms of Exposi- city (NTP): city (IARC): city (OSHA): Composition/infor mponents Components Amide, Tallol-fett-, N alkanes, C14-17, ch Fettalkoholpolyglyko 2,2'-iminodiethanol, Fettsäureamid Triethanolamin 1,3,5,5-Trimethylherari 2-(2-butoxyethoxy)e	Sure rmation on ingredients A,N-Bis(hydroxyethyl) loro; chlorinated paraffins, C14-17 olether diethanolamine	5 - 10 % 5 - 10 % 1 - 5 %
Route(s) of Signs and S Carcinogenia Carcinogenia Carcinogenia SECTION 3: C Mixtures Hazardous co CAS No 68155-20-4 85535-85-5 68920-66-1 111-42-2 102-71-6 3302-10-1 112-34-5 10043-35-3	Entry Symptoms of Exposi- city (NTP): city (IARC): city (OSHA): Composition/infor mponents Components 4 Amide, Tallol-fett-, N alkanes, C14-17, ch 4 Amide, Tallol-fett-, N alkanes, C14-17, ch 5 Ettalkoholpolyglyko 2 2,2'-iminodiethanol, Fettsäureamid 3 Triethanolamin 1 3,5,5-Trimethylherau 2 -(2-butoxyethoxy)e 3 boric acid	sure mation on ingredients I,N-Bis(hydroxyethyl) Ioro; chlorinated paraffins, C14-17 Dether diethanolamine Insäure	$\begin{array}{c c} 5-10 \% \\ 5-10 \% \\ 1-5$
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according to ANSI Z400.1-2004

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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 unconsiousness 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 (NOx). 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

J jokisch

Material Safety Data Sheet

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_	Advice on safe handling	
	Use only in well-ventilated areas.	
	Dicrect 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 absorbtion 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 hanled. Maximum period of storage (time):

SECTION 8: Exposure controls/personal protection

Control parameters

Exposure limits

CAS No	Components	ppm	mg/m³	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.

	irrelevant determined determined	Test method DIN 51369	Page 4 of 5
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not	irrelevant determined determined		
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		ASTIVI D 7042	
	479	ASTM D 7042	
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Ovidizing agents strong acid			
cts: none/none			
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S.			
	cal experience. properties of the components. i in accordance with the calculation m iC).	1,05 g/cm³ 479 Oxidizing agents, strong. acid. tts: none/none cal experience. properties of the components. in accordance with the calculation method gove (C). s.	1,05 g/cm ³ EN ISO 12185 ASTM D 7042 479 ASTM D 7042 Oxidizing agents, strong. acid. ets: none/none cal experience. properties of the components. in accordance with the calculation method governed by the (C).

j <u>jokisch</u>	Material Safety Data Sheet according to ANSI Z400.1-2004	Intercon Enterprises Inc.
	Concentrate W2 OP	
Print date: 21.02.2012	Product code: 002	Page 5 of 5
Waste treatment methods		
Advice on disposal Completely emptied pack	ings can be re-cycled. Waste disposal according to off	icial state regulations.
SECTION 14: Transport information		
Marine transport		
Other applicable information Not restricted		
Air transport		
Other applicable information Not restricted		
SECTION 15: Regulatory information	1	
U.S. Regulations		
SECTION 16: Other information		And the second
Hazardous Materials Information Lab	pel (HMIS)	
Health:	1	
Flammability:	0	
NFPA Hazard Ratings		
Health:	1	0
Flammability:	0	
Reactivity:	0	< Y
Unique Hazard:		\checkmark

(The data for the hazardous ingredients were taken respectively from the last version of the sub-contractor's safety data sheet.)



MATERIAL SAFETY DATA SHEET

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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 All	oy			
Synonyms:	Copper, UNS/CDA All	oy Nos. C10000-C15599	(except 15815)		
Chemical Family:	Copper				
Formula:	Not applicable - mixture				
Product Use:	Metallurgical Produ	cts			
COMPANY ADDRESS	MSDS Control Group	TECHNICAL	EMERGENCY TELEPHONE	NUMBER:	
	Olin Brass	INFORMATION:	1-618-258-5167		
	427 North Shamrock St.	618-258-5003			

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

East Alton, IL 62024-1197

www.olinbrass.com

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 VENTILATION. AVOID CONTACT WITH EYES, SKIN 2	RESPIRATORY TRACT IRRITATION. USE AND CLOTHING. WASH THOROUGHLY AFTER						
	<pre>ee of hazard (0 = low, 4 = extreme) th: 1 Flammability: 0</pre>	Physical Hazard:					
System (HMIS)		None					
National Fire Protection Association Mixture. Not rated. $(NFPA)$							
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 for copper is 100 mg/m^3 .	known. The IDLH					

POTENTIAL HEALTH EFFECTS

ACUTE EFFECT	<u>'S</u>
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.
QUIDONITO	Durd and an annexed which contract with durt many many many standards in the

CHRONICProlonged 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
	\overline{d} ifficulty), 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

PROPERTY	VALUE	PROPERTY	VALUE
Explosive	No	Flammable	No
Combustible	No	Pyrophoric	No
Flash Point (°C):	Not	Burning Rate of	Not applicable
Flash Point (C):	applicable	Material:	Not applicable
Lower Explosive	Not	Autoignition Temp.:	Not applicable
Limit:	applicable	Aucoignicion remp	Not applicable
		Flammability	
Upper Explosive	e Not	Classification:	Not appliable
Limit:	applicable	(defined by 29 CFR	Not applicable
		1910.1200)	

UNUSUAL FIRE AND EXPLOSION HAZARDS: EXTINGUISHING MEDIA: Dust may cause an ignitable and/or an explosive atmosphere. For localized powder fires, smother with dry sand, dry dolomite, sodium chloride or soda ash. Use fireextinguishing media appropriate to fight surrounding fire. None required.

SPECIAL FIREFIGHTING PROCEDURES:

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)	0.1mg/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: CONDITIONS TO AVOID:

MATERIALS TO AVOID:

Stable under normal temperatures and pressure Not affected by mechanical impact or shock or by electrical discharge. 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. Will not occur.

HAZARDOUS POLYMERIZATION:

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: CARCINOGENICITY:

REPRODUCTIVE, TERATOGENICITY, OR

No information for product. This product is not known or reported to be carcinogenic by IARC, NTP, OSHA, or EPA. This product is not known or reported to be mutagenic. 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. This product is not known or reported to cause neurological effects.

NEUROLOGICAL EFFECTS:

DEVELOPMENTAL EFFECTS:

MUTAGENICITY:

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 dataBIOACCUMULATION: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 nonhazardous wastes. This product may be a candidate for metal reclamation.



14. TRANSPORT INFORMATION

	U.S. DOT	RID/ADR	IMDG	IATA	IMO	Canada TDG
PROPER SHIPPING NAME:			Not reg	gulated		
HAZARD CLASS:						
UN NO.:						
PACKING GROUP:						
LABEL:						
REPORTABLE QUANTITY:						

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:	Health: For dust or fume only	Acute - Yes, Chronic -	<u>Fire</u> : None	<u>Reactivity</u> : None	Release of Pressure: None		
	No						
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	Х	Х	Х	Х

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

<u>NOTICE:</u> 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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HAZARD RATING Please rate consistent with NFPA cod

mebility Beting

MATERIAL SAFETY DATA SHEET

I. PRODUCT INFORMATION

TRADE NAME (COMMON NAME OR SYNONYM)

Copper Tubing (all sizes and wall thicknesses)

CHEMICAL NAME Copper	FORM	IULA Cu	MOLECU	<u>LAR WEIGHT .</u> 63.55		
<u>CONTACT</u> Safety/Environmental	PHONE NUMBE 618/337-6000	R ISSUED DAT October 1, 201		<u>CEDES</u> . 12, 2010		
II. COMPOSITION/INF	ORMATION O	N INGREDIENTS				
MATERIAL OR COMPONENT	C.A.S. No.	WT. %	PERMISSIBLE A	IR CONC. (mg/cu.m).		
Copper	7440-50-8	99.9 +	OSHA Dust - 1.0 Fume - 0.1	ACGIH . 1.0 0.2		
III HAZARDS IDENTIFICATION						
PRIMARY ROUTES OF ENTR	Y INGESTION I	NHALATION SKIN <u>X</u> Not l	CARCINGENICITY listed as a carcinogen by N	FP, IARC, or OSHA		
ACUTE OVER EXPOSURE (SV	MPTOMS AND FFE					

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
	-F-	
FIRE AND EXPLOSION HAZ	ZARDS FIRE EXTINGUISHING AGENTS 1	RECOMMENDED FIRE EXTINGUISHING AGENTS TO AVOID
Not Applicable	No specific agents recomme	ended 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	LABEL SIGNAL WORD:	
No special precautions.	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) APPEARANCE AND ODOR .					
Solid	Solid Yellow-red metal, various shapes and sizes.				
MELTING POINT (DEGREES C)	BOILING POINT (DEGREES C)	SPECIFIC GRAVITY (H2O = 1)	VAPOR DENSITY (AIR = 1) \therefore		
1083	2595	8.96	Not applicable		
SOLUBILITY IN WATER (% BY W	Г.) рН	VAPOR PRESSURE (mm Hg)	EVAPORATION RATE .		
Insoluble	Not Applicable	Not Applicable	Not Applicable		
X. STABILITY AND REACTIVITY STABILITY CONDITIONS TO AVOID .					
Stable Not Applicable					
<u>INCOMPATIBILITY (MATERIALS TO AVOID)</u> . Reacts violently with acetylene, hydrogen peroxides, gaseous chlorine, ammonia nitrate, bromates, chlorates, hydrogen sulfide, lead azide, and hydrazine.					
HAZARDOUS DECOMPOSIT		RDOUS POLYMERIZATION	CONDITIONS TO AVOID .		

Copper does not decompose

Not Applicable

XI. TOXICOLOGICAL INFORMATION

LD50 (SPECIES, ROUTE)	LC50 (SPECIES)	MUTAGENICITY
Conner: 3.5 mg/kg (mayse introportioned)	Not Availabla	Not positive in A mes test

Copper: 3.5 mg/kg (mouse, intraperitoneal)

Not Available

Not positive in Ames test

XII. ECOLOGICAL

ECOTOXICITY

ENVIRONMENTAL FATE

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

4. Filst Alu Meusules	
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, CO2, 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	Not available.

6. Accidental Release Measures

impact

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

Components	Туре	Value	Form
Morpholine (CAS 110-91-8)	TWA	20 ppm	
Sodium Molybdate (CAS 7631-95-0)	TWA	0.5 mg/m3	Respirable fraction.
Canada. Alberta OELs (Occupationa	l Health & Safety Code, Schedule	1, Table 2)	
Components	Туре	Value	Form
Morpholine (CAS 110-91-8)	TWA	71 mg/m3	
		20 ppm	
Sodium Molybdate (CAS 7631-95-0)	TWA	0.5 mg/m3	Respirable.
Canada. British Columbia OELs. (Oc 296/97, as amended)	cupational Exposure Limits for C	hemical Substances, Occupatior	al Health and Safety Regula
Components	Туре	Value	Form
		20 ppm	

Components	Туре	Va	lue	Form
Sodium Molybdate (CAS 7631-95-0)	TWA	0.5	mg/m3	Respirable.
Canada. Manitoba OELs (Reg. 2	217/2006, The Workplace So	afety And Health Act)		
Components	Туре	Va	lue	Form
Morpholine (CAS 110-91-8)	TWA	20	ppm	
Sodium Molybdate (CAS 7631-95-0)	TWA	0.5	mg/m3	Respirable fraction.
Canada. Ontario OELs. (Contro	l of Exposure to Biological o	or Chemical Agents)		
Components	Туре	Va	lue	Form
Morpholine (CAS 110-91-8)	STEL	10	5 mg/m3	
			ppm	
	TWA		mg/m3	
			ppm	
Sodium Molybdate (CAS 7631-95-0)	TWA	0.5	mg/m3	Respirable fraction.
Canada. Quebec OELs. (Ministr	y of Labor - Regulation Res	pecting the Quality of the Wor	k Environme	nt)
Components	Туре		lue	
Morpholine (CAS 110-91-8)	TWA	71	mg/m3	
			ppm	
Sodium Molybdate (CAS 7631-95-0)	TWA	5 n	ng/m3	
US. OSHA Table Z-1 Limits for A Components	Air Contaminants (29 CFR 19 Type		lue	
Morpholine (CAS 110-91-8)	PEL		mg/m3	
			ppm	
Sodium Molybdate (CAS 7631-95-0)	PEL		ng/m3	
ogical limit values	No biological exposure lim	its noted for the ingredient(s).		
-	no biological enposare int			
osure guidelines				
Canada - Alberta OELs: Skin de	signation			
Morpholine (CAS 110-91-8) Canada - British Columbia OEL	s: Skin designation	Can be absorbed throug	h the skin.	
Morpholine (CAS 110-91-8)		Can be absorbed throug	h the skin.	
Canada - Manitoba OELs: Skin	designation			
Morpholine (CAS 110-91-8)		Can be absorbed throug	h the skin.	
Canada - Ontario OELs: Skin de	esignation			
Morpholine (CAS 110-91-8)		Can be absorbed throug	h the skin.	
Canada - Quebec OELs: Skin de	esignation			
Morpholine (CAS 110-91-8)		Can be absorbed throug	h the skin.	
Canada - Saskatchewan OELs:	Skin designation			
Morpholine (CAS 110-91-8)		Can be absorbed throug	h the skin.	
US. ACGIH Threshold Limit Valu	Jes			
Morpholine (CAS 110-91-8)		Can be absorbed throug	h the skin.	
neering controls	Provide adequate ventilati	on.		
onal protective equipment				
Eye / face protection	Splash proof chemical gog	ales. Face shield		
		oves. Wash off after each use. F	Ponlaco as na	cassary Chamical resistant
Skin protection	apron.		·	
Respiratory protection		se is appropriate, use organic v 5, R99, R100, P95, P99 or P100.	apor cartridg	es and any of the following
hysical & Chemical Prope	rties			
earance				

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		
Dermal		
LD50	Rabbit	> 5000 mg/kg, (Estimated value)
Oral		
LD50	Rat	> 5000 mg/kg, (Estimated value)
Components	Species	Test Results
Morpholine (CAS 110-91-8)		
Acute		
Dermal		
LD50	Rabbit	504 mg/kg
Inhalation		
LC50	Rat	8 mg/l, 4 Hour
Oral		
LD50	Rat	1680 mg/kg
Sodium Molybdate (CAS 7631-95-0)		
Acute		
Inhl		
LC50	Rat	> 2080 mg/m3/4hr
Material name: CORRSHIELD* MD4102		Page: 4 / 6
Version number: 2.0		5

Components	Species	Test Results			
Oral					
LD50	Rat	4000 mg/kg			
Carcinogenicity					
ACGIH Carcinogens Morpholine (CAS 110-91-8) Sodium Molybdate (CAS 76 IARC Monographs. Overall Evo Morpholine (CAS 110-91-8)	331-95-0) Iluation of Carcinogenicity	A4 Not classifiable as a human carcinogen. A3 Confirmed animal carcinogen with unknown relevance to humans. 3 Not classifiable as to carcinogenicity to humans.			
12. Ecological Information					
Ecotoxicity	No ecotoxicity data noted for t	he 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 disposed of in a safe manner.	Empty containers or liners may retain some product residues. This material and its container must be			
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 go	ods.				
DOT					
Not regulated as a dangerous of Some containers may be DOT e	good. exempt, please check BOL for exa	ct container classification.			
Not regulated as dangerous go	ods.				
Not regulated as dangerous go	ods.				
15. Regulatory Information					
WHMIS status	Controlled				
WHMIS classification	D2B - Other Toxic Effects-TOXI	c			
WHMIS labeling					
(\underline{I})					

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).

Inventory status

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.

Page 1 of 2

Date of Preparation: January 2, 2013

MATERIAL SAFETY DATA SHEET Use in case of an emergency only (613) 996-6666

SECTION I - PRODUCT AND PREPARATION INFORMATION 10D3								
	777 McKay Road TRADE NAME: D3 HB PVC GREY							
SCHWARTZ	5				MANUFAC. CO		10D3	
ADVANCED CHEMISTRY SOLUTIONS	(905) 683-0411				PRODUCT CLA		ADHESIVE CLASS 3 UN1133 PACKING GROUP II	
	(903) 003-0411	Pr	repared by: Technical Committee		WHIMIS CLAS		B2 D2B	
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 CYCLOHEXANONE	78-93-3 108-94-1	15-40 7-13	HARMFUL IF INHALED, IRRITANT SKIN CONTACT HARMFUL IF INHALED, IRRITANT SKIN CONTACT	ACUTE ACUTE	200 PPM 25 PPM	TLV TLV		
TETRAHYDROFURAN	109-99-9	40-70	HARMFUL IF INHALED, IRRITANT SKIN CONTACT HARMFUL IF INHALED, IRRITANT SKIN CONTACT	ACUTE	200 PPM	TLV		
SECTION III - PHYSICAL DATA								
ODOUR AND APPEARANCE	ODOUR AND APPEARANCE PH VALUE PERCENT VOLATILE BY VOLUME EVAPORATION RATE							
KETONE			81%		GREATER THA	N BUTYL .	ACETATE	
GREY LIQUID			VOC LEVEL 510 g/L					
BOILING POINT			FREEZING POINT		SPECIFIC GRA	AVITY		
66 °C SECTION IV - FIRE AND EXPLOSION HAZA	BDC		°C		0.946			
FLAMMABILITY CLASSIFICATION /	FLASHPOINT	HAZAR	DOUS COMBUSTION PRODUCTS				-	
Class 3, Division 2	14- °C		FORCED TO BURN, THIS PRODUCT GIVES OUT CARBC	ON MONOXI	DE, CARBON DI	IOXIDE, HY	(DROGEN CHLORIDE AND SMOKE	
	TAG CUP		GUISHING MEDIA					
		Foam, dr	ry chemical, carbon dioxide or any class B extinguishing ag	gent				
UNUSUAL FIRE AND EXPLOSION HAZARD								
							equipment and all other sources of ignition. Keep away from and do rk-proof tools and conductive shoes to avoid sparking hazards.	
SPECIAL FIREFIGHTING PROCEDURES								
Exposure to vapours or products of combustion	n should be avoided.	Self-con	tained breathing apparatus is recommended. Vapours ma	ay form an ex	plosive mixture v	with air. Clo	used containers may rupture when exposed to extreme heat.	

Date of Preparation: January 2, 2013

MATERIAL SAFETY DATA SHEET 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 PROCEDUES	
INHALATION: Excessive exposure to vapours or spray mists can result in headache, dizziness,	INHALATION: Remove victim to fresh air. Restore breathing. Treat symptomatically.	
incoordination and loss of consciousness. Irritation of the eyes, nose, throat and lungs	Consult a physician.	
can also occur when exposed to high vapour concentrations. Some reports have associated repeated and prolonged occupational overexposure to solvents with	SPLASH (EYES): Flush immediately with large amounts of water for at least 15 minutes. Take to a physician for medical treatment.	
permanent nervous system damage.	SPLASH (SKIN): Wash affected areas with soap and water. Remove contaminated	
EYE CONTACT: This material can cause eve irritation. The effects are usually reversible.	clothing.	
SKIN CONTACT: This material may cause defatting and irritation of skin (Dermattitis) upon prolonged or	INGESTION: Drink 1 or 2 glasses of water to dilute. DO NOT INDUCE VOMITING.	
repeated contact.	Consult a physician or Poison Control center immediately. Treat	
INGESTION: Swallowing can cause nausea, vomiting, diarrhea and loss of consciousness.	symptomatically.	
CHRONIC EFFECTS OF OVEREXPOSURE	IRRITANT SENSITIZER	
n/av	YES: Skin and Eye YES: Skin	
SECTION VI - REACTIVITIY DATA		
STABILITY:	HAZARDOUS POLYMERIZATIONS:	
Stable	Will not occur	
INCOMPATABILITY: (Materials to avoid)	CONDITIONS TO AVOID:	
Oxidizing compounds HAZARDOUS DECOMPOSITION PRODUCTS:	Vapour concentrations Ignition sources	
None known	ignuor sources	
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	Dispose of this material in accordance with Federal, Provincial, and	
such as vermiculite or sand and place material into a closed container. If a large spill, dike area to prevent this	Municipal regulations.	
material from entering water systems or sewers. Wear protective equipment during cleanup.		
SECTION VIII - SPECIAL PROTECTION INFORMATION		
PERSONAL PROTECTION EQUIPMENT		
PROTECTIVE GLOVES:	EYE PROTECTION:	
Chemical reistant 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.	
	OTHER PROTECTIVE EQUIPMENT:	
RESPIRATORY PROTECTION: An organic vapour cartridge respiratory mask shall be worn to prevent the inhalation of vapours or spray mist when	Eye wash fountain and safety showers must be available in areas where this material is used. Wear protective clothing to prevent skin contact.	
the TLB or PEL is exceeded. If respiratory protection is required, institute a complete repiratory protection program.	ENGINEERING CONTROLS - VENTILATION:	
Refer to the CSA Standard Z94.4 M1982 "Selection, Care and Use of Respirators" available from the Candadian Standard Association, Rexdale, Ontario. M9W 1R3	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	
STORAGE: Keep storage area separate from populated work areas. Store in a cool, dry, well ventilated area, out of direct s	sunlight and away	
from incompatible materials and any source of ignition. Ventilation fans and electrical equipment should be non HANDLING: Avoid prolonged or repeated inhalation of vapours or spray mist. Avoid prolonged or repeated skin contact. G		
equipment and container to prevent a static charge build-up.		
ATTENTION: Emptied containers may retain hazardous residue and explosive vapours. Keep away from heat, sparks and fla	ames. Do not cut	
puncture or weld near this container. Follow label warning until container is thoroughly cleaned or destroyed.		

DAP®	Material Safety Data	An RPIT 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
	Sheet		 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 in	nformation to employees of	ustomers, and users of this prod	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

888-327-8477 (non-emergency matters)

This Material Safety Data Sheet is available in American Spanish upon request. Los Datos de Serguridad del Producto pueden obtenerse en Espanol si lo riquiere.

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		

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

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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/(%SiO2 + 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 mg/m3/(% SiO2 + 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)		'I '
2		
2.5	· · ·	
3.5		
5.0		
10	· · ·	

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

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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
Odor:	Very Slight Ammonia
Color:	Colored
Solubility in H2O:	Not Established
Freeze Point:	Not Established
Vapor Pressure:	Not Established
Physical State:	Paste
Flash Point, F:	Greater than 200
Lower Explosive Limit, %:	Not Determined

Vapor Density: Odor Threshold: **Evaporation Rate:** Specific Gravity: pH: Viscosity: Flammability: Method: Upper Explosive Limit, %:Not Determined

Heavier Than Air Not Established Slower Than n-Butyl Acetate 1.57 - 1.59 Between 7.0 and 12.0 Not Established Non-Flammable (Seta Closed Cup)

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., COx, NOx.

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

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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:

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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:

Section 16 - Other Information

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.

HMIS Ratin	HMIS Ratings:								
Health: 1	Flammability: 0	Reactivity: 0	Personal Protection: X						
Volatile Org	ganic Compounds (VOC), less wat	er less exempts: g/L: 32	.7 lb/gal: 0.27 wt:wt%: 1.4						
Volatile Orç	ganic Compounds (VOC), less wat	er less exempts, less LVP-	VOCs: wt:wt%: 0.6						
REASON FO	DR REVISION: Periodic Update								
Legend:	N.A. – Not Applicable	ACGIH – American C	ACGIH – American Conference of Governmental Industrial Hygienists						
	N.E. – Not Established	SARA – Superfund	SARA – Superfund Amendments and Reauthorization Act of 1986						
	N.D. – Not Determined	NJRTK – New Jers	ey Right-to-Know Law						
	VOC – Volatile Organic Compound	OSHA – Occupatior	nal Safety and Health Administration						
	PEL – Permissible Exposure Limit	HMIS – Hazardous	Materials Identification System						
	TLV – Threshold Limit Value	NTP – National Toxic	NTP – National Toxicology Program						
	CEIL – Ceiling Exposure Limit	STEL – Short Term	STEL – Short Term Exposure Limit						
	LD50 – Lethal Dose 50	LC50 – Lethal Conc	centration 50						
	F – Degree Fahrenheit	MSDS – Material S	afety Data Sheet						
	C – Degree Celsius	CASRN – The Che	mical 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 CHEMTREC (314) 469-7000 / (800) 554-5499 (800) 424-9300			
Street Address 2008 Altom Court	CityStatePostal CodeSt. LouisMO63146-4151			Last Update 10/20/12
Product Name Degreasing Solvent ef	Product Number 4162	Product Use Chlorinated Hydrocarbon Solvent		EPA Registration # N/A

SECTION 2 - COMPOSITION/INFORMATION ON INGREDIENTS

Hazardous Ingredients	<u>% By Wt.</u>	CAS Number	TLV	PEL
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

Eves: 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.

<u>Chronic Exposure</u>: 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.

<u>Medical Conditions Aggravated be Exposure</u>: ACUTE (Primary Route of Exposure) Acute effects are possible irritation and discomfort

SECTION 4 – FIRST AID MEASURES

Eves: 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 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.

Eve 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	<u>Vapor Density [air =1]</u> : 60-90 F: >1	Evaporation Rate: (ether=l): <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	<u>pH (concentrate</u>): 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	<u>CAS #</u>	EINECS #	LD 50 of Ingredient (Specify Species)	LC50 of Ingredient (Specify Species)
No Data.				

SECTION 12 – ECOLOGICAL INFORMATION						
Hazardous Ingredients			Aquatic Toxicity Data			
No Data.						
SECTION	N 13 – DISPOSAL CONSI	DERATION	S			
Waste Dispo	osal: N/A					
SECTION	N 14 – TRANSPORTATIC	N INFORM	IATION			
Special Ship	pping Information: Flash point: >	140°F / >60°C				
<u>Purview</u>	<u>Proper Shipping Na</u>	me	<u>UN Number</u>	Packing Group	Hazard Class	
DOT (Land)	Not Regulated					
IMO (Water)	Not Regulated					
ICAO (Air)	Not Regulated					
SECTION	N 15 – REGULATORY IN	FORMATIO	ON			
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.				
	(Comprehensive Response on & Liability Act)	No Data.	No Data.			
IDL: (Canadian Ingredient Disclosure List)		No Data.	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 herin.





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

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:

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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

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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) Freeze Point (F) Freeze Point (C)	1.112 28 -2	Vapor Pressure (mmHG) ~ 18 Vapor Density (air=1) < 1.	
Viscosity(cps 70F,21C)	25	% Solubility (water) 100).0
Odor Appearance Physical State Flash Point P- pH As Is (approx.) Evaporation Rate (Ether Percent VOC:	-M(CC) c=1)	Mild Yellow Liquid > 200F > 93C 5.5 < 1.00 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
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11 Toxicological information

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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

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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.

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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	В	Goggles,Gloves

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

CHANGE LOG

	EFFECIIVE		
	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

PEPECTIVE

22-APR-2009	4,5,7,8,10	16-MAY-2006
18-JUN-2009	4,5,7,8,10	22-APR-2009
26-SEP-2011	11	18-JUN-2009

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 Canutec 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 effect	<u>its</u>
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 eff	ects
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.
Data af is and a C/00/0010	Internet warmente ander ander

Date of issue : 6/28/2013.	Internet: www.petro-canada.ca/ms	ds Page: 1/8	
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exposure

2. Hazards identification

Developmental effects

: No known significant effects or critical hazards.

Fertility effects Medical conditions aggravated by overNo known significant effects or critical hazards.
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

Name	CAS number	<u>%</u>
Hydrotreated Renewable Diesel/ Fuels, diesel/ Fuel Oil No. 1/ Fuel Oil No. 2	64742-81-0/	95 - 100
	68334-30-5/	
	8008-20-6/	
	68476-30-2	
Alkanes, C10 – 20 Branched and Linear (R100)	928771-01-1	10 - 20
Fatty acids methyl esters	61788-61-2 /	0 - 5
	67784-80-9 /	
	73891-99-3	

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. In case of contact, immediately flush skin with plenty of water for at least 15 minutes Skin contact 5 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. Move exposed person to fresh air. If not breathing, if breathing is irregular or if Inhalation 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. : No action shall be taken involving any personal risk or without suitable training. It may **Protection of first-aiders** 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 ż immediately if large quantities have been ingested or inhaled.

5. Fire-fighting measures

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Special protective equipment for fire-fighters	: Fire-fighters should wear appropriate protective equipment and self-co apparatus (SCBA) with a full face-piece operated in positive pressure	
Products of combustion	: Carbon oxides (CO, CO2), nitrogen oxides (NOx), sulphur oxides (SO compounds (H2S), smoke and irritating vapours as products of incomp	
Special exposure hazards	: Promptly isolate the scene by removing all persons from the vicinity of there is a fire. No action shall be taken involving any personal risk or v training. Move containers from fire area if this can be done without ris spray to keep fire-exposed containers cool.	without suitable
Not suitable	: Do not use water jet.	
Suitable	: Use dry chemical, CO ₂ , water spray (fog) or foam.	
Extinguishing media		
Flammability of the product	: Combustible liquid	

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5. Fire-fighting measures

	avier than air k. This product
Special remarks on explosion hazards : Do not pressurise, cut, weld, braze, solder, drill, grind or expose containers sources of ignition. Runoff to sewer may create fire or explosion hazard.	rs to heat or

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 pollutior (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).		
		ACGIH TLV (United States). Absorbed through skin. TWA: 100 mg/m ³ , (Inhalable fraction and vapour) 8 hour(s). ACGIH TLV (United States). Absorbed through skin.		
Fuel oil No. 1		TWA: 200 mg/m ³ 8 hour(s). ACGIH TLV (United States). Absorbed through skin. TWA: 200 mg/m ³ 8 hour(s).		
Consult local authorities for	acceptable expo	osure limits.		
Recommended monitoring procedures	or biological	t contains ingredients with exposure limits, personal, workplace atmosphere monitoring may be required to determine the effectiveness of the ventilation rol measures and/or the necessity to use respiratory protective equipment.		
Engineering measures	other engined recommende	n adequate ventilation. Use process enclosures, local exhaust ventilation or ering controls to keep worker exposure to airborne contaminants below any ed or statutory limits. The engineering controls also need to keep gas, st concentrations below any lower explosive limits. Use explosion-proof quipment.		
Hygiene measures	eating, smok techniques s contaminated	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	standard if a based on kno working limits canister may are expected is limited. Us uncontrolled	Ity fitted, air-purifying or air-fed respirator complying with an approved risk assessment indicates this is necessary. Respirator selection must be own or anticipated exposure levels, the hazards of the product and the safe s of the selected respirator. Recommended: organic vapour cartridge or be permissible under certain circumstances where airborne concentrations to exceed exposure limits. Protection provided by air-purifying respirators se a positive-pressure, air-supplied respirator if there is any potential for release, exposure levels are unknown, or any other circumstances where respirators may not provide adequate protection.		
Hands	worn at all tin necessary. Recommend provider for b use patterns. imperviousne	sistant, impervious gloves complying with an approved standard should be nes when handling chemical products if a risk assessment indicates this is ed: nitrile, neoprene, polyvinyl alcohol (PVA), Viton®. Consult your PPE preakthrough times and the specific glove that is best for you based on your . It should be realized that eventually any material regardless of their ess, will get permeated by chemicals. Therefore, protective gloves should be cked for wear and tear. At the first signs of hardening and cracks, they anged.		
Eyes		ear complying with an approved standard should be used when a risk indicates this is necessary to avoid exposure to liquid splashes, mists or		
Skin		tective equipment for the body should be selected based on the task being nd the risks involved and should be approved by a specialist before handling		
Environmental exposure controls	comply with t fume scrubbe	om ventilation or work process equipment should be checked to ensure they he requirements of environmental protection legislation. In some cases, ers, filters or engineering modifications to the process equipment will be 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: ≥40°C (≥104°F) Marine Diesel/MDO/Naval Distillate: Closed Cup: ≥60°C (≥140°F) Mining Diesel: Closed Cup: ≥52°C (≥126°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.
рН	: 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℃ (59°F)
Vapour pressure	: 1 kPa (7.5 mm Hg) @ 20°C (68ºF).
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 COx, NOx, SOx, 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	Rat	>5000 mg/m³	4 hours
		Vapour		"	
Hydrotreated Renewable Die	esel	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 availab	•			
Chronic toxicity					
Conclusion/Summary	: Not availab	ole.			
Irritation/Corrosion					
Conclusion/Summary	: Not availab	ole.			
<u>Sensitiser</u>					
Data of issue + 6/00/0010	Intorna		ada aa/mada		Dama, E

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11. Toxicological information

Conclusion/Summary ÷. Not available.

Carcinogenicity

.

Conclusion/Summary : Diesel engine exhaust particulate is probably carcinogenic to humans (IARC Group 2A).

<u>Classification</u>						
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

```
: The generation of waste should be avoided or minimised wherever possible. Significant
Waste disposal
                                  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	111		-
DOT Classification	Not available.	Not available.	Not available.	-		-

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14. Transport information

PG* : Packing group

15. Regulatory information

United States

HCS Classification	: Combustible liquid Irritating material
<u>Canada</u>	
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.)	2 Flammability
	Health 2 0 Instability
	Special
References	 Available upon request. ™ Trademark of Suncor Energy Inc. Used under licence.
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

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 stabllized 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			



Product Identity: DUAL SHIELD MILD STEEL AWS A5.20 T-1, T-2, T-9 & T-12 FLUX CORED WELDING ELECTRODES

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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	К	
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).

"All Position" T-1, T-9 & T 12 Electrodes

APPROXIMATE COMPOSITION (Wt. %)

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 Identity: DUAL SHIELD MILD STEEL AWS A5.20 T-1, T-2, T-9 & T-12 FLUX CORED WELDING ELECTRODES

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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-9/

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	<u>10 mg/m³</u> ### %SiO ₂ +2



Product Identity: DUAL SHIELD MILD STEEL AWS A5.20 T-1, T-2, T-9 & T-12 FLUX CORED WELDING ELECTRODES

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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 <u>www.esabna.com</u> 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 <u>www.aws.org</u>.

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.

3M Multi-Use Duct Tape 3900

Product Description	polyethylene	film over clo	th scrim and a sy	conformable cloth duct ynthetic rubber adhesive ng, attaching, sealing, pr	. A good choice	
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				d data should be consider for specification purposes AS		
	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.		8.1 mils (0.21 m	m)	D-3652	
	Temperature Us	se Range:	Up to 200°F (93	°C)		
Features	• Aggressive of surfaces	synthetic rub	ober adhesive pro	ovides instant adhesion t	o a wide variety	
	• 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.					
	 Sealing, hol 	ding, protect	ing, bundling, co	for coding.		

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.
Warranty, Limited Remedy, and Disclaimer	Unless an additional warranty is specifically stated on the applicable 3M product packaging or product literature, 3M warrants that each 3M product meets the applicable 3M product specification at the time 3M ships the product. 3M MAKES NO OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OR CONDITION OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ANY IMPLIED WARRANTY OR CONDITION ARISING OUT OF A COURSE OF DEALING, CUSTOM OR USAGE OF TRADE. If the 3M product does not conform to this warranty, then the sole and exclusive remedy is, at 3M's option, replacement of the 3M product or refund of the purchase price.
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 800-362-3550 • 877-369-2923 (Fax) www.3M.com/industrial



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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: Product Identifier:	DURO DYNE SOLVENT BASED ADHESIVE PBA
Froduct Identifier:	FDA
Supplier Details:	DURO DYNE CORPORATION
	81 Spence Street
	Bay Shore, NY 11706
Information	

Phone No: Emergency Phone No:

800-899-3876

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:

Warning:

Liver, central nervous system, kidneys, bladder, reproductive system.

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:



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:









Splash Goggles

Gloves

Vapor Respirator

RISK PHRASES: R12: R38: R48/20 Harmful:

R62: R63: R65 Harmful: R67:

SAFETY PHRASES: S2:

S9: S16: S36/37: S61:

S62:

POTENTIAL HEALTH EFFECTS **Acute Exposure Effects:** Inhalation:

Highly flammable. Irritating to skin. Danger of serious damage to health by prolonged exposure through inhalation. Possible risk of impaired fertility. Possible risk of harm to the unborn child. May cause lung damage if swallowed. Vapors may cause drowiness and dizziness.

Keep out of reach of children. Keep container in a well – ventilated place. Keep away from sources of ignition – No smoking. Wear suitable protective clothing and gloves. Avoid release to the environment. Refer to special instructions / Safety data sheets. If swallowed, do not induce vomiting: seek medical advice immediately and show this container or label.

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

	disturbances, and intolerance to alcohol. Aspiration of
	product or vomitus and subsequent regurgitation may
	result in pulmonary edema and/or aspirant pneumonia.
Skin:	May cause moderate skin irritation. Causes redness and
Simil	pain. May be harmful if absorbed through the skin.
Evos.	May cause moderate to severe mechanical and chemical
Eyes:	•
	irritation to eyes with redness and pain; chemical
T	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
Carcinogenicity.	5
	the IARC, the NTP, ESIS, OSHA, or the state of
	California.

3. <u>COMPOSITION/INFORMATION ON INGREDIENTS</u>

HAZARDOUS	% (BY	CAS#	EINECS#	HAZARD	RISK PHRASES
COMPONENTS	WEIGHT)			SYMBOL	(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	OSHA Exposure Limits
		(mg/m3 unless otherwise noted)	(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

	100 ppm/384 mg/m3 STEL (skin)(Europe)
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

APPERANCE AND ODOR	VAPOR PRESSURE
Soft gray paste, mild odor.	180 mm Hg
ODOR THRESHOLD	SPECIFIC GRAVITY (WATER = 1)
Not Established	1.02
FREEZING/MELTING POINT	BOILING POINT
Not Established	150°F/65°C
SOLUBILITY IN WATER	COEFFICIENT OF WATER/OIL DISTRIBUTION
Not Soluble	Favors Oil
РН	SOLUBILITY IN ORGANIC SOLVENTS
Not Determined	Variable Solubility dependent upon solvent
FLASH POINT	VISCOSITY
<0°F/<-18°C	Not Determined
FLAMMABLE LIMITS	VAPOR DENSITY (AIR= 1)
LEL: 1.2% UEL: 6.9%	3
AUTO IGNITION TEMPERATURE	EVAPORATION RATE (BuAc = 1)
234°C/453°F (References Toluene)	3.2
VOLATILE ORGANIC COMPOUND	O (VOC) INFORMATION
3.46 lbs/gallon or 415 g/L	
NOTES: None	

10. STABILITY AND REACTIVITY

STABILITY	CONDITIONS TO AVOID	
Stable under normal conditions	Excess heat, ignition sources, water, moisture, light,	
	incompatible materials.	
INCOMPATIBLITY (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: CONDITIONS TO AVOID:		
Will not occur	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	C 50	Not known – product componen	ts are harmful by inhalation.	
Irritation / Se	nsitization	Chemical and mechanical irritan	t to eyes, skin and respiratory tract.	
Carcinogenici	ty	Product contains no components	s listed by, IARC, NTP, OSHA, ESIS,	
	-	or the state of California.		
Mutagenicity		Not known.		
Reproductive	Toxicity	Known reproductive toxicants (toluene and hexane).		
Teratogenicity	y	May possess teratogenic effects.		
	Product Components			
Component	CAS #	LD50 of Ingredient	LC50 of Ingredient	
_		(Oral, Rat – unless otherwise	(Inhalation, Rat – unless otherwise	
		specified)	specified)	
Hexane	110-54-3	25 g / kg	48000 ppm / 4 Hours	
Toluene	108-88-3	636 mg / kg	49 g / m3 / 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:

DOT Hazard Class/Pack Group: Reference: UN/NA Identification Number: Label: Flammable Liquid, N.O.S. (contains Hexane, Toluene), UN 1993 Class 3 / PG III 49CFR, IATA, IMDG UN 1993 Flammable Liquid, 3



Hazard Symbol: IATA Hazard Class/Pack Group: IMDG Hazard Class: RID/ADR Hazard Class: ADR Classification: ADR Emergency Action Code: Hazard Identification Number (HIN): TDG Class/Pack Group: Note:

Class 3/PG III Class 3/PG III F1 3Y 30 Class 3/PG III 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. <u>REGULATORY INFORMATION</u>

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:	-	oduct contains a chemical
	. ,	ne State of California to cause birth
	defects or other repro	oductive harm.
CPR (Canadian Controlled Products		
Regulations):	-	n classified in accordance with the
		Controlled Products Regulations
		s all of the information required by
	those regulations.	
WHMIS Classifications:	B2, D2A	
CIDL (Canadian Ingredient Disclosure List):	Hexane (CAS # 110-	54-3) and

DSL/NDSL (Canadian Domestic Substances List/Non-Domestic Substance List): EINECS (European Inventory of Existing Commercial Chemical Substances): WGK Water Quality Index:



EU RISK PHRASES: R11: R38: R45/20 Harmful:

R62: R63: R65 Harmful: R67:

EU SAFETY PHRASES: S2: S9: S16: S36/37: S61:

S62:

16. OTHER INFORMATION

LEGEND: ACGIH: American Congress of Government Industrial **Hygienists** CAS: **Chemical Abstracts Service EINECS:** European Inventory of Existing Commercial Chemical Substances Hazardous Materials Identification System HMIS: **IARC:** International Agency for Research on Cancer Not Available NA: Not Determined ND:

Toluene (CAS # 108-88-3) are listed on the CIDL.

Components are on the DSL.

Referenced 2



Highly Flammalble.
Irritating to Skin.
Danger of seruios damage to health by prolonged
exposure through inhalation.
Possible risk of impaired fertility.
Possible risk of harm to the unborn child.
May cause lung damage if swallowed.
Vapors may cause drowsiness and dizziness.

Keep out of reach of children. Keep container in a well-ventilated place. Keep away from sources of ignition – No smoking. Wear suitable protective clothing and gloves. Avoid release to the environment. Refer to special instructions / Safety data sheets. If swallowed, do not induce vomiting: seek medical advice immediately and show this container or label.

NE: NR: NIOSH: NTP: OSHA:	Not Established Not Reported National Institute for Occupational Safety and Health National Toxicology Program 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

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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 Soction I & II Droparation and Droduct Information

Section 1 & 11 - Preparation and Product Information				
	Product Type:	Covered Electrode		
The Lincoln Electric Company of Canada LP 179 Wicksteed Avenue	Representative Classifications:	AWS E7018-1H4R CSA E4918-1		
Toronto, Ontario M4G 2B9 CANADA Phone: (416) 421-2600	1 2	ctric Company, Cleveland, Ohio, USA 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.

			TLV	LD ₅₀	LC ₅₀ mg/m ³
Ingredients:	CAS No.	Wt. %	mg/m ³	(Route/Species)	(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.		(LDLo, (#)	Crystallin Agency fo	Lowest published to the silica (quartz) is on the or Research on Cancer) a gy Program) lists as posin is.	IARC (International nd NTP (National
(****) There is no listed value for insoluble barium compounds. The TLV for soluble barium compounds is 0.5 mg/m ³ .					
Section	IV - Phy	sical I	Data		

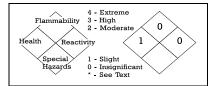
Physical data such as odor, vapor pressure, density, evaporation rate and freezing or boiling points are not listed as they are not applicable to this product and its use.

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
Issue Date:	03/11/14	Supercedes Date:	03/22/13

SECTION 1: Identification

1.1. Product identifier

3MTM 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: DIVISION:	3M Abrasive Systems Division
ADDRESS: Telephone:	3M Center, St. Paul, MN 55144-1000, USA 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.

3MTM Abrasive Products, 011K, Emery Cloth Sheets, Medium, Coarse 03/11/14

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

<u>Substance</u> Carbon monoxide Carbon dioxide <u>Condition</u> 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	TWA(respirable fraction):5	
		Gov. Indust.	mg/m3	
		Hyg.		
Iron Oxide Mineral	1309-37-1	US Dept of	TWA(as fume):10 mg/m3	
		Labor - OSHA		
ROUGE	1309-37-1	US Dept of	TWA(as total dust):15	
		Labor - OSHA	mg/m3;TWA(respirable	
			fraction):5 mg/m3	
Limestone	1317-65-3	US Dept of	TWA(as total dust):15	
		Labor - OSHA	mg/m3;TWA(respirable	
			fraction):5 mg/m3	
Aluminum Oxide Mineral (non-	1344-28-1	Chemical	TWA:1 fiber/cc	
fibrous)		Manufacturer		
		Rec Guid		
Aluminum Oxide Mineral (non-	1344-28-1	US Dept of	TWA(as total dust):15	
fibrous)		Labor - OSHA	mg/m3;TWA(respirable	
			fraction):5 mg/m3	
Aluminum, insoluble compounds	1344-28-1	Amer Conf of	TWA(respirable fraction):1	
		Gov. Indust.	mg/m3	
		Hyg.		
Titanium Dioxide	13463-67-7	Amer Conf of	TWA:10 mg/m3	
		Gov. Indust.		
		Hyg.		

3MTM Abrasive Products, 011K, Emery Cloth Sheets, Medium, Coarse 03/11/14

Titanium Dioxide	13463-67-7	Chemical	TWA(as respirable dust):5	
		Manufacturer	mg/m3	
		Rec Guid		
Titanium Dioxide	13463-67-7	US Dept of	TWA(as total dust):15 mg/m3	
		Labor - OSHA		
Quartz Silica	14808-60-7	Amer Conf of	TWA(respirable	
		Gov. Indust.	fraction):0.025 mg/m3	
		Hyg.		
Quartz Silica	14808-60-7	US Dept of	TWA concentration(as total	
		Labor - OSHA	dust):0.3 mg/m3;TWA	
			concentration(respirable):0.1	
			mg/m3(2.4 millions of	
			particles/cu. ft.)	
Silica	7631-86-9	Chemical	TWA(as respirable dust):3	
		Manufacturer	mg/m3	
		Rec Guid		
SILICA, AMORPHOUS	7631-86-9	US Dept of	TWA concentration:0.8	
		Labor - OSHA	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

General Physical Form:	Solid
Odor, Color, Grade:	Solid Abrasive Product
Odor threshold	Not Applicable
рН	Not Applicable
Melting point	Not Applicable
Boiling Point	Not Applicable
Flash Point	Not Applicable
Evaporation rate	Not Applicable
Flammability (solid, gas)	Not Classified
Flammable Limits(LEL)	Not Applicable
Flammable Limits(UEL)	Not Applicable
Vapor Pressure	Not Applicable
Vapor Density	Not Applicable
Specific Gravity	Not Applicable
Solubility In Water	Not Applicable
Solubility- non-water	Not Applicable
Partition coefficient: n-octanol/ water	Not Applicable
Autoignition temperature	Not Applicable
Decomposition temperature	Not Applicable
Viscosity	Not Applicable

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 <u>Substance</u>

None known.

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:

Ingredient	C.A.S. No.	Class Description	Regulation
Quartz Silica	14808-60-7	Grp. 1: Carcinogenic to humans	International Agency for Research on Cancer
SILICA, CRYS 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**

Condition

3MTM Abrasive Products, 011K, Emery Cloth Sheets, Medium, Coarse 03/11/14

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-	Rat	LC50 > 2.3 mg/l
	Dust/Mist		-
	(4 hours)		
Aluminum Oxide Mineral (non-fibrous)	Ingestion	Rat	LD50 > 5,000 mg/kg
Limestone	Dermal	Rat	LD50 > 2,000 mg/kg
Limestone	Inhalation-	Rat	LC50 3.0 mg/l
	Dust/Mist		-
	(4 hours)		
Limestone	Ingestion	Rat	LD50 6,450 mg/kg
Iron Oxide Mineral	Dermal	Not	LD50 3,100 mg/kg
		available	
Iron Oxide Mineral	Ingestion	Not	LD50 3,700 mg/kg
		available	
Silica	Dermal	Rabbit	LD50 > 5,000 mg/kg
Silica	Inhalation-	Rat	LC50 > 0.691 mg/l
	Dust/Mist		
	(4 hours)		
Silica	Ingestion	Rat	LD50 > 5,110 mg/kg
Titanium Dioxide	Dermal	Rabbit	LD50 > 10,000 mg/kg
Titanium Dioxide	Inhalation-	Rat	LC50 > 6.82 mg/l
	Dust/Mist		
	(4 hours)		
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 $> 5,000 \text{ mg/kg}$

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	Not sensitizing
	and	
	animal	
Titanium Dioxide	Human	Not sensitizing
	and	
	animal	

Respiratory Sensitization

	Name		Species	Value
--	------	--	---------	-------

3MTM Abrasive Products, 011K, Emery Cloth Sheets, Medium, Coarse 03/11/14

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	Mouse	Some positive data exist, but the data are not
	Specified		sufficient for classification
Titanium Dioxide	Ingestion	Multiple	Not carcinogenic
		animal	
		species	
Titanium Dioxide	Inhalation	Rat	Carcinogenic
Quartz Silica	Inhalation	Human	Carcinogenic
		and	
		animal	

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	premating & 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 organogenesi s

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

3MTM Abrasive Products, 011K, Emery Cloth Sheets, Medium, Coarse 03/11/14

			classification			
Silica	Inhalation	respiratory system 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 <u>not</u> 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).

Document Group:	25-0157-5	Version Number:	1.06
Issue Date:	03/11/14	Supercedes Date:	03/22/13

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3M USA SDSs are available at www.3M.com



SAFETY DATA SHEET

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: Application:	ESAB MILD STEEL COVERED ELECTRODES 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.

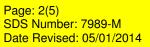
Electricity: Electric shock can kill.

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 14808-6	60-7 are conside	ered 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	К	
Hectorite		14808-60-7	238-878-4	T; R45	1	K	
Pyrropholite		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	К	
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).

					· ,			
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

APPROXIMATE COMPOSITION (Wt. %)

* 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 antici	pated)			
All substances with CAS # of 1480	8-60-7 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
Pyrropholite 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		1312-76-1	None	None
& Sodium Silicate)		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⁾ Parmissible Exposure Limits according to the Occupational Safety & Health Administration (USA)

⁽²⁾ Permissible Exposure Limits according to the Occupational Safety & Health Administration (USA) Unless noted, all values are for 8 hour time weighted averages (TWA).

Unless noted, all values are for o nour time weighted averages (1

* 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.

inimis 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 <u>www.esabna.com</u> 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

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			



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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	К	
Mineral Silicates	All substances wit	h CAS # of 14808-6		•			
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	К	
Hectorite		14808-60-7	238-878-4	T; R45	1	K	
Pyrropholite		14808-60-7	238-878-4	T; R45	1	К	
Wollanstanite		14808-60-7	238-878-4	T; R45	1	К	
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	К	
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	К	
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).



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

APPROXIMATE COMPOSITION OF ELECTRODE (Wt. %)

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	A5.1	A5.5
	E7014	E7024	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**
on Carbonate		10290-71-8	None	None
ron Oxide		1309-37-1	5**	10 (fume)
lagnesium Carbonate		546-93-0	10***, 3** (PNOS)	15*, 5**
langanese and inorganic compounds	(as Mn)	7439-96-5	0.02**, 0.1***	5 Ceiling
langanese, fume	(as Mn)	7939-96-5	0.2	5 Ceiling
fill Scale (Ferrous metal)				
Iron Oxide		1309-37-1	5**	10 (fume)
Silicon Dioxide		14808-60-7	0.025**	<u>10 mg/m³</u> ### %SiO ₂ +2
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
Pyrropholite Silica-Crystalline- Quartz		14808-60-7	0.025**	<u>10 mg/m³</u> ### %SiO ₂ +2
		14808-60-7	0.025**	<u>10 mg/m³###</u>
Wollanstanite Silica-Crystalline- Quartz		14000-00-7	0.025	%SiO ₂ +2
Zircon Silica-Crystalline-Quartz		14808-60-7	0.025**	<u>10 mg/m³</u> ### %SiO ₂ +2
lolybdenum	(metal and insoluble compounds, as Mo)	7439-98-7	3 **, 10 ***	15*
	(soluble compounds, as Mo)		0.5 **	5
lickel, elemental		7440-02-0	1.5***	1
Other Silicates				
Kaolin Use Quartz Formula		1332-58-7	2**	15*, 5**
		14808-60-7	0.025**	<u>10 mg/m³ ###</u> %SiO ₂ +2
Mica		12001-26-2	3**	20 mppcf, quartz < 1%
Potassium Titanate		12030-97-6	None	None



SUREWELD AND OK® MILD STEEL AND LOW ALLOY COVERED ELECTRODES

Substance		CAS#	ACGIH TLV ⁽¹⁾ mg/m ³	OSHA PEL ⁽²⁾ mg/m ³
Silicate Binder (Potassium Silica & Sodium Silicate)	ate	1312-76-1 1344-09-8	None None	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
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.



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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:



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USA: Contact ESAB at <u>www.esabna.com</u> 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 <u>www.aws.org</u>.

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	>99	Oral LD50 (Rat) = 4000 mg/kg
107-21-1		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.

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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 dehydrogenate to various metabolites including glyceraldehydes, 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 dehydogenase, 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 in 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%

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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.

LA1301 Ethylene glycol Page 3 of 8

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	•	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.

LA1301 Ethylene glycol Page 4 of 8

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.

LA1301 Ethylene glycol Page 5 of 8 **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 gayage 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		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 (Ibs): 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	SARA (311, 312) Hazard	CERCLA/SARA - Section
	302:	Class:	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



LA1301 Ethylene glycol Page 7 of 8

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/m³	Not listed	
D-LIMONENE 5989-27-5	0.1-1.0	Not listed	Not listed	

3. HAZARDS IDENTIFICATION

Toxicity: Primary Routes of Entry: Signs and Symptoms of Exposure: May irritate the eyes. May cause skin sensitization. Eye and skin contact, ingestion, inhalation None under normal conditons of use.

Component	Weight%	NTP	ACGIH Carcinogens	IARC Carcinogen
TRIETHANOLAMINE	<2	male rat-equivocal		Group 3; Monograph 77, 2000
102-71-6		evidence; female rat-		
		no evidence; male		
		mice-inadequate;		
		female mice-		
		inadequate		
D-LIMONENE	0.1-1.0	male rat-clear		Group 3 Monograph 73, 1999
5989-27-5		evidence; female rat-		
		no evidence; male		
		mice-no evidence;		
		female mice-no		
		evidence		

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°): Recommended Extinguishing Media: >200°F CC Carbon dioxide, Water, dry chemical

5. FIRE FIGHTING MEASURES

Special Fire-Fighting Procedures: Hazardous Products of Combustion: Unusual Fire/Explosion Hazards: No special procedures. None anticipated None.

n/d n/d

Lower Explosive Limit:	
Upper Explosive Limit:	

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: Hazardous Polymerization: Incompatabilities: Conditions to Avoid: Hazardous Products of Combustion: Stable at normal conditions Will not occur None known Freezing. 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)

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:

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.

None

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

Prepared By:	Denise Boyd, Manager-Environmental, Health & Safety	Revision Date: June 08, 2012
Company:	ITW Permatex 10 Columbus Blvd. Hartford, CT USA 06106	Revision Number: 1
Telephone No.:	1-87-Permatex (877) 376-2839	



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 Costion I Q II Duono d Due due of Infe

Section I & II - Preparation and Product Information			
	Product Type:	Covered Electrode	
The Lincoln Electric Company of Canada LP 179 Wicksteed Avenue Toronto, Ontario M4G 2B9 CANADA Phone: (416) 421-2600	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.

not necessarily imply the existence of any nazard.					0
			TLV	LD ₅₀	LC ₅₀ mg/m ³
Ingredients:	CAS No.	Wt. %	mg/m ³	(Route/Species)	(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 (intratracheal/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 1 per cubic meter. TLV value for iron oxide is 5 milligram meter.		(LDLo, (#)	Crystallii Agency fo	Lowest published to ne silica (quartz) is on the or Research on Cancer) a gy Program) lists as posin s.	IARC (International nd NTP (National
(**) As respirable dust.					

Section IV - Physical Data

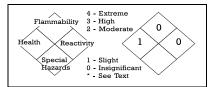
Physical data such as odor, vapor pressure, density, evaporation rate and freezing or boiling points are not listed as they are not applicable to this product and its use.

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.

not necessarily imply the existence of any nazaru.	1		1		
			TLV	LD ₅₀	$LC_{50} \text{ mg/m}^3$
Ingredients:	CAS No.	Wt. %	mg/m ³	(Route/Species)	(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
Notos				Lowest published to	kia concentration
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. (#)			, 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.		
(**) As respirable dust.					

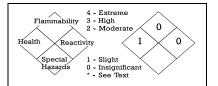
Section IV - Physical Data

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.

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, 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.

Material Safety Data She	et 🤇	DUPOND
DuPont [™] FREON [®] 22	Refrigerant	
Version 2.3		
Revision Date 10/04/2011	Ref. 13000024323	
This SDS adheres to the standa requirements in other countries.	ards and regulatory requirements of the United States and may not mee	et the regulatory
SECTION 1. PRODUCT AND C	OMPANY IDENTIFICATION	
Product name Product Grade/Type	: DuPont [™] FREON [®] 22 Refrigerant : ASHRAE Refrigerant number designation: R-22	
Tradename/Synonym	: R-22 FREON [®] 22 CHLORODIFLUOROMETHANE HCFC-22 DYMEL [®] 22	
MSDS Number	: 13000024323	
Product Use	: Refrigerant	
Manufacturer	: DuPont 1007 Market Street Wilmington, DE 19898	
Product Information Medical Emergency Transport Emergency	 1-800-441-7515 (outside the U.S. 1-302-774-1000) 1-800-441-3637 (outside the U.S. 1-302-774-1139) CHEMTREC: 1-800-424-9300 (outside the U.S. 1-703-527-3887) 	7)
SECTION 2. HAZARDS IDENT	IFICATION	
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 a	and frostbite.
Eyes Chlorodifluoromet hane (HCFC-22)	: Contact with liquid or refrigerated gas can cause cold burns a	and frostbite.
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DuPont[™] FREON[®] 22 Refrigerant Version 2.3 Revision Date 10/04/2011 Ref. 130000024323 Inhalation Chlorodifluoromet : Misuse or intentional inhalation abuse may cause death without warning hane (HCFC-22) 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. 2/10

Material Safety Data Sheet	OU POND
DuPont [™] FREON [®] 22 R	efrigerant
Version 2.3	
Revision Date 10/04/2011	Ref. 13000024323
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 MEA	SURES
Flammable Properties Flash point	: does not flash
Thermal decomposition	: 632 ℃ (1,170 ℉)
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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evision Date 10/04/2011	Ref. 13000024323			
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.			
	G MEASURES and HANDLING (PERSONNEL) sections before proceeding with clea AL 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.			
CTION 7. HANDLING AND STO	DRAGE			
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 4 / 10			
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Material Safety D	ata Sheet
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DuPont [™] FREON [®] 22 F	?efrigerant			
Version 2.3				
Revision Date 10/04/2011	Ref. 13000024323			
	(>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 ℃ (<126 °F)			
SECTION 8. EXPOSURE CONTR	ROLS/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 equipmen Respiratory protection	t : 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			
	le Exposure Limit. Where governmentally imposed occupational exposure limits which in effect, such limits shall take precedence.			
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uPont [™] FREON [®] 22 I	Refrigerant
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vision Date 10/04/2011	Ref. 130000024323
CTION 9. PHYSICAL AND CH	HEMICAL PROPERTIES
Form Color Odor pH Boiling point % Volatile	 Liquefied gas clear slight, ether-like neutral -40.8 ℃ (-41.4 °F) 100 %
Vapour Pressure Density Water solubility Vapour density	: 10,439.0 hPa at 25 °C (77 °F) : 1.194 g/cm3 at 25 °C (77 °F) : 2.6 g/l at 25 °C (77 °F) : 3.0 at 25 °C (77 °F) and 1013 hPa (Air=1.0)
Evaporation rate	: > 1 (CCL4=1.0)
CTION 10. STABILITY AND F	
	: Stable under recommended storage conditions.
Conditions to avoid	 Stable under recommended storage conditions. 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.
-	 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.
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.



uPont [™] FREON [®] 22 Refr	igerant
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	HCFC 22 in the presence of certain concentrations of chlorine.
ECTION 11. TOXICOLOGICAL INFO	RMATION
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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DuPont [™] FREON [®] 22 Rei	rigerant
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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 INFOR	
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 Refrige Biodegradability	erant : According to the results of tests of biodegradability this product is not readily biodegradable.
SECTION 13. DISPOSAL CONSIDE	RATIONS
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.
	ΙΑΤΙΟΝ
SECTION 14. TRANSPORT INFORM	
DOT UN number	: 1018



DuPont [™] FRI	EON [®] 22 Refr	igerant	
Version 2.3			
Revision Date 10/0	4/2011	Ref. 13	0000024323
IATA_C	Proper shipping Class Labelling No. UN number		Chlorodifluoromethane 2.2 2.2 1018
	Proper shipping	name	Chlorodifluoromethane
IMDG	Class Labelling No. UN number Proper shipping Class Labelling No.	name	 2.2 2.2 1018 Chlorodifluoromethane 2.2 2.2
SECTION 15. REG		ΙΑΤΙΟΝ	
SARA 313 R Chemical(s)	Regulated :	Chlorodifluorometh	ane
California Pr		Chemicals known t any other harm: no	to the State of California to cause cancer, birth defects or one known
PA Right to I Regulated C			Pennsylvania Hazardous Substances List present at 1% or more (0.01% for Special Hazardous rodifluoromethane
NJ Right to H Regulated C	hemical(s)	present at a conce	New Jersey Workplace Hazardous Substance List ntration of 1% or more (0.1% for substances ogens, mutagens or teratogens): nane
SECTION 16. OTH	ER INFORMATION		
		HMIS	
Health Flammability	:	1 0	
			9 / 10

Material Safety Data Sheet		QUPOND
DuPont [™] FREON [®] 22 Re	frigerant	
Version 2.3		
Revision Date 10/04/2011	Ref. 130000024323	
Reactivity/Physical hazard : PPE :	1 Personal Protection rating to be supplied by user depending on use conditions.	
Before use read DuPont's safety	rk of E. I. duPont de Nemours & Company, Inc. y information. he local DuPont office or DuPont's nominated distribut	ors.
the date of its publication. The i storage, transportation, disposa information relates only to the s	Safety Data Sheet is correct to the best of our knowled nformation given is designed only as a guidance for sa and release and is not to be considered a warranty of pecific material designated and may not be valid for su by process, unless specified in the text.	afe handling, use, processing, r quality specification. The
Significant change from previou	s version is denoted with a double bar.	
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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

Emergency Phone Number:

Creation Date: 09/01/85

Revision Date: 07/31/13

CHEMTREC® (800) 424-9300

SECTION I. MATERIAL IDENTIFICATION

Chemical Name: Galvanized (Hot Dipped) Sheet - Carbon Steel;

Products: Galvanized Lath TiLath

SECTION II. COMPOSITION/INFORMATION ON INGREDIENTS

Ingredient Name	CAS Number	Percentage by wt.	OSHA PEL ¹	ACGIH TLV ^{1a}
Base Metal	4			
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	10 mg/m ³ - Inhalable fraction ^{2a} (PNOS) ³
			5 mg/m ³ - Respirable fraction (PNOR)	3 mg/m ³ - Respirable fraction ^{3a} (PNOS)
Copper	7440-50-8	0.50 max.	0.1 mg/m ³ - Fume (as Cu)	0.2 mg/m ³ - Fume
			1 mg/m3 - Dusts & mists (as Cu)	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)	10 mg/m ³ - Inhalable fraction (PNOS)
			5 mg/m ³ - Respirable fraction (PNOR)	3 mg/m ³ - Respirable fraction (PNOS)
Silicon	7440-21-3	0.60 max.	15 mg/m ³ - Total dust	10 mg/m ³
			5 mg/m ³ - Respirable fraction	
Sulfur	7704-34-9	0.04 max.	15 mg/m ³ - Total dust (PNOR)	10 mg/m ³ - Inhalable fraction (PNOS)
			5 mg/m ³ - Respirable fraction (PNOR)	3 mg/m ³ - Respirable fraction (PNOS)
Metallic Coating		*	•	•
Aluminum	7429-90-5	0.055 max.	15 mg/m ³ - Total dust	10 mg/m ³ - Metal dust
			5 mg/m ³ - Respirable fraction	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 ³ n	0.05 mg/m ³
Zinc	7440-66-6	0.15 - 9.1	5 mg/m ³ - Fume	5 mg/m ³ - Fume
			15 mg/m ³ - Total dust	10 mg/m ³ - Fume (STEL)
			5 mg/m ³ - Respirable fraction	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

Galvanized (Hot Dipped) Sheet - Carbon Steel

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.

Galvanized (Hot Dipped) Sheet - Carbon Steel

- 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

Galvanized (Hot Dipped) Sheet - Carbon Steel

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

Flash Point Method: Not applicable

Burning Rate: Not applicable

Galvanized (Hot Dipped) Sheet - Carbon Steel

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.

LEL: Not applicableUEL: Not applicableAuto-ignition Temperature: Not applicable

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

Water Solubility: Insoluble Physical State: Solid Galvanized (Hot Dipped) Sheet - Carbon Steel Rev. 05/02 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 Freezing/Melting Point: Base Metal - 2750 °F pH: Not applicable 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 TDL₀: 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 TDL₀: 450 mg/kg/6 yrs. Oral (human). Zinc TCL₀: 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.

Galvanized (Hot Dipped) Sheet - Carbon Steel

* 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 Authorizationsa) Exceptions: Noneb) Non-bulk Packaging: NAc) 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.

 Galvanized (Hot Dipped) Sheet - Carbon Steel

 Rev. 05/02

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





Issue Date: 20-AUG-2011 Supercedes: 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

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)	0.1-1.0

- 95-14-7 1-H-BENZOTRIAZOLE (BZT) 0.1-1 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
- 7414-83-7 PHOSPHONIC ACID, (1-HYDROXYETHYLIDENE)BIS-, DISODIUM 7-13 SALT Eye irritant; slight skin irritant ORAL LD50-RAT: 1340 MG/KG DERMAL LD50-RABBIT: >2000 MG/KG INHL. LC50: NO DATA.

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

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HANDLING:
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```
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.
```

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SKIN PROTECTION:
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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)
Freeze Point (C)
                      18
                                    Vapor Density (air=1) < 1.00
                      -8
Viscosity(cps 70F,21C) 13
                                     % Solubility (water)
                                                             100.0
Odor
                                 Mild
                                 Colorless To Amber
Appearance
Physical State
Flash Point P-M(CC)
                                 Liquid
                                 > 200F > 93C
                                 6.0
pH As Is (approx.)
                                 < 1.00
Evaporation Rate (Ether=1)
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
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11 Toxicological information

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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

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AQUATIC TOXICOLOGY
```

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	В	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





Issue Date: 28-OCT-2011 Supercedes: 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

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 r 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	
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 (sk. ORAL LD50-RAT: 1,100 MG/KG DERMAL LD50: NO DATA. INHL. LC50-RAT: 15 G/M3/15MIN	7-13 in)

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) Freeze Point (F)	1.112 14	Vapor Pressure (mmHG) Vapor Density (air=1)	~ 18.0 < 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 B	P-M(CC)	> 200F > 93C	
pH As Is (approx.)		1.0	
Evaporation Rate (Ethe	er=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	В	Goggles,Gloves	

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

	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





Issue Date: 12-SEP-2012 Supercedes: 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

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

INHL. LC50-RAT: >5.5 mg/L/4hr

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-, DISO SALT Slight skin irritant; slight eye irritant	DIUM 7-13
	ORAL LD50-RAT: 1300 MG/KG DERMAL LD50-RABBIT: >5000 MG/KG INHL. LC50: NO DATA.	
7757-83-7	SODIUM SULFITE IARC=3 (carcinogen status not classifiable) ORAL LD50-RAT: 2610 MG/KG DERMAL LD50: 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:

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)
Freeze Point (C)
                      26
                                    Vapor Density (air=1) < 1.00
                      -3
Viscosity(cps 70F,21C) 20
                                    % Solubility (water)
                                                            100.0
Odor
                                 Slight
Appearance
                                 Colorless To Light Yellow
Physical State
Flash Point P-M(CC)
                                 Liquid
                                > 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	В	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-1999 20-SEP-2002 23-AUG-2005	2,3,4,15 2,3,4,8 16	23-SEP-1998 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 Supercedes: 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

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 INHL. LD50: NO DATA.	/KG	*
*	(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/K INHL. LC50: NO DATA.	G	3-7
*	(E03L)ORGANIC ACID; Irritant (eyes and skin) ORAL LD50-RAT: 1,850 MG/KG DERMAL LD50-RABBIT: >5,000 MG/ INHL. LD50: NO DATA.	KG	*
*HMIRC Trade	Secret Registry #:8782	Application I	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) Freeze Point (F) Freeze Point (C)	1.070 27 -3	Vapor Pressure (mmHG) Vapor Density (air=1)	~ 36.0 < 1.00
Viscosity(cps 70F,21C)	9	% Solubility (water)	100.0
Odor Appearance Physical State Flash Point P- pH As Is (approx.) Evaporation Rate (Ether Percent VOC:	M(CC) =1)	<pre>Pungent Colorless To Green Liquid > 200F > 93C 1.4 < 1.00 0.0</pre>	
NA = not applicable	ND = not det	ermined	

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

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	В	Goggles,Gloves

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

CHANGE LOG

	EFFECTIVE DATE	REVISIONS TO SECTION:	SUPERCEDES
MCDC status			++ NIDIJ ++
MSDS status:		2 4	** 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 Supercedes: 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

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 INHL. LD50: NO DATA.	/KG	*
*	(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/KU INHL. LC50: NO DATA.	G	7-13
*	(E03L)ORGANIC ACID; Irritant (eyes and skin) ORAL LD50-RAT: 1,850 MG/KG DERMAL LD50-RABBIT: >5,000 MG/T INHL. LD50: NO DATA.	KG	*
*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

- <u>-</u>	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	r=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

Heal	Lth		3	Serious Hazard
Fire	e		1	Slight Hazard
Read	ctivity		0	Minimal Hazard
Spec	cial		CORR	DOT corrosive
(1)	Protective	Equipment	В	Goggles,Gloves

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

CHANGE LOG

	EFFECTIVE DATE	REVISIONS TO SECTION:	SUPERCEDES
MSDS status:	21-NOV-1997 13-AUG-1998 21-SEP-1998 01-APR-1999 23-AUG-2001 27-JUN-2003 25-SEP-2003 23-OCT-2003 07-APR-2006 19-APR-2006 07-JUN-2006 08-SEP-2006 26-SEP-2006 29-MAY-2009	3 12 12 2 14 2 14 2 12 2,3,4,8 3,4,8,16 2,8,15 4 2 3,10 3,4,11 16 3	** NEW ** 07-MAY-1997 21-NOV-1997 13-AUG-1998 21-SEP-1998 01-APR-1999 23-AUG-2001 27-JUN-2003 25-SEP-2003 23-OCT-2003 07-APR-2006 19-APR-2006 08-SEP-2006 26-SEP-2006 29-MAY-2009 18-DEC-2009 13-NOV-2012



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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.

	guages and available of our website at www.fiobartbrothers.com, from your sales representative of by caning ca	stomer service at 1 (557/ 552 4000:
SECTION 1 – IDENTIFIC	ATION	
Manufacturer 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	
Products Type:	TUBULAR ARC WELDING ELECTRODES FOR FLUX CORED, METAL CORED AND COMPOSITE SUBMERGED ARC WE	LDING
······································		
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, TR7	0, 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; S	
	81A1, 95D2, 105D2, 711M, 791, 811A1, RX7; TRIPLE-7, 8; VERSATILE; VERTI-COR I, II, III; VISION AP70, HiDep 7	0, 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: Trade Name:	Carbon and Low Alloy Steel ELEMENT 70T LF, 71Ni1C, 71Ni1M, 71T1C, 71T LF, 71T1M, 81K2C, 81K2M, FABCO 70XHP, 81K2-C, 811N1, 91	K2 C 107C 110 110K2 M 115 712M
frade Name.	750M, 803, 812 Ni1M, MIL-101-TM; FABCO XTREME 101, 120, B2, B3, B3V; FABCO 70AHP, 81A2-C, 81A4, 91	
	71K6, 71T8, 81N1, 81N1, 81N2, K54, XLNT-6, XLR-8, X80, X90, X100, OFFSHORE 71Ni, OFFSHORE 81N1, FLUX-C	
	XL525, XL550; MATRIX; METAL-COR MAXIM; METALLOY 71, 715G, 80B2, 80N1, 80N2, 90, 90B3, 100, 100F3-S,	
	S, VANTAGE, VANTAGE D2, VANTAGE Ni1, W-S; MX2; PREMIER 70; PW-201; SPEED-ALLOY 81Ni1-V, 81Ni2-V,	
	790; TM 71 HYD, 81B2, 81N1, 81N2, 81Ŵ, 91B3, 91K2, 91N2, 95K2, 101K3, 111K3, 115, 125K4, 770, 771,	
	811W, 881K2, 910, 911B3, 911N2, 991K2, 101, 1101K3-C, 1101K3-M; VERTI-COR 70, 72, 81Ni2, 91B3, 91K2, 91	
	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; PO	WERCORE 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).

(25 CINT art 1510.1200).			· · · · · · · · · · · · · · · · · · ·				
HAZARDOUS INGREDIENT	CAS	EINECS	REGULATORY HAZARD CLASSIFICATION/DESIGNATION 67/548/EEC [△]		NTP ^Z	OSHA ^H	65 ⁰
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° - R40	2B			Х
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 ^Ф - R45; Muta 2 - R46; Repr 3 - R62; T+ - R26; T - R24/25, R48/23; C - R35, R42/43; N - R50, R53 ³³²	1 ^{ΣΣ} , 3 ^Σ	$K^{\Sigma\Sigma}$	$X^{\Sigma\Sigma}$	$X^{\Sigma\Sigma}$
COBALT	7440-48-4	231-158-0	Xn; R42/43, R53	2B		Х	Х
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 _				
LITHIUM FLUORIDE	7789-24-4	232-152-0	F - R14/15; C - R34 _				
LITHIUM OXIDE	12057-24-8	235-019-5	F - R14/15; C - R34'				
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 ^v				
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 ^w - R40; T - R43, R48/23	$1 \\ 1^{\Psi}$	К	Х	Х
SILICA	14808-60-7	238-878-4	Xn - R48/20, R40/20	1*	К	Х	Х
(Amorphous Silica Fume)	69012-64-2	273-761-5	None	3	К		х
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			Х
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 Θ – Carcinogen, Mutagen or Reproductive Category per European Council Directive 67/548/EEC Annex I Σ – Metal and Chromium III Compounds $\Sigma\Sigma$ – Chromium VI Compounds $\Sigma\Sigma\Sigma$ – Chromium (VI) Trioxide 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:



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.



MSDS NO: 415889 REVISED: November 1, 2013 C0654 Page 2 of 4

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

			GROU	JP AND	%WEI	GHT				G	ROUP A	ND %V	VEIGHT
INGREDIENT	CAS	EINECS	Α	В	C	D	INGREDIENT	CAS	EINECS	Α	В	С	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	
BARIUM 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 METALLLOY 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 0FFSHORE 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 71K8, 81N1, 81N2 (12) Present only in FABCOR CVN; MATRIX; METAL-COR MAXIM; METALLOY VANTAGE, VANTAGE CVN, VANTAGE D2, VANTAGE N1

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 (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 ALUMINUM### ALUMINUM OXIDE## ANTIMONY TRIOXIDE	CAS 7429-90-5 1344-28-1 1309-64-4	EINECS 231-072-3 215-691-6 215-175-0	OSHA PEL 5 R* (Dust) 5 R* 0.5 (as Sb)	ACGIH TLV 1 R* {A4} 1 R* {A4} 0.5 (as Sb) {A2}	EU OEL 4 I*; 1.5 R* - Germany 1.5 R*(Aerosol) - Germany; 2 – Poland 0.1 I*; 0.4*** - Hungary
BARIUM FLOURIDE# CALCIUM CARBONATE	7787-32-8 1317-65-3	232-108-0 215-279-6	0.5 (as Ba) 5 R*, 5 (as CaO)	0.5 (as Ba) {A4} 3 R*, 2 (as CaO)	0.11* (Aerosol); 0.4*** (Aerosol) - Austria 0.51* (Aerosol as Ba), 4*** (Aerosol as Ba) - Germany 10 I* (Aerosol) – UK; 3 R* (Aerosol) - Switzerland
CERIUM OXIDE CHROMIUM#	1306-38-3 7440-47-3	215-150-4 231-157-5	5 R* (Dust), 15 (Dust) 1 (Metal) 0.5 (Cr II & Cr III Cpnds)	3 R* (Dust), 10 (Dust) 0.5 (Metal) {A4} 0.5 (Cr III Cpnds) {A4}	4 I*; 1.5 R* (as Dust - NOS) - Germany 0.1 I* (Aerosol) - Switzerland 0.005; 0.01*** - Denmark
COBALT	7440-48-4	231-158-0	0.005 (Cr VI Cpnds) 0.1 (Dust and Fume)	0.05 (Cr VI Sol Cpnds) {A1} 0.01 (Cr VI Insol Cpnds) {A1} 0.02 {A3}	0.005 (Total Aerosol); 0.015***(Total Aerosol) - Sweden 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 0.1; 0.2*** - Denmark
FLUORSPAR IRON+	7789-75-5 7439-89-6	232-188-7 231-096-4	2.5 (as F) 5 R*	2.5 (as F) {A4} 5 R* (Fe ₂ O ₃) {A4}	1 I* (Aerosol as F); 4^{***} (Aerosol as F) - Germany 3 R* (Aerosol as Fe ₂ O ₃) – Switzerland 7 ^{***} (as Fe ₂ O ₃) - Denmark
IRON OXIDE	1309-37-1	215-168-2	10 (Oxide Fume)	5 R* (Fe ₂ O ₃) {A4}	3 R* (Aerosol as Fe_2O_3) – Switzerland 7*** (as Fe_2O_3) - Denmark
LITHIUM CARBONATE LITHIUM FLUORIDE	554-13-2 7789-24-4	209-062-5 232-152-0	5 R* (Dust), 15 (Dust) 2.5 (as F)	3 R* (Dust), 10 (Dust) 2.5 (as F) {A4}	4 *; 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
					4 I*(Aerosol); 1.5 R*** (Aerosol) - Germany
MAGNESIUM OXIDE	1309-48-4	215-171-9	15 (Fume, Total Part)	10 I* {A4}	3 R* (Aerosol as Mg) – Switzerland
					4 I*(Aerosol as Mg); 1.5 R*** (Aerosol as Mg) - Germany
MANGANESE#	7439-96-5	231-105-1	5 CL ** (Fume)	0.1 I* {A4}	0.02 R*(Aerosol); 0.16 R*** (Aerosol) - Germany
			1, 3 STEL*** ■	0.02 R*	0.2 I*(Aerosol) - Germany
					0.2; 0.4*** - Denmark
MANGANESE OXIDE	1344-43-0	215-171-9	5 CL ** (Fume)	0.1 I* {A4}	0.02 R*(Aerosol); 0.16 R*** (Aerosol) - Germany
			1, 3 STEL*** ■	0.02 R*	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)	3 R* - Spain;
				0.5 R* (Sol Cpnds) {A3}	4; 10*** - Poland
NICKEL#	7440-02-0	231-111-4	1 (Metal)	1.5 I* (Ele) {A5}	0.05; 0.1*** - Denmark
			1 (Sol Cpnds)	0.1 I* (Sol Cpnds) {A4}	
			1 (Insol Cpnds)	0.2 I* (Insol Cpnds) {A1}	
SILICA++	14808-60-7	238-878-4	0.1 R*	0.025 R* {A2}	0.1 (Fused, Respirable Dust) - Denmark
	C0042 C4 2	272 764 5		2.5*	0.2*** (Fused, Respirable Dust) - Denmark
(Amorphous Silica Fume)		273-761-5	0.8	3 R*	2 *; 4 *** - Denmark
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 7440-67-7	236-675-5 231-176-9	15 (Dust)	$10 \{A4\}$	1.5 R* - Germany
ZIRCONIUM	/440-6/-/	231-1/0-9	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 as dust or fume \blacksquare - NIOSH REL TWA and STEL \blacksquare \blacksquare - 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} - Not Suspected as a Human Carcinogen per ACGIH {A5} - Not Suspected as a Human Carcinogen per ACGIH {A5} - Not Suspected as a Human Carcinogen per ACGIH {A5} - Not Suspected As a nuisance to Humans per ACGIH {A4} - Not Classifiable as a Human Carcinogen per ACGIH {A5} - Not Suspected As a Human Carcinogen per ACGIH {A5} - Not Suspected As a Human Carcinogen per ACGIH {A5} - Not Suspected As a Human Carcinogen per ACGIH {A5} - Not Suspected As a Human Carcinogen per ACGIH {A5} - Not Suspected As a Human Carcinogen per ACGIH {A5} - Not Suspected As a Human Carcinogen per ACGIH {A5} - Not Suspected As a Human Carcinogen per ACGIH {A5} - Not Suspected As a Human Carcinogen per ACGIH {A5} - Not Suspected As a Human Carcinogen Per ACGIH {A5} - Not Suspected As a Human Carcinogen Per ACGIH {A5} - Not Suspected As a Human Carcinogen Per ACGIH {A5} - Not Suspected As a Human Carcinogen Per ACGIH {A5} - Not Suspected As a Human Carcinogen Per ACGIH {A5} - Not Suspected As a Human Carcinogen Per ACGIH {A5} - Not Suspected As a Human Carcinogen Per ACGIH {A5} - Not Suspected As a Human Carcinogen Per ACGIH {A5} - Not Suspected As a Human Carcinogen Per ACGIH {A5}

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

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 CHEMCIAL PROPERTIES

Welding consumables applicable to this sheet as shipped are nonreactive, nonflammable, nonexplosive and essentially nonhazardous until welded. PHYSICAL STATE: Cored Wire COLOR: Gray COLOR: M/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. Manganese Oxide - Metal fume fever characterized by metallic taste, tightness of chest and fever. Symptoms may last 24 to 48 hours following 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 - 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 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 h



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MATERIAL SAFETY DATA SHEET

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 cancer. (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

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

In use:

Immediate delayed

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	R24/25 – Toxic in contact with skin and	R42/43 – May cause sensitization by	R48/20/22 – Harmful: danger of serious
combustible material	if swallowed	inhalation and skin contact	damage to health by prolonged
R10 – Flammable	R26 – Very toxic by inhalation	R43 – May cause sensitization by skin	exposure through inhalation and if
R11 – Highly flammable	R34 – Causes burns	contact	swallowed
R14/15 – Reacts violently with water,	R35 – Causes severe burns	R45 – May cause cancer	R48/23 – Toxic: danger of serious
liberating extremely flammable gases	R36/37 – Irritating to eyes and	R46 – May cause heritable genetic	damage to health by prolonged
R15 – Contact with water liberates	respiratory system	damage	exposure through inhalation
extremely flammable gases	R40 – Limited evidence of a	R48/20 – Harmful: danger of serious	R50 – Very toxic to aquatic organisms
R17 – Spontaneously flammable in air	carcinogenic effect	damage to health by prolonged	R53 – May cause long-term adverse
R20/22 – Harmful by inhalation and if	R40/20 – Harmful: possible risk of	exposure through inhalation	effects in the aquatic environment
swallowed	irreversible effects through inhalation		R62 – Possible risk of impaired fertility

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. <u>Classification</u> : Gases Under Pressure/Liquefied Gas <u>Precautionary Statement Codes</u> : P410 + P403 <u>Hazard Symbol/Pictogram</u> : 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. Under this regulation, compressed and liquefied gases that do not meet any hazard hazard Classification: Not Applicable Risk Phrase Codes: Not Applicable Hazard Symbol: Not Applicable Safety Phrase Codes: Not Applicable See Section 16 for full classification information for this product. Safety Phrase Codes: Not Applicable
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 equipmed with Self Contained Protective GSCRD) 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 $CBrClF_2$ 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: Classification: Compressed Gas/Liquefied Gas Hazard Statement Codes: H280 Hazard Symbols/Pictograms: GHS04

Oxygen, they should be equipped with Self-Contained Breathing Apparatus (SCBA) and appropriate personal protective equipment.

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, <u>immediately</u> begin decontamination with running water. <u>Minimum</u> 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 NFPA RATING **AUTOIGNITION:** Not Applicable FLAMMABILITY FLAMMABLE RANGE: Not Applicable **EXTINGUISHING MEDIA:** This is a non-flammable gas; use fire-extinguishing media appropriate for the surrounding materials. 0 UNSUITABLE FIRE EXTINGUISHING MEDIA: None known. SPECIFIC HAZARDS ARISING FROM THE CHEMICAL: This gas does not 2 1 HEALTH INSTABILITY 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. OTHER HAZARDOUS COMBUSTION PRODUCTS: Combustion or decomposition Hazard Scale: $\mathbf{0}$ = Minimal $\mathbf{1}$ = Slight $\mathbf{2}$ = Moderate products above 481.7°C (900°F) include hydrogen bromide, hydrogen chloride, 3 = Serious 4 = Severe 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 is low-lying areas or confined spaces. Detection systems should be available to monitor for level of oxygen. The level of oxygen should above 19.5% before personnel can be allowed in the area without SCBA.

PERSONAL PROTECTIVE EQUIPMENT: Proper protective equipment should be used.

<u>All Releases</u>: 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.

SECTION 6. ACCIDENTAL RELEASE MEASURES (Continued)

METHODS FOR CLEAN-UP AND CONTAINMENT:

<u>All Releases</u>: 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 strapwrench 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 <u>www.cganet.com</u> 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, <u>DO NOT USE</u> <u>ADAPTERS:</u>

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	ACGIH TLVs	NIOSH RELs	NIOSH IDLH	DFG MAKs	AIHA WEELs
		ppm	ppm	ppm	ppm	ppm	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	CBrCIF 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 EXPOSURE SYMPTOM

Normal oxygen concentration in ai

20.9% Oxygen:	Normal oxygen concentration in air.
15–19% Oxygen:	Decreased ability to perform tasks. May impair coordination and may induce early symptoms in persons with heart, lung, or circulatory problems.
12–15% Oxygen:	Breathing increases, especially in exertion. Pulse up. Impaired coordination, perception, and judgment.
10–12% Oxygen:	Breathing further increases in rate and depth, poor coordination and judgment, lips slightly blue.
8-10%Oxygen:	Mental failure, fainting, unconsciousness, ashen face, blueness of lips, nausea (upset stomach), and vomiting.
6–8% Oxygen:	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.
4–6% Oxygen:	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: paresthesis; 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: paresthesis

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

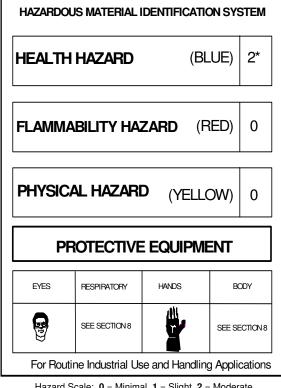
TCLo (Inhalation-Rat) 1 pph/6 hours/3 weeks-intermittent: Behavioral: somnolence (general depressed activity)

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/I on one Saturday and 544 IU/I 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.



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 2.07X10+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 9.4X10-2 atm-cu m/mole. 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 1044U.S. DOT PROPER SHIPPING NAME:Fire extinguisher with compressed or liquefied gasHAZARD 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 ApplicablePLACARD (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

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.

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
	None
PASSENGER CARRYING SHIP INDEX:	None
PASSENGER CARRYING ROAD OR RAIL VEHICLE	
INTERNATIONAL AIR TRANSPORT ASSOCIAT	FION SHIPPING INFORMATION (IATA): This gas is classified as
dangerous goods, per the International Air Transpor	t 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)
	Class 2.2 (Non-Flammable Gas)
PACKING GROUP:	None
EXCEPTED QUANTITIES:	EO
PASSENGER and CARGO AIRCRAFT PACKING IN	
PASSENGER and CARGO AIRCRAFT MAXIMUM N	
PASSENGER and CARGO AIRCRAFT LIMITED QU	
PASSENGER and CARGO AIRCRAFT LIMITED QU	ANTITY MAXIMUM NET QUANTITY PER PKG: Forbidden
CARGO AIRCRAFT ONLY PACKING INSTRUCTION	N :213
CARGO AIRCRAFT ONLY MAXIMUM NET QUANTI	TY 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 Or	
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
LIMITED QUANTITIES: EXCEPTED QUANTITIES:	120 mL E0
	-
EXCEPTED QUANTITIES:	EO
EXCEPTED QUANTITIES: PACKING:	E0 Instructions: P003; Provisions: None
EXCEPTED QUANTITIES: PACKING: IBCs:	E0 Instructions: P003; Provisions: None Instructions: None; Provisions: None Instructions: None; Provisions: None
EXCEPTED QUANTITIES: PACKING: IBCs: TANKS:	E0 Instructions: P003; Provisions: None Instructions: None; Provisions: None Instructions: None; Provisions: None F-C, S-V
EXCEPTED QUANTITIES: PACKING: IBCs: TANKS: EmS: STOWAGE CATEGORY:	E0 Instructions: P003; Provisions: None Instructions: None; Provisions: None Instructions: None; Provisions: None F-C, S-V Category A.
EXCEPTED QUANTITIES: PACKING: IBCs: TANKS: EmS: STOWAGE CATEGORY: MARINE POLLUTANT: This gas does not meet the	E0 Instructions: P003; Provisions: None Instructions: None; Provisions: None Instructions: None; Provisions: None F-C, S-V Category A. criteria of a Marine Pollutant.
EXCEPTED QUANTITIES: PACKING: IBCs: TANKS: EmS: STOWAGE CATEGORY: MARINE POLLUTANT: This gas does not meet the EUROPEAN AGREEMENT CONCERNING THE	E0 Instructions: P003; Provisions: None Instructions: None; Provisions: None Instructions: None; Provisions: None F-C, S-V Category A. criteria of a Marine Pollutant. E INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY
EXCEPTED QUANTITIES: PACKING: IBCs: TANKS: EmS: STOWAGE CATEGORY: MARINE POLLUTANT: This gas does not meet the EUROPEAN AGREEMENT CONCERNING THE ROAD (ADR): This gas is classified by the Econo	E0 Instructions: P003; Provisions: None Instructions: None; Provisions: None Instructions: None; Provisions: None F-C, S-V Category A. criteria of a Marine Pollutant. E INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY mic Commission for Europe to be dangerous goods.
EXCEPTED QUANTITIES: PACKING: IBCs: TANKS: EmS: STOWAGE CATEGORY: MARINE POLLUTANT: This gas does not meet the EUROPEAN AGREEMENT CONCERNING THE ROAD (ADR): This gas is classified by the Econo UN NO.:	E0 Instructions: P003; Provisions: None Instructions: None; Provisions: None Instructions: None; Provisions: None F-C, S-V Category A. criteria of a Marine Pollutant. E INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY mic Commission for Europe to be dangerous goods. 1044
EXCEPTED QUANTITIES: PACKING: IBCs: TANKS: EmS: STOWAGE CATEGORY: MARINE POLLUTANT: This gas does not meet the EUROPEAN AGREEMENT CONCERNING THE ROAD (ADR): This gas is classified by the Econo UN NO.: NAME and DESCRIPTION:	E0 Instructions: P003; Provisions: None Instructions: None; Provisions: None Instructions: None; Provisions: None F-C, S-V Category A. criteria of a Marine Pollutant. E INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY mic Commission for Europe to be dangerous goods. 1044 Fire extinguisher with compressed or liquefied gas
EXCEPTED QUANTITIES: PACKING: IBCs: TANKS: EmS: STOWAGE CATEGORY: MARINE POLLUTANT: This gas does not meet the EUROPEAN AGREEMENT CONCERNING THE ROAD (ADR): This gas is classified by the Econo UN NO.: NAME and DESCRIPTION: CLASS:	E0 Instructions: P003; Provisions: None Instructions: None; Provisions: None Instructions: None; Provisions: None F-C, S-V Category A. criteria of a Marine Pollutant. E INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY mic Commission for Europe to be dangerous goods. 1044 Fire extinguisher with compressed or liquefied gas 2
EXCEPTED QUANTITIES: PACKING: IBCs: TANKS: EmS: STOWAGE CATEGORY: MARINE POLLUTANT: This gas does not meet the EUROPEAN AGREEMENT CONCERNING THE ROAD (ADR): This gas is classified by the Econo UN NO.: NAME and DESCRIPTION: CLASS: CLASSIFICATION CODE:	E0 Instructions: P003; Provisions: None Instructions: None; Provisions: None Instructions: None; Provisions: None F-C, S-V Category A. criteria of a Marine Pollutant. E INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY mic Commission for Europe to be dangerous goods. 1044 Fire extinguisher with compressed or liquefied gas 2 6A
EXCEPTED QUANTITIES: PACKING: IBCs: TANKS: EmS: STOWAGE CATEGORY: MARINE POLLUTANT: This gas does not meet the EUROPEAN AGREEMENT CONCERNING THE ROAD (ADR): This gas is classified by the Econo UN NO.: NAME and DESCRIPTION: CLASS: CLASSIFICATION CODE: PACKING GROUP:	E0 Instructions: P003; Provisions: None Instructions: None; Provisions: None Instructions: None; Provisions: None F-C, S-V Category A. criteria of a Marine Pollutant. E INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY mic Commission for Europe to be dangerous goods. 1044 Fire extinguisher with compressed or liquefied gas 2 6A None
EXCEPTED QUANTITIES: PACKING: IBCs: TANKS: EmS: STOWAGE CATEGORY: MARINE POLLUTANT: This gas does not meet the EUROPEAN AGREEMENT CONCERNING THE ROAD (ADR): This gas is classified by the Econo UN NO.: NAME and DESCRIPTION: CLASS: CLASSIFICATION CODE: PACKING GROUP: LABELS:	E0 Instructions: P003; Provisions: None Instructions: None; Provisions: None Instructions: None; Provisions: None F-C, S-V Category A. criteria of a Marine Pollutant. E INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY mic Commission for Europe to be dangerous goods. 1044 Fire extinguisher with compressed or liquefied gas 2 6A None 2.2
EXCEPTED QUANTITIES: PACKING: IBCs: TANKS: EmS: STOWAGE CATEGORY: MARINE POLLUTANT: This gas does not meet the EUROPEAN AGREEMENT CONCERNING THE ROAD (ADR): This gas is classified by the Econo UN NO.: NAME and DESCRIPTION: CLASS: CLASSIFICATION CODE: PACKING GROUP: LABELS: SPECIAL PROVISIONS:	E0 Instructions: P003; Provisions: None Instructions: None; Provisions: None Instructions: None; Provisions: None F-C, S-V Category A. criteria of a Marine Pollutant. E INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY mic Commission for Europe to be dangerous goods. 1044 Fire extinguisher with compressed or liquefied gas 2 6A None 2.2 225, 594
EXCEPTED QUANTITIES: PACKING: IBCs: TANKS: EmS: STOWAGE CATEGORY: MARINE POLLUTANT: This gas does not meet the EUROPEAN AGREEMENT CONCERNING THE ROAD (ADR): This gas is classified by the Econo UN NO.: NAME and DESCRIPTION: CLASS: CLASSIFICATION CODE: PACKING GROUP: LABELS:	E0 Instructions: P003; Provisions: None Instructions: None; Provisions: None Instructions: None; Provisions: None F-C, S-V Category A. criteria of a Marine Pollutant. E INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY mic Commission for Europe to be dangerous goods. 1044 Fire extinguisher with compressed or liquefied gas 2 6A None 2.2
EXCEPTED QUANTITIES: PACKING: IBCs: TANKS: EmS: STOWAGE CATEGORY: MARINE POLLUTANT: This gas does not meet the EUROPEAN AGREEMENT CONCERNING THE ROAD (ADR): This gas is classified by the Econo UN NO.: NAME and DESCRIPTION: CLASS: CLASSIFICATION CODE: PACKING GROUP: LABELS: SPECIAL PROVISIONS: LIMITED QUANTITIES: EXCEPTED QUANTITIES:	E0 Instructions: P003; Provisions: None Instructions: None; Provisions: None Instructions: None; Provisions: None F-C, S-V Category A. criteria of a Marine Pollutant. E INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY mic Commission for Europe to be dangerous goods. 1044 Fire extinguisher with compressed or liquefied gas 2 6A None 2.2 225, 594
EXCEPTED QUANTITIES: PACKING: IBCs: TANKS: EmS: STOWAGE CATEGORY: MARINE POLLUTANT: This gas does not meet the EUROPEAN AGREEMENT CONCERNING THE ROAD (ADR): This gas is classified by the Econo UN NO.: NAME and DESCRIPTION: CLASS: CLASSIFICATION CODE: PACKING GROUP: LABELS: SPECIAL PROVISIONS: LIMITED QUANTITIES:	E0 Instructions: P003; Provisions: None Instructions: None; Provisions: None Instructions: None; Provisions: None F-C, S-V Category A. criteria of a Marine Pollutant. E INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY mic Commission for Europe to be dangerous goods. 1044 Fire extinguisher with compressed or liquefied gas 2 6A None 2.2 225, 594 120 mL

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
	n the product is supplied in types of cylinders other than fire
extinguishers:	in the product is supplied in types of cylinders other than me
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
	nould be transported in a secure position in a well-ventilated truck (never
	insure cylinder valve is properly closed, valve outlet cap has been reinstalled,
and valve protection cap is secured before shipping of	
	refilled except by qualified producers of compressed gases. Shipment of a
	the owner or with the owner's written consent is a violation of Federal law (49
CFR 173.301).	
	plies to various liquefied compressed gases: Consult the regulations for
specific requirements Sec. 172.102 Special Provision	
TRANSPORT CANADA TRANSPORTATION OF D	ANGEROUS 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 ASSOCIATIO	
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 IN	
PASSENGER and CARGO AIRCRAFT PACKING IN	
PASSENGER and CARGO AIRCRAFT LIMITED QU	
	ANTITY MAXIMUM NET QUANTITY PER PKG: Forbidden
CARGO AIRCRAFT ONLY PACKING INSTRUCTION	
CARGO AIRCRAFT ONLY PACKING INSTRUCTION	
SPECIAL PROVISIONS:	None
ERG CODE:	2L
INTERNATIONAL MARITIME ORGANIZATION SH	
UN No.:	
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 o	

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):

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:

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.

<u>Disposal</u>: P501: Dispose of contents/containers in accordance with all local, regional, national and international regulations. <u>Hazard Symbol</u>: 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
S	Standard, and the requirements of the Europe	an Union Directives. The intent of this N	hay comply with 29 CFR 1910.1200, Hazard Com Material Safety Data Sheet is to provide end users	s 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 H₃R Aviation, believes to be reliable and accurate. H₃R 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 with non-genotoxic mechanisms of action. By definition, germ cell mutagens are genotoxic. Therefore, 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 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 a 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 timeweighted 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 a there is a danger of cutaneous absorption. STEL-Short Term Exposure Limit: Short Term Exposure Limit, usually a 15-minute timeweighted 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 LD₅₀Rat or Rabbit. < 2000 mg/kg. Inhalation Toxicity 4-hrs LC_{50} 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 LD_{50} Rat. > 500-5000 mg/kg. Dermal Toxicity LD₅₀Rat 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 is severely irritating and/or corrosive; reversible corneal opacity; corneal involvement or irritation clearing in 8-21 days. Draize > 0, \leq 25. Oral Toxicity LD_{50} Rat: > 50-500 mg/kg. Dermal Toxicity LD₅₅Rat or Rabbit. > 200-1000 mg/kg. Inhalation Toxicity LC₅₅ 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. Pll 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 LD_{50} Rat. > 1-50 mg/kg. Dermal Toxicity LD_{50} Rat or Rabbit. > 20-200 mg/kg. Inhalation Toxicity LC_{50} 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 LD_{50} Rat \leq 1 mg/kg. Dermal Toxicity LD_{50} Rat or Rabbit: \leq 20 mg/kg. Inhalation Toxicity LC_{50} 4-hrs Rat \leq 0.05 mg/L). **FLAMMABILITY HAZARD:** 0 (Minimal Hazard-Materials that will not burn in air when

FLAMMABILITY HAZARD: 0 (Minimal Hazard-Materials that will not burr 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 course 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 ignite 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; <u>Solids</u>: 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 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

<u>HEALTH HAZARD</u>: **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 demal toxicity is greater than 200 mg/L. Materials whose LD₅₀ for acute demal toxicity is greater than 2000 mg/kg. Materials whose LD₅₀ for acute demal toxicity is greater than 2000 mg/kg. Materials whose LD₅₀ for acute demal toxicity is greater than 2000 mg/kg. Materials whose LD₅₀ for acute demal toxicity is greater than 2000 mg/kg. There experil 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 10 mg/L but less than or equal to 2000 mg/kg. Materials whose LD₅₀ for acute demal toxicity is greater than 10 mg/L but less than or equal to 2000 mg/kg. Materials whose LD₅₀ for acute demal toxicity is greater than 500 mg/kg but less than or equal to 2000 mg/kg. Materials whose LD₅₀ for acute demal toxicity is greater than 500 mg/kg but less than or equal to 2000 mg/kg. Materials whose LD₅₀ for acute demal toxicity is greater than 500 mg/kg but less than or equal to 2000 mg/kg. Materials whose LD₅₀ for acute demal toxicity is greater than 500 mg/kg but less than or equal to 2000 mg/kg. Materials whose LD₅₀ for acute acute or al 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 LC_{50} 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 LC_{50} for acute inhalation toxicity, if its $\rm LC_{50}$ 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 Materials that cause severe, but reversible irritation to the eyes or are irritants. 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 LC_{50} for acute inhalation toxicity, if its LC_{50} 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 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 according 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 (55°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 $^\circ\text{C}$ (100 $^\circ\text{F})$ (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). <u>Flash Point</u> - Minimum temperature at which a liquid gives off sufficient vapors to form an ignitable mixture with air. <u>Autoignition Temperature</u>: The minimum temperature required to initiate combustion in air with no other source of ignition. <u>LEL</u> - the lowest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source. <u>UEL</u> - 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: LD_{50} - Lethal Dose (solids & liquids) which kills 50% of the exposed animals; LC_{50} - 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/m^3 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 <u>mutagen</u> is a chemical that causes permanent changes to genetic material (DNA) such that the changes will propagate through generational lines. An <u>embryotoxin</u> 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 <u>teratogen</u> is a chemical that causes damage to a developing fetus, but the damage does not propagate across generational lines. A <u>teratogen</u> is a chemical that causes damage to a developing fetus, but the damage does not propagate across generational lines. A <u>teratogen</u> is a 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_{ow} 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. **O**ccupational 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 precautional Safety and Health Administration.

MATERIAL SAFETY DATA SHEET



1. Product and Company Identification

1. Floudet and company h	
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 Emergency Telephone Numbers	513-754-2000 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	Туре	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	Respirable fraction.
Manganese (CAS 7439-96-5)	TWA	0.1 mg/m3	Inhalable fraction.
		0.02 mg/m3	Respirable fraction.
Tin (CAS 7440-31-5)	TWA	2 mg/m3	
Zinc oxide (CAS 1314-13-2)	STEL	10 mg/m3	Respirable fraction.
	TWA	2 mg/m3	Respirable fraction.
Coating(s)	Туре	Value	Form
Boric acid (CAS 10043-35-3)	STEL	6 mg/m3	Inhalable fraction.
	TWA	2 mg/m3	Inhalable fraction.
Borax decahydrate (CAS 1303-96-4)	STEL	6 mg/m3	Inhalable fraction.
	TWA	2 mg/m3	Inhalable fraction.

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Туре	Value	Form
Copper (CAS 7440-50-8)	PEL	1 mg/m3	Dust and mist.
		0.1 mg/m3	Fume.
Iron oxide (CAS 1309-37-1)	PEL	10 mg/m3	Fume.
Manganese (CAS 7439-96-5)	Ceiling	5 mg/m3	Fume.
Silicon (CÁS 7440-21-3)	PEL	5 mg/m3	Respirable fraction.
		15 mg/m3	Total dust.
Tin (CAS 7440-31-5)	PEL	2 mg/m3	
Zinc oxide (CAS 1314-13-2)	PEL	5 mg/m3	Respirable fraction.
		5 mg/m3	Fume.
		15 mg/m3	Total dust.

Canada. Alberta OELs (Occupational Health & Safety Code, Schedule 1, Table 2)

Components	Туре	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	Respirable.
Manganese (CAS 7439-96-5)	TWA	0.2 mg/m3	
Tin (CAS 7440-31-5)	TWA	2 mg/m3	
Zinc oxide (CAS 1314-13-2)	STEL	10 mg/m3	Respirable.
	TWA	2 mg/m3	Respirable.

Canada. British Columbia OELs. (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended)

Components	Туре	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)	STEL	10 mg/m3	Fume.
	TWA	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	
Tin (CAS 7440-31-5)	TWA	2 mg/m3	
Zinc oxide (CAS 1314-13-2)	STEL	10 mg/m3	Respirable.
	TWA	2 mg/m3	Respirable.
Coating(s)	Туре	Value	Form
Boric acid (CAS 10043-35-3)	STEL	6 mg/m3	Inhalable
	TWA	2 mg/m3	Inhalable
Borax decahydrate (CAS 1303-96-4)	STEL	6 mg/m3	Inhalable
	TWA	2 mg/m3	Inhalable

Canada. Manitoba OELs (Reg. 217/2006, The Workplace Safety And Health Act)

Components	Туре	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	Respirable fraction.
Manganese (CAS 7439-96-5)	TWA	0.1 mg/m3	Inhalable fraction.
		0.02 mg/m3	Respirable fraction.
Tin (CAS 7440-31-5)	TWA	2 mg/m3	
Zinc oxide (CAS 1314-13-2)	STEL	10 mg/m3	Respirable fraction.
	TWA	2 mg/m3	Respirable fraction.
Coating(s)	Туре	Value	Form
Boric acid (CAS 10043-35-3)	STEL	6 mg/m3	Inhalable fraction.
	TWA	2 mg/m3	Inhalable fraction.
Borax decahydrate (CAS 1303-96-4)	STEL	6 mg/m3	Inhalable fraction.
	TWA	2 mg/m3	Inhalable fraction.

Canada. Ontario OELs. (Control of Exposure to Biological or Chemical Agents)

Components	Туре	Value	Form
Copper (CAS 7440-50-8)	TWA	0.2 mg/m3	Fume.
Iron oxide (CAS 1309-37-1)	TWA	5 mg/m3	Respirable fraction.
Manganese (CAS 7439-96-5)	TWA	0.2 mg/m3	
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	Respirable fraction.
	TWA	2 mg/m3	Respirable fraction.
Coating(s)	Туре	Value	Form
Boric acid (CAS 10043-35-3)	STEL	6 mg/m3	Inhalable fraction.
	TWA	2 mg/m3	Inhalable fraction.
Borax decahydrate (CAS 1303-96-4)	STEL	6 mg/m3	Inhalable fraction.
- -	TWA	2 mg/m3	Inhalable fraction.

Canada. Quebec OELs. (Ministry of Labor - Regulation Respecting the Quality of the Work Environment)

Components	Туре	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)	Туре	Value	
Borax decahydrate (CAS 1303-96-4)	TWA	5 mg/m3	

Mexico. Occupational Exposure Limit Values

Components	Туре	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 0.2 mg/m3	Fume.
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)	Туре	Value	
Borax decahydrate (CAS 1303-96-4)	TWA	5 mg/m3	
gineering controls	Provide adequate ventilation. Observ inhalation of dust and fumes. Shower recommended.		
sonal 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 hygie and before eating, drinking, and/or sr	ne measures, such as washing noking. Routinely wash work o	g after handling the material

equipment to remove contaminants.

9. Physical & Chemical Properties

•••••••••••••••••••••••••••••••••••••••	
Appearance	Bronze rods.
Physical state	Solid.
Form	Solid.
Color	Bronze.
Odor	Odorless.
Odor threshold	Not available.
рН	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 (H2O2). 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		
Oral		
LD50	Rat	30 g/kg
Manganese (CAS 7439-96-5)		
Acute		
Oral		
LD50	Rat	9000 mg/kg
Silicon (CAS 7440-21-3)		
Acute		
Oral		
LD50	Rat	3160 mg/kg
Zinc (CAS 7440-66-6)		
Acute		
Oral		
LD50	Rat	630 mg/kg

Coating(s)	Species	Test Results	
Boric acid (CAS 10043-35-3)			
Acute			
Dermal			
LD50	Rabbit	> 2000 mg/kg	
Oral	_		
LD50	Rat	2660 mg/kg	
Borax decahydrate (CAS 1303-9	6-4)		
Acute			
Dermal	Dable	10000	
LD50	Rabbit	> 10000 mg/kg	
Sensitization	Rare cases of allergic c	ontact 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	poor coordination, diffic	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 cons	idered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.	
ACGIH Carcinogens			
Borax decahydrate (CA Boric acid (CAS 10043- Manganese (CAS 7439-	35-3)	A4 Not classifiable as a human carcinogen. A4 Not classifiable as a human carcinogen. 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		rted to cause reproductive effects in humans. Clinical studies on test tively high doses of the Boric Acid and Copper components of this product uctive 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.
media	
13. Disposal Consideration	ns
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 g	oods.
IMDG	
Not regulated as dangerous g	oods.
TDG	
Not regulated as dangerous g	oods.
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.
TSCA Section 12(b) Export I	Notification (40 CFR 707, Subpt. D)
Not regulated.	
Clean Air Act (CAA) Section	112 Hazardous Air Pollutants (HAPs) List
Manganese (CAS 7439-9	
	ection 313 - Toxic Chemical: De minimis concentration
Copper (CAS 7440-50-8) Manganese (CAS 7439-9	1.0 % 6-5) 1.0 %
Zinc (CAS 7440-66-6)	1.0 %
	ection 313 - Toxic Chemical: Listed substance
Copper (CAS 7440-50-8)	
Manganese (CAS 7439-9	6-5) Listed. Listed.
Zinc (CAS 7440-66-6)	
CERCLA (Superfund) reportable Copper: 5000	quantity (IDS) (40 CFR 302.4)
Zinc: 1000	
Superfund Amendments and Re	authorization Act of 1986 (SARA)
Hazard categories	Immediate Hazard - Yes
	Delayed Hazard - Yes
	Fire Hazard - No Pressure Hazard - No
	Reactivity Hazard - No
SARA 302 Extremely hazard	lous substance
Not listed.	
SARA 311/312 Hazardous chemical	Yes
Drug Enforcement	Not controlled
Administration (DEA) (21 CFR 1308.11-15)	
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	contains all the information required by the CPR. Controlled

WHMIS classification

WHMIS labeling

Inventory status			
Country(s) or region	Inventory name		On inventory (yes/no)*
Canada	Domestic Substand	ces List (DSL)	Yes
Canada	Non-Domestic Sub	stances List (NDSL)	No
United States & Puerto Rico	Toxic Substances	Control Act (TSCA) Inventory	Yes
	components of the pro	ry requirements administered by the governing c duct are not listed or exempt from listing on the i not contain a chemical known to the State c	nventory administered by the governing
otato regulationo	defects or other rej		
US - California Hazardous S	ubstances (Directo	r's): Listed substance	
Borax decahydrate (CAS	1303-96-4)	Listed.	
Copper (CAS 7440-50-8)		Listed.	
Iron (CAS 7439-89-6)		Listed.	
Manganese (CAS 7439-9	6-5)	Listed.	

Listed.

Listed.

Zinc (CAS 7440-66-6) US - California Proposition 65 - Carcinogens & Reproductive Toxicity (CRT): Listed substance

Not listed.

Tin (CAS 7440-31-5)

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® ratings Health: 2* Flammability: 0

HMIS® is a registered trade and service mark of the NPCA. Physical hazard: 0



Disclaimer

The information in the sheet was written based on the best knowledge and experience currently available.



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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 (Compress	sed Gas)	
• Article number: 033-01-0001		
· Creation date: 08/14/2006		
 Manufacturer/Supplier: Linde Canada Limited 5860 Chedworth Way Mississauga, Ontario L5R 0A2 Telephone (905) 501-1700 24-HOUR EMERGENCY TELEPH : (905) 501-0802 Pse ensure that this MSDS is rece Information department: Custom 	CHEMTREC (800 Linde National O ived by the appropriate person.	974 . 64-8100 . MERGENCY TELEPHONE NUMBER . 0) 424-9300 OR . perations Center (800) 232-4726 .
 Identification number(s) EINECS Number: 231-168-5 		
3 Hazards identification • Hazard description:		
· WHMIS-symbols:		
A - Compressed gas		
Θ		
· HMIS-ratings (scale 0 - 4)		
HEALTHImage: 0FIREImage: 0REACTIVITYImage: 0		
• NFPA ratings (scale 0 - 4)		
$\begin{array}{c} 0 \\ $		
Information pertaining to partic	ular dangers for man and environ	ment: Not applicable.
• Classification system: The classification is in line with in		
	are and by information furnished by	

(Contd. of page 1)

Material Safety Data Sheet

Printing date 07/10/2014

Version 6

Reviewed on 07/10/2014

Trade name: Helium (Compressed Gas)

· GHS label elements



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

· Storage:

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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 ventillation.

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 ventillation.
- · 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 $50^{\circ}C$ (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.

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CDN

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Trade name: Helium (Compressed Gas)

• 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 ventillation.

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.



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: Boiling point/Boiling range: 	
· 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:

 \cdot **Dangerous reactions** No dangerous reactions known.

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Trade name: Helium (Compressed Gas)

• 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

 \cdot TDG and DOT regulations:



 Identification number: Proper shipping name (technical na Label 	UN1046 me): HELIUM, COMPRESSED 2.2
· Maritime transport IMDG:	
-	
· IMDG Class:	2.2
· UN Number:	1046
· Label	2.2
· Marine pollutant:	No

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CDN

⁽Contd. of page 3)

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Trade name: Helium (Compressed Gas)

		(Contd. of page
Proper shipping name:	HELIUM, COMPRESSED	
Air transport ICAO-TI and IAT	A-DGR:	
ICAO/IATA Class:	2	
UN/ID Number:	1046	
Label	2.2	
Propper shipping name:	HELIUM, COMPRESSED	
UN "Model Regulation": UN104	6. HELIUM. COMPRESSED. 2.2	
	-, -,, -, -, -, -, -, -, -, -, -, -	
Regulations		
Sara		
Section 355 (extremely hazardou	is substances):	
Substance is not listed.		
Section 313 (Specific toxic chemi	cal listings):	
Substance is not listed.		

• TSCA (Toxic Substances Control Act):

Substance is listed.

· Proposition 65

 \cdot Chemicals known to cause cancer:

Substance is not listed.

· Chemicals known to cause reproductive toxicity for females:

Substance is not listed.

 \cdot 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.

 \cdot 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.

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Trade name: Helium (Compressed Gas)

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\cdot 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: ExposureLlimit per ACGIH TLV EV: Permissible Exposure Limit per OSHA N/A: Not Applicable

it 1%)



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Henry

HEWP200 - BLUESKIN WP SELF ADHERED WATERPROOFING 200

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

MATERIAL SAFETY DATA SHEET

Page 2 of 5

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

<u>Eye</u>

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.

<u>Skin</u>

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 grining 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.



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.

MATERIAL SAFETY DATA SHEET

Page 4 of 5

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>	
	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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 101C

 Revision No.:
 008

 Prep. Date:
 12/20/2013

 Page:
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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 , (ra	at) LD ₅₀ (rat)	TLV		STEL
Nitrocellulose Lead styphnate Barium nitrate	00055-63-0 09004-70-0 15245-44-0 10022-31-8 00109-27-3	5 -10 7 -13 0.1-1 < 0.1 < 0.1	N/Av N/Av N/Av N/Av N/Av	105 mg/kg >5000 mg/ N/Av 355 mg/kg N/Av	/kg N/E N/E		0.1 mg/m ³ (S) N/E N/E N/E N/E
		PHYS	ICAL PRO	PERTIES			
Appearance / Physical state:	Blank brass	s cartridges.		Odour:		Not app	olicable.
Specific gravity (at 20°C):	Not applica	ble.		Odour threshold	:	Not app	olicable.
Vapour pressure (at 20ºC):	Not applica	Not applicable. Vapour density: Not applicable		olicable.			
Evaporation rate:	Not applica	Not applicable. Boiling point: Not applicable		olicable.			
Freezing point:	Not applica	ble.		pH:		Not app	olicable.
Coefficient of H ₂ 0 / oil distrib	strib: Not applicable. Solubility in water: Not applical		olicable.				
		FIRE AN	<mark>ID EXPLO</mark>	SION DATA			
Flash point / Method:	Not applica	Not applicable. Flammable limits: Not applicable.			olicable.		
Conditions of flammability:	Not applica	Not applicable. Auto-ignition temperature:		Not app	olicable.		
Means of extinction:	Means of extinction: Water.						
Special fire fighting procedures:							
Hazardous combustion products:	tion Oxides of nitrogen, oxides of carbon, oxides of lead, metallic lead and acrid fumes.						
Sensitivity to mechanical impact / static discharge:							
		RE		DATA			
Stability:	Explosive n	naterial.		Conditions of rea	activity:	Explosi	ve material.

Stability:	Explosive material.	Conditions of reactivity:	Explosive material.
Incompatible materials:	Strong acids and oxidizing materials.		
Conditions to avoid:	Acids, excess heat, crushing and e	electrical currents.	
Hazardous decomposition products:	Oxides of nitrogen, oxides of carbon, oxides of lead, metallic lead and acrid fumes.		
	TOXICOLOGICAL	PROPERTIES	
Routes of exposure:	🗌 N/Ap 🛛 Skin contact 🖾 Skin	absorption 🛛 Eye contact 🖾 Inha	alation 🗌 Ingestion
Exposure limits:	See "Ingredients" section above.		
Acute effects of exposure:	Adverse health effects are not e	ght cause irritation to the eyes, sk xpected from acute exposure to fu tective equipment, and/or good per nimum.	umes and dases; however,
Chronic effects of exposure:	and reproductive systems. Orga carcinogens. Lead styphnate is o Metallic lead and lead oxide have	to lead can result in damage to bloo nic lead compounds are not clas converted to metallic lead and lead e not been tested adequately. A evidence that lead produces cancer	sified by IARC or NTP as d oxide during combustion. study by Goyer and Rhyne
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.			
nhalation:	Move victim to fresh air. Get medical attention if symptoms persist.			
ngestion:	Get immediate medical attention.			
· · · · · · · · · · · · · · · · · · ·	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.			
	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			
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.			
	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 disposa 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)			
CAO/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 Date of Preparation: Emergency phone 1 800 424 9300 USA Dec. 20, 2013 Emergency phone 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			

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.



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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
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 20ºC):	0.94	0.94 Odour threshold: Not determined.		
Vapour pressure (at 20ºC):	Not applicable.	Vapour density:	Not applicable.	
Evaporation rate:	Not determined.	Boiling point:	Not determined.	
Freezing point:	Not determined.	pH:	Not determined.	
Coefficient of H ₂ 0 / oil distrib:	Not determined.	Solubility in water:	Slightly soluble.	
	FIRE AND EXPLO	SION 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	Z 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 I	PROPERTIES		
Routes of exposure:	🗌 N/Ap 🛛 Skin contact 🗌 Ski	in absorption 🛛 Eye contact 🗌 In	halation 🗌 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 Date of Preparation: Emergency phone 1 800 424 9300 USA Jan. 9,2014 number:			
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.



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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.)	LC50, (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 P	ROPERTIES
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and a set of the set of the set of the			1
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) Insoluble.
Coefficient of H ₂ 0 / oil distrib:	Not determined.	Solubility in water:	
and the second	FIRE AND EXPL	OSION 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, CO2, Dry Chemical, Foan	1.	

None known. A NIOSH-approved self-contained breathing apparatus (SCBA) should be worn when fighting fires involving chemicals. Hazardous combustion

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.

Special fire fighting procedures:

products:

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:	

HILTI ® is a registered trademark of Hilti Corp.

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:

Synergistic materials:

Can cause skin sensitization in susceptible individuals. IARC has classified silica as a Group 1 carcinogen based upon chronic exposure to silica dust. *In vitro* 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.

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 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 betweer 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 t skin. Wear appropriate personal protective equipment. Place in a container for prop 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		
and the second s	PREPARATION INFORMATION / CONTACTS		
Prepared by:	Hilti, Inc., Tulsa, OK Date of Preparation: Emergency phone 1 800 424 9300 USA May 22,2012 number:		
Customer Service:	Hilti (Canada) Corporation, Mississauga, Ontario; 1 800 363 4458		
lealth / 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 Agend for Research on Cancer. HMIS: Hazardous Materials Information System. TLV: ACGI 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.



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MATERIAL SAFETY DATA SHEET

Emergency phone

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.) LC₅₀, (rat) LD₅₀ (rat) TLV STEL Part A: Silicon dioxide (quartz sand) 14808-60-7 70 - 80 N/Av N/Av 0.025 (R) N/E mg/m³ 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 N/E 67762-90-7 01 - 05N/Av N/Av NE Part B: Dicyclohexyl phthalate 00084-61-7 01 - 05N/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/m³ 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 20ºC):	Not applicable.	Vapour density:	Not applicable.	
Evaporation rate:	Not determined.	Boiling point:	Not determined.	
Freezing point:	Not determined.	pH:	Not determined.	
Coefficient of H ₂ 0 / oil distrib:	Not determined.	Solubility in water:	Pt. A: soluble; Pt. B: insoluble.	
FIRE AND EXPLOSION DATA				
Flash point / Method:	> 200º F (100º 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.

When stored at temperatures greater than 30° C, dibenzoyl peroxide can begin to release carbon dioxide. This will cause swelling of the foil pouches. Hazardous decomposition products:

	тох	ICOLOGICAL PROPERTIES		
Routes of exposure:	🗌 N/Ap 🖾 Skin c	ontact 🛛 Skin absorption 🖾 Ey	e contact 🗌 Inhalation 🔲 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 cause CNS depression.			
Exposure limits:	See "Ingredients" s	ection 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 phys	ician if symptoms occur.	
Skin:		d water. Seek medical attention i		
Inhalation:		ed. Should discomfort occur, mo		
Ingestion:			an. Contact a Physician immediately.	
Other:			is any question about the seriousness of the	
	P	REVENTIVE MEASURES		
Engineering controls:	General (natural or mechanically induced fresh air movements).			
Eye protection:	Safety glasses with	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)			
	PREPARA	FION INFORMATION / CONTAC	TS	
Prepared by:	Hilti, Inc., Tulsa, OK USA	Date of Preparation: May 22, 2012	Emergency phone number: 1 800 424 9300	
Customer Service:	Hilti (Canada) Corp	oration, Mississauga, Ontario; 1	800 363 4458	
Health / Safety contacts:	Hilti, Inc., Tulsa, OK	USA; 1 800 879 6000, Jerry Me	etcalf (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.



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.
In case of emergency	: 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	1	Rotten eggs. [Strong]
Signal word	1	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.
Potential acute health effects	3	
Inhalation	:	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.
Ingestion Skin		Since the product is a gas it is more probable that it will be inhaled rather than ingested. 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).

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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 H ₂ S may freeze the eye and cause severe damage or blindness.
Potential chronic health effe	ects
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/symp	toms
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 overexposu	: 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 reuse, 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	۱.
Extinguishing media		
Suitable	SMALL FIRE: Use dry chemical powder. LARGE FIRE: Use water spray, fog or foam. Move vessels containing H_2S from fire are if without risk. Cool H_2S containing vessels with flooding quantities of water until well after fire is out. Cool H_2S containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion. Do not extinguish a leaking gas flame unless leak ca 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	H_2S is extremely toxic. Fight fires from safe distance or protected location. Stay upwind Wear full protective equipment. H_2S 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	err sui pe ha res	cidental releases pose a serious fire or explosion hazard. Immediately contact hergency personnel. No action shall be taken involving any personal risk or without itable training. Evacuate surrounding areas. Keep unnecessary and unprotected rsonnel from entering. Shut off all ignition sources. No flares, smoking or flames in zard area. Do not breathe gas. Provide adequate ventilation. Wear appropriate spirator when ventilation is inadequate. Put on appropriate personal protective uipment (see Section 8).
Environmental precautions	co ter	sure emergency procedures to deal with accidental gas releases are in place to avoid ntamination of the environment. Hazardous to aquatic environment. May cause long- rm adverse effects in the aquatic environment. Prevent leaking substances from nning into the aquatic environment or the sewage system.
Small spill	: Se	e instructions below.
Large spill	cle sm an sa Lic co Ga the po In co be	acuate area immediately. Restrict access to area until completion of clean up. Ensure can up is conducted by trained personnel only. Remove all ignition sources (no noking, flares, sparks or flames). All equipment should be grounded. Ventilate area d stay upwind. Use appropriate Personal Protection Equipment. Stop or reduce leak if fe to do so. quid H_2S : Do not touch spilled material. Prevent material from entering sewers or nfined spaces. Stop or reduce leak if safe to do so. If not, allow liquid to vaporize. aseous H_2S : Stop or reduce leak if safe to do so. If source of the leak is a cylinder and e leak cannot be stopped safely, move the cylinder to a safe place in the open air. If ssible, repair the leak or allow the cylinder to empty. the case of a large spill, evacuation of populated areas downwind may have to be nsidered. Deliberate ignition and controlled burn of escaping hydrogen sulfide should considered in order to reduce the risk to adjacent areas.

7. Handling and storage

Handling

Storage

: 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.

: 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.

Exposure controls/personal protection 8.

United States

Ingredient	Exposure limits
	ACGIH TLV (United States, 1/2011). STEL: 5 ppm 15 minute(s). TWA: 1 ppm 8 hour(s). NIOSH REL (United States, 6/2009). CEIL: 15 mg/m ³ 10 minute(s). CEIL: 10 ppm 10 minute(s). OSHA PEL Z2 (United States, 11/2006). AMP: 50 ppm 10 minute(s). CEIL: 20 ppm

Occupational exposure limits		TWA (8 hours)			STEL (15 mins)			Ceiling			
Ingredient	List name	ppm	mg/m ³	Other	ppm	mg/m³	Other	ppm	mg/m³	Other	Notations
Hydrogen sulfide	US ACGIH 1/2011 AB 4/2009 BC 9/2011 ON 7/2010 QC 9/2011	1 10 - 10 10	- 14 - - 14	- - - -	5 - - 15 15	- - - 21	- - - -	- 15 10 - -	- 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 H ₂ S 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.
KMK Regulatory Services KMK Regulatory Servi	ces Inc. Tel : +1-888-GHS-7769 (447-7769)/+1-450-GHS-7767 (447-7767); Services Réglementaires KMK Inc. 5/11



8. Exposure controls/personal protection

Eyes	: A face shield may also be necessary if there is potential for contact with liquid H_2S .
Skin	: Recommendations are valid for permeation rates reaching 0.1 ug/cm ² /min or 1 mg/m ² /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/m3	4 hours

Irritation/Corrosion

Skin	: There is no data available.
Eyes	: There is no data available.

KMK Regulatory Services



11. Toxicological information

Respiratory	: There is no data available.
<u>Sensitizer</u>	
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 water, the presence of water in soil or contribute to movement in the soil. If time of the spill as might be the case and/or evaporate away.	falling as precipitation at the time of the soil surface is saturated with moi	f the spill may sture at the
Products of degradation	: Products of degradation: sulfur oxides	s (SO ₂ , SO ₃ etc.).	
Special remarks on the products of biodegradation	Microorganisms in soil and water are involved in oxidation-reduction reactions, we oxidize hydrogen sulfide to elemental sulfur. Abiotic Degradation: Hydrogen sulfide a not absorb solar radiation reaching the tropsphere. It does not, therefore, und photolysis or react photochemically with oxygen. The primary chemical transformation hydrogen sulfide in the atmosphere is oxidation by oxygen containing radicals to s 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)	-	INHAATION RADATION 2 CLANMAGILE CAST 2	Reportable quantity100 lbs. (45.4 kg)Limited quantityYes.Packaging instructionPassenger aircraftQuantity limitation:Forbidden.



14. Transport information

14. Transpor		Idlion			
					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 <u>Aircraft</u> Quantity limitation: Forbidden
					Cargo Aircraft OnlyQuantity limitation: Forbidden

PG* : Packing group

Exemption to the above classification may apply.

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.

AERG : 117



15. Regulatory information

		Clean Air Act (CAA) 112 accidental release pr	evention Hydroger	a sulfida
		Clean Air Act (CAA) 112 regulated flammable	substances: No pr	oducts were found.
		Clean Air Act (CAA) 112 regulated toxic subst	tances: Hydrogen s	ulfide
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	1	Not listed		
DEA List I Chemicals (Precursor Chemicals)	:	Not listed		
DEA List II Chemicals (Essential Chemicals)	:	Not listed		
<u>SARA 313</u>				
		Product name	CAS number	Concentration
Form R - Reporting requirements	;	Hydrogen sulfide	7783-06-4	99.9
Supplier notification	:	Hydrogen sulfide	7783-06-4	99.9
SARA 313 notifications must	t na	ot be detached from the MSDS and any conving a	nd redistribution of	the MSDS shall

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 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 not listed. Rhode Island Hazardous Substances: This material is not listed.
<u>California Prop. 65</u>	
No products were found.	
<u>Canada</u>	
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.

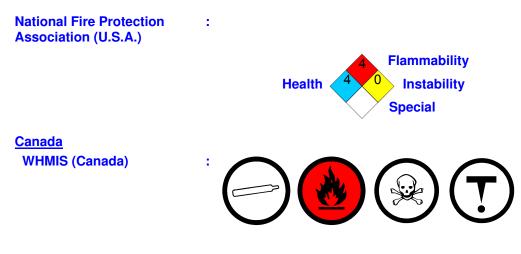
Hazardous Material Information System (U.S.A.)

Health	*	4
Flammability		4
Physical hazards		
		-

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.

2





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 CARETM.





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

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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 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

*For a full list of subsidiary companies, please refer to our website <u>www.specialmetals.com</u> 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. 7449-98-7
Nickel	CAS No. 7440-02-0
Niobium	CAS No. 7440-03-1
Tantalum	CAS No. 7440-03-1
Titanium	CAS No. 7440-25-7
Tungsten	CAS No. 7440-33-7
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 APPENDX 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.

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 LaborIn Canada:Canadian Standards Association, CAN/CSA – W17.2-M87In 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.
 Odor: Odorless

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:

- Ú.S. National Toxicology Program 10th Report On carcinogens 1.
- Health and Safety Executive UK EH40 Occupational exposure limits; EH42 Monitoring Strategies for toxic 2. 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.
- З. EH Health and Safety Executive's publications (www.hse.gov.uk)
- HSC. Information approved for the classification, packaging and labeling of dangerous substances for supply and 4. 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/EECSixth amendment of Council Directive 67/548/EEC 79/831/EEC8.
- The Chemicals (Hazard Information and Packaging for Supply) Regulations 2002 No. 1689 9
- 10. International Agency for Research on Cancer. Monographs on the evaluation of carcinogenic risks to humans. Vol. 49 Chromium Nickel and Welding, 1990.
- Approved Code of Practice ISBN 0 7176 0859X 11.
- 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.

Alloy	Alum-	Chrom-	radenan _{Cobalt}	Copper	Iron	Manga-	Molyb-	Nickel	Nio-	Silicon	Tant-	Titan-	Tung-	Yttrium
	inum	ium	3	Copper		nese	denum		bium	Childon	alum	ium	sten	Oxide
INCONEL® alloy 050	0.2	20 22	3		18 2.5		9 14	50 58	1				3	
INCONEL® alloy 22	0.2				2.5		14						3	
INCONEL® alloy 600 & 600T		16			-			76						
INCONEL® alloy 600SP		15			8			77						
INCONEL® alloy 601	1	24			14			61						
INCONEL® alloy 601GC	1	24			14		0	61						
INCONEL® alloy 603XL		22			•		3	73	-	2				
INCONEL® alloy 604		16			8	0		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	
NCONEL® alloy 690 & 690T		29			9			62						
NCONEL® 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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Alloy Designation Alum- inum Chrom- ium Cobalt Copper Iron Manga- nese Molyb- denum Nickel Nic- bium Silicon Titan- ium Yttrium Oxide INCOLOY® alloy 20 20 4 38 3 34 1 <th>Nitrogen 0.2 0.35</th>	Nitrogen 0.2 0.35
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 INCOLOY® alloy 25-6MO 20 1 45 0.5 6 25 INCOLOY® alloy 25-6MO 20 1 41 1 7 27 INCOLOY® alloy 27-7MO 22 1 41 1 7 27 INCOLOY® alloy 330 19 44 36 1 1 INCOLOY® alloy 330Cb 19 48 34 1 INCOLOY® alloy 800 20 45 1 1 INCOLOY® alloy 800HT 20 45	
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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 801 20 46 1 32 1 INCOLOY® alloy 802 21 44 1 33 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	

Table 2. INCOLOY®, NILO® and NI-SPAN-C® alloys

 $\ensuremath{\textcircled{B}}$ Registered trademarks of the Special Metals Corporation group of companies

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

Table 3. NIMONIC® and NIMOLOY alloys Tradename and Nominal Composition (% weight)

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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
NIOTHERM® Positive	14		85	1		
NIOTHERM® Negative			96	4		

Table 4. BRIGHTRAY®, KOTHERM® and NIOTHERM® alloys Tradename and Nominal Composition (% weight)

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Alloy Designation	Alum- inum	Chrom- ium	Cobalt	Iron	Manga- nese	Molyb- denum	Nickel	Nio- bium	Rheni- um	Tant- alum	Titan -ium	Tung -sten	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	

Table 5A. Miscellaneous Designations Tradename and Nominal Composition (% weight)

® Registered trademarks of the Special Metals Corporation group of companies

			Т			Nominal Cor			ght)				
Alloy Designation	Aluminum	Chromium	Cobalt	Iron	Manga- nese	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			

Table 5B. Miscellaneous Designations

I	radename a	and Nomir	nal Cor	nposition (%	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		

Table 6. MONEL® alloys, FERRY® alloy and Cupro 107

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			Tradena	ame an	d Nominal Con	nposition (% wei	ght)			
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	

Table 7. UDIMET® and UDIMAR® alloys

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Table 8. Nitinol alloys

	Tradename	and Nom	inal Compo	osition	% weight	t)	
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

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)

	maaoman			mpoon	aon (70 n oigin)			
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		

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/m^3 (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/m ³ (Dust & fume as Co)
-	PEL: 0.1 mg/m ³ (As Co metal)
	CAS No. ⁽²⁾ : 7440-48-4
	LD ₅₀ : 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.

 $EH40 - MEL 0.1 mg/m^3$ (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 Fe ₂ O ₃ fume the TLV is 5 mg/m ³ as Fe)
•	PEL: No limit set (For Fe_2O_3 dust & fume the PEL is 10 mg/m ³ as Fe)
	CAS No. ⁽²⁾ : 7439-89-6
	LD ₅₀ : 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/m ³ elemental and inorganic compounds, as Mn
-	PEL: 5 mg/m ³ (Ceiling, as Mn compounds); 5 mg/m ³ (Fume, as Mn)
	CAS No. ⁽²⁾ : 7439-96-5
	LD ₅₀ : 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 my produce a goutlike 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 LD_{50} 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.*

L1140-40. NO IIIIII SEL

 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 LD_{50} 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/m^3 (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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2-4 Hopewell Street, Canning Vale; Western Australia 6155 Australia Phone 61.8.9455.4111 Fax 61.8.9456.0011

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PRO CHEM, INC. 1475 BLUEGRASS LAKES PKWY. ALPHARETTA, GA 30004 EMERGENCY/INFO # (800) 241-8180 ADDITIONAL EMERGENCY # INFO TRAC 1-800-535-5053

MATERIAL SAFETY DATA SHEET

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HEALTH	2
FIRE	0
REACTIVITY	0
P.P.E.	В

Complies With USDL Safety and Health Regulations, (29 CFR 1910.1200)

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.	

Stop leak at the source and collect into a suitable container, then treat as a small spill. LARGE 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 RESULTS OBTAINED FROM USE. PROCHEM ASSUMES NO RESPONSIBILITY FOR PERSONAL INJURY OR PROPERTY DAMAGE TO USER. VENDEE/ USER ASSUMES ALL RISKS ASSOCIATED WITH USE.

SECTION 2 – Composition on Ingredients				
CAS #	CHEMICAL NAMES	WT %	TLV (UNITS)	
111-76-2	2-butoxyethanol	< 10	25 (PPM) skin	

SECTION 3 – Hazards Information

PRIMARY ROUTE(S) OF ENTRY: Skin contact/absorption and inhalation

SECTION 1 – Chemical and Company Identification

Degreaser

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:

PRODUCT USE:

- 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: INGESTION:	If symptoms develop move victim to fresh air. If symptoms persist, call a physician. 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	METHOD USED: C.C. Method
EXPLOSIVE LIMITS:	Not Applicable
AUTOIGNITION TEMPERATURE:	Not Applicable
HAZARDOUS PRODUCTS OF COMBUSTION:	Oxides of carbon, oxides of nitrogen, and ammonia
EXTINGUISHING MEDIA:	Not Applicable
FIRE FIGHTING INSTRUCTIONS:	Avoid contact with this material. Avoid walking in spilled
	material. Wear protective clothing for skin and eyes.

(PPM) skin N/E = not established

PRO CHEM, INC.

1475 BLUEGRASS LAKES PKWY. ALPHARETTA, GA 30004 EMERGENCY/INFO # (800) 241-8180 ADDITIONAL EMERGENCY # INFO TRAC 1-800-535-5053

MATERIAL SAFETY DATA SHEET

INDUSOL / 2214 APRIL 2012 PAGE 2

HEALTH	2
FIRE	0
REACTIVITY	0
P.P.E.	В

Complies With USDL Safety and Health Regulations, (29 CFR 1910.1200)

SECTION 14 – Transport Information

DOT INFORMATION:	
DOT DESCRIPTION:	
REPORTABLE QUANTITY (RQ):	
NOT APPLICABLE	

49 CFR 172.101 33440 Class 55 49 CFR 172.101

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.

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 RESULTS OBTAINED FROM USE. PROCHEM ASSUMES NO RESPONSIBILITY FOR PERSONAL INJURY OR PROPERTY DAMAGE TO USER. VENDEE/ USER ASSUMES ALL RISKS ASSOCIATED WITH USE.

CLOVERDALE PAINT MSDS Prod.ID:

:

RATE:

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MATERIAL SAFETY DATA SHEET
 Pred.ID:
 74163
                                                         Patre 4
 PRODUCT NAME: INDUSTRIAL ENAMEL - B.P.
                                                 HMIS
                                                            HFFP
                  YELLOW
                                                 COJES:
                 74163
 PRODUCT
                                                            1 31 5
 IDENTIFIER:
 PRODUCT USE: General purpose coating.
PRODUCT IDENTIFICATION UN1263
NUMBER:
WHMIS INFO:
                 B2, D2A
MANUFACTURER'S NAME: Cloverdale Paint Inc
         : 6950 King George Boulevard
ADDRESS
                    Surrey, BC,
                                     REVISION DATE: 22-Mar-13
                  : 613-996-6666
EMERGENCY PHONE
 INFORMATION PHONE : 604-596-6261
ABREVIATIONS N/AP - NOT APPLICABLE N/AV - NOT AVAILABLE
 SECTION 11 - HAZARDOUS INGREDIENTS
REPORTABLE CAS WEIGHT O.E.L.
COMPONENTS NUMBER PERCENT
STODDARD 8052-41- 15-40 ACGIR TLV: 100 ppm
SOLVENT 3 LD50: ORAL:>5g/kg(PAT),
LC50:>5g/M3/4R(RAT)
>CGTH TLV: 400 ppm
LIGHT NAPHTHA 64742- 5-10

- HYDROTREATED 89-8

TITANIUM 13463- 1-5

DIOXIDE 67-7

ETHYLBENZENE 100-41- 0.1-1

4

LC50:>5g/M3/4H(RAT)

ACGIH TLV: 400 ppm

LD5D:ORAL:>25000

mg/kg(RAT),LC50:16000 ppm/4H(RAT)

TLV (ACGIH): 10 mg/m3, total

dust, 8 hr. TWA

TWA: 100ppm LD50 (ORAL-RAT):

3500 mg/kg

TD50: SKIN:17E00 mg/kg(RABBIT)
                                   1D50: SKIN:17800 mg/kg(BABBIT)

    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 FOINT: 99.0 deg C SPECIFIC GRAVITY
                                                        0.92
                                  (H2O=1):
VAPOR DENSITY: Heavier than PHYSICAL STATE:
                                                        Liquid.
                 air.
               Faster than n-Butyl Acetate.
EVAPORATION
COATING V.O.C.: 488 g/l (before thinning)
SOLUBILITY IN Insoluble.
```

WATER: APPEARANCE AND Moderately thick liquid; Aromatic odor. ODOR: FREEZING POINT: Not available. pH: Not available. COEFFICIENT OF WATER/OIL DIST: ODOR THRESHOLD: 1-30 ppm N/AV

SECTION IV - FIRE AND EXPLOSION HAZARD DATA -----

FLASH FOINT: -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 sword 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

HAZAREOUS COMBUSTION PRODUCTS: Carbon Monoxide, Carbon Dioxide and Oxides of Nitroden.

SECTION V - PEACTIVITY 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, distiness, 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 gracks, 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 Sthylbenezene 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 humana is unknown. The International Agency for Research on Cancer has classified Titanium Dioxide as possibly catcinogenic to (IARC) humans (Group 2B) based on inadequate evidence of carcinogenicity in humans and sufficient evidence of carcinogenicity in experimental

animule,

TERATUSENICITY AND EMBRYOTOXICITY High exposures to xylenes in some animal studies have been reported to cause health effects on the developing embryo/fotus. These effects were often at levels toxic to the mother. The significance of these findings to humans has not been determined.

REPRODUCTIVE COXICITY Not Available.

MUTAGENICITY Not available.

TOXICOLOGICALLY SYNERGISTIC PRODUCTS None known.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXBOSURE Abesthesia, respiratory tract irritation, dermatitis, nausea, vomiting.

SECTION VII - PREVENTIVE MEASURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OF SPILLED Eliminate ignition sources. Provide good ventilation or wear appropriate breathing apparatus. Absorb small spills with nonflammable 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. Froduct 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, SVC.

EYE PROTECTION Chemical safety glasses, goggles or face shield.

OTHER PROTECTIVE CLOTHING OF 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

INHIBITOR AZ8101

Issue Date: 19-SEP-2013 Supercedes: 21-SEP-2011

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

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/C02/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:
```

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- ----
```

```
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)
Freeze Point (C)
                      13
                                    Vapor Density (air=1) < 1.00
                     -11
Viscosity(cps 70F,21C)
                        6
                                    % Solubility (water)
                                                             100.0
Odor
                                 Mild
Appearance
                                 Light Amber
Physical State
Flash Point SETA(CC)
                                 Liquid
                                 > 200F > 93C
                                 12.8
pH As Is (approx.)
                                  < 1.00
Evaporation Rate (Water=1)
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:
             E
```

D2B

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	В	Goggles,Gloves

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

CHANGE LOG

	EFFECIIVE		
	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

PEPECTIVE

02-JUL-2010	7,8,10	13-JUL-2007
21-SEP-2011	7,8,10	02-JUL-2010
19-SEP-2013	14	21-SEP-2011

GHS SAFETY DATA SHEET

IPEX

IPEX 636 ORG Low VOC Cement for CPVC Plastic Pipe

Date Revised: JAN 2012 Supersedes: JAN 2010

SECTION I - PROD	UCT AND COMPANY	IDENTIFICAT	ION						
PRODUCT NAME:	IPEX 636 ORG Low VOC	Cement for CPVC	Plastic Pip	be					
PRODUCT USE:	Low VOC Solvent Cement	for CPVC Plastic P	'ipe						
SUPPLIER:	IPEX Inc. 807 Pharmacy Avenue Scarborough, Ontario M1L	3K2, CAN	MANUFA	CTURER:		Main Street, Ca 9, Gardena, CA	,		
EMERGENCY: Transporta	tion: CHEMTEL Tel. 800.255	5-3924, 813-248-05	585 (Interna	ational)	Medical: Tel	. 800.451.8346	760.602.87	'03 3E Com	pany (International)
	RDS IDENTIFICATIO	N							
GHS CLASSIFICATION:	14							· .	
He Acute Toxicity:	alth Category 4	Acute Toxicity:	Environr	mental None Knowr		Flammable Liq		ysical	Category 2
Skin Irritation:	Category 3	Chronic Toxicity:		None Knowr			ulu		Ouldgory 2
Skin Sensitization:	NO								
Eye:	Category 2B								
GHS LABEL:	OR OR	<u>*</u>	K	Signal Word Danger	1:	WHMIS CLASSIF	FICATION:	CLASS B, I	DIVISION 2
	Hazard Statements					Precautionary	/ Statements	<u>s</u>	
H225: Highly flammable liquid a				-		arks/open flames/ł		No smoking	
H319: Causes serious eye irrita H335: May cause respiratory irr						ne/gas/mist/vapors protective clothing/		/face protecti	on
H336: May cause drowsiness of				-	et medical advic				
EUH019: May form explosive pe	eroxides					tilated place. Keep			
					of contents/cont	tainer in accordan	ce with local re	gulation	
SECTION 3 - COM	POSITION/INFORMA		KEDIEN I IECS #		ACH	CO	NCENTRATIO	N	
		109-99-9 20	03-726-8	Pre-registration		9	6 by Weight		
Tetrahydrofuran (THF) Methyl Ethyl Ketone (MEK) Cyclohexanone		78-93-3 20	01-159-0	05-2116297	728-24-0000		30 - 60 5 - 25 5 - 20		
	s adhesive product are listed					ned by the US E		exempt from	n that listing.
* Indicates this chemical is # indicates that this chemic	subject to the reporting requ al is found on Proposition 65	irements of Sectior	n 313 of the	e Emergency	Planning and	Community Rig	ht-to-Know	Act of 1986	
SECTION 4 - FIRS									
Contact with eyes: Skin contact: Inhalation: Ingestion:	Flush eyes immediately with Remove contaminated clot Remove to fresh air. If brea Rinse mouth with water. G	hing and shoes. Wathing is stopped, g	/ash skin th give artificia	noroughly with Il respiration.	n soap and wa If breathing is	ter. If irritation of difficult, give or	kygen. Seek	medical ad	dvice.
-	FIGHTING MEASURE								·····,
Suitable Extinguishing	Media: Dry chemical	powder, carbon die	oxide gas, f	foam, Halon,	water fog.		HMIS	NFPA	0-Minimal
Unsuitable Extinguishir						Health	2 3	2	1-Slight
Exposure Hazards: Combustion Products:		d dermal contact bon, hydrogen chlo	oride and s	moke		Flammability Reactivity	0	3 0	2-Moderate 3-Serious
		, ··, ··, -·-g-····				PPE	В	-	4-Severe
Protection for Firefighte		d breathing appara	tus or full-fa	ace positive p	pressure airline	e masks.			
SECTION 6 - ACCI Personal precautions:	DENTAL RELEASE N	IEASURES om heat, sparks ar	nd open flar	mo					
r ersonar precautions.					st ventilation e	quipment or we	ar suitable r	espiratory p	protective equipment.
	Prevent conta	act with skin or eye	s (see sect	ion 8).					
Environmental Precaution Methods for Cleaning up		uct or liquids contai sand or other iner			0	, ,		ater course.	
Materials not to be used		Aluminum or plast				3000 3000 703	501.		
SECTION 7 - HAND	LING AND STORAG	E							
	ng of vapor, avoid contact w								
	om ignition sources, use only ink or smoke while handling	, , ,	ded handlin	ig equipment	and ensure a	dequate ventilat	ion/tume ex	haust hood	S.
	ated room or shade below 3		ay from dire	ect sunlight.					
	om ignition sources and inco cautionary information on co						pounds, stro	ong oxidizer	s and isocyanates.
	AUTIONS TO CONT	,			•				
EXPOSURE LIMITS:	Component		CGIH STEL	OSHA PEL					
	Tetrahydrofuran (THF)		00 ppm	200 ppm					
	Methyl Ethyl Ketone (MEK)		300 ppm	200 ppm					
Engineering Controls:	Cyclohexanone Use local exhaust as neede		50 ppm	50 ppm]			
Monitoring:	Maintain breathing zone air		ns below e	xposure limits	3.				
Personal Protective Equ Eye Protection:	ipment (PPE): Avoid contact with eyes, we	ar splash-proof ch	emical dod	ales face shi	ald safaty ala	ssas (snactarle	s) with brow	uuarde an	d side shields
	etc. as may be appropriate		ernicai yoy	שינש, ומטד שווו	oiu, saiety yla	usus (speciacit		guarus all	
Skin Protection:	Prevent contact with the sk	in as much as poss							
	Use of solvent-resistant glo practices and procedures a				ld provide ade	equate protectio	n when norr	nal adhesiv	e application
Respiratory Protection:	Prevent inhalation of the so exhaust ventilation to remo	lvents. Use in a w	ell-ventilate	ed room. Ope n employee b	reathing zone	and to keep co	ntaminants I	below levels	s listed above.
	With normal use, the Expos	sure Limit Value wil	i not usuall	y be reached.	. when limits a	approached, us	e respiratory	protection	equipment.

IPEX

GHS SAFETY DATA SHEET

IPEX 636 ORG Low VOC Cement for CPVC Plastic Pipe

Date Revised: JAN 2012 Supersedes: JAN 2010

SECTION 9 - PHYS Appearance:			vy syrupy liquid					
Odor:		Ketone	7 - 7 - 1 -			Odor Threshold:	0.88 ppm (Cyclohexanone)	
pH:		Not Applicabl	le				, , , , , , , , , , , , , , , , , , , ,	
Melting/Freezing Poi	int:	-108.5℃ (-16	63.3 °F) Based o	on first melting	component: THF	Boiling Range:	66℃ (151°F) to 156℃ (313	°F)
Boiling Point:) Based on first			Evaporation Rate:	> 1.0 (BUAC = 1)	,
Flash Point:		-20 ℃ (-4 °F)	TCC based on	THF		Flammability:	Category 2	
Specific Gravity:		0.995 @23°C	C(73°F)			Flammability Limits:	LEL: 1.1% based on Cyclol	nexanone
Solubility:		Solvent portion	on soluble in wa	ater. Resin pol	rtion separates out.	-	UEL: 11.8% based on THF	
Partition Coefficient	n-octanol/wa	iter:	Not Available			Vapor Pressure:	129 mm Hg @ 20℃ (68°F)b	ased on Th
Auto-ignition Tempe	erature:	321 ℃ (610 ¶	F) based on TH	F		Vapor Density:	<2 (Air = 1)	
Decomposition Tem	perature:	Not Applicab				Other Data: Viscosity		
VOC Content:		When applied	d as directed, p	er SCAQMD F	Rule 1168, Test Metho	od 316A,VOC content is: \leq 49	0 g/l.	
ECTION 10 - STA	BILITY AN	ID REACTI	VITY					
Stability:			Stable					
Hazardous decompo	osition produ	cts:	None in norma	al use. When	forced to burn, this pr	oduct gives off oxides of carbo	on, hydrogen chloride and smok	e.
Conditions to avoid:					s, open flame and oth			
Incompatible Materia	als:		Oxidizers, stro	ong acids and l	bases, amines, ammo	onia		
ECTION 11 - TOX				0	, ,			
kely Routes of Exposur		Innalation, Ey	ye and Skin Cor	ntact				
cute symptoms and effe				!!! :		demonstration of the first of		
Inhalation:						drowsiness, irritation of eyes		
Eye Contact:							lammation on contact with the lic	luid.
Skin Contact:						tis may occur with prolonged o	contact.	
Ingestion:			ng, diarrhea and	d mental slugg	ishness.			
hronic (long-term) effec	cts:	None known	to humans					
oxicity:		LD50			LC			
Tetrahydrofuran (THF)		Oral: 2842 m				tion 3 hrs. 21,000 mg/m 3 (rat)		
Vethyl Ethyl Ketone (MEK	K)		g/kg (rat), Derm		g (rabbit) Inhala	tion 8 hrs. 23,500 mg/m ³ (rat)		
Cyclohexanone		Oral: 1535 m	g/kg (rat), Derm	nal: 948 mg/kg	(rabbit) Inhala	tion 4 hrs. 8,000 PPM (rat)		
Democratic Eff	Toroto							7
Reproductive Effects	Terato	aenicity	Mutaq	enicitv	Embryotoxicit	v Sensitization to Produce	uct Syneraistic Products	
Reproductive Effects Not Established		genicity tablished		<u>lenicity</u> ablished	Embryotoxicit Not Establishe	-	Not Established	
Not Established	Not Es	tablished	Not Est			-		
Not Established	Not Es	tablished	Not Est			-		
Not Established	Not Es	tablished	Not Est			-		
Not Established	Not Es DLOGICAL None Knowr	tablished INFORMA	Not Esta	ablished	Not Establishe	-	Not Established	
Not Established SECTION 12 - ECC Ecotoxicity:	Not Es DLOGICAL None Knowr	tablished INFORMA n e, emission of	Not Esta	ablished	Not Establishe	d Not Established	Not Established	
Not Established SECTION 12 - ECC Ecotoxicity: Mobility:	Not Es DLOGICAL None Knowr In normal us	tablished INFORMA e, emission of ile	Not Esta	ablished	Not Establishe	d Not Established	Not Established	
Not Established SECTION 12 - ECC Ecotoxicity: Mobility: Degradability: Bioaccumulation:	Not Es DLOGICAL None Knowr In normal us Biodegradab Minimal to no	tablished INFORMA e, emission of ele one.	Not Est	ablished compounds (Not Establishe	d Not Established	Not Established	
Not Established SECTION 12 - ECC Ecotoxicity: Mobility: Degradability: Bioaccumulation: SECTION 13 - WAS	Not Es DLOGICAL None Knowr In normal us Biodegradab Minimal to no STE DISPO	tablished INFORMA e, emission of ble one. DSAL CON	Not Est TION volatile organic SIDERATIO	ablished compounds (Not Establishe	d Not Established	Not Established	
Not Established SECTION 12 - ECC Ecotoxicity: Mobility: Degradability: Bioaccumulation: SECTION 13 - WAS ollow local and national resources	Not Es DLOGICAL None Knowr In normal us Biodegradab Minimal to no STE DISPC egulations. Co	tablished INFORMA e, emission of ble one. OSAL CON INSUIT disposal	Not Est TION volatile organic SIDERATIO expert.	ablished compounds (Not Establishe	d Not Established	Not Established	
Not Established ECTION 12 - ECC Ecotoxicity: Mobility: Degradability: Bioaccumulation: ECTION 13 - WAS ollow local and national res ECTION 14 - TRAI	Not Es DLOGICAL None Knowr In normal us Biodegradab Minimal to no STE DISPO egulations. Co NSPORT I	tablished INFORMA e, emission of ble one. DSAL CON DSAL CON DNSUIT disposal NFORMAT	Not Est TION volatile organic SIDERATIO expert.	ablished compounds (Not Establishe	d Not Established	Not Established	
Not Established ECTION 12 - ECC Ecotoxicity: Mobility: Degradability: Bioaccumulation: ECTION 13 - WAS ollow local and national re ECTION 14 - TRAI Proper Shipping Name:	Not Es DLOGICAL None Knowr In normal us Biodegradab Minimal to no STE DISPO egulations. Co NSPORT I	tablished INFORMA e, emission of le one. DSAL CON onsult disposal NFORMAT Adhesives	Not Est TION volatile organic SIDERATIO expert.	ablished compounds (Not Establishe	d Not Established	490 g/l.	
Not Established ECTION 12 - ECC Ecotoxicity: Mobility: Degradability: Bioaccumulation: ECTION 13 - WAS ollow local and national re ECTION 14 - TRAI Proper Shipping Name: Hazard Class:	Not Es DLOGICAL None Knowr In normal us Biodegradab Minimal to no STE DISPO egulations. Co NSPORT I	tablished INFORMA e, emission of le one. OSAL CON onsult disposal NFORMAT Adhesives 3	Not Est TION volatile organic SIDERATIO expert. ION	ablished compounds ('	Not Establishe	d Not Established s place, typically at a rate of <u><</u> EPTION for Ground Shippin	490 g/l.	
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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------IPEX 100T PRIMER . MANUFACTURED FOR-------Ipex 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	1650 mg/kg	18000 ppm 4 hours
	200 ppm	Oral (Rat)	Inhalation (Rat)
ACETONE			
15 - 40	67-64-1	9750 mg/kg	16000 ppm 4 hours
	750 ppm	Oral (Rat)	Inhalation (Rat)
METHYL ETHYL KETON	E		
15 - 40	78-93-3	2737 mg/kg	23500 mg/m3 8 Hours
	200 ppm	Oral (Rat)	Inhalation (Rat)

SECTION 03: HAZARDS IDENTIFICATION

ROUTE OF ENTRY:
SKIN CONTACTCan cause moderate skin irritation,
defatting and dermatitis.
SKIN ABSORPTIONTetrahydrofuran can be absorbed through
the skin resulting in toxic effects.
INHALATIONAs described below.
INHALATION CHRONICCan cause damage to the respiratory
system. Can cause headache, dizziness and nausea.
INGESTIONCan cause gastro-intestinal irritation,
nausea, vomiting and diarrhea.
EYE CONTACTCauses eye burns. Severe irritation,
redness, watering and blurred vision.
EFFECTS OF ACUTE EXPOSURERefer to "ROUTE ENTRY" section.
EFFECTS OF CHRONIC EXPOSUREMay 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.

Ref: 00000318

Preparation Date : June.04.2012

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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

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MATERIAL SAFETY DATA SHEET IPEX 100T PRIMER (Low VOC)

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

SECTION 09: PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATELiquid.
ODOURStrong solvent odour
SPECIFIC GRAVITY0.84 - 0.88.
ODOUR THRESHOLD (ppm)25 ppm.
VAPOUR PRESSURE145 mmHg @ 20°C.
VAPOUR DENSITY (AIR=1)2.50.
EVAPORATION RATE6.00 (NBUAC = 1).
BOILING POINT (deg C)65°C.
pHNot available.
SOLUBILITY IN WATER (% W/W)Slightly.
COEFFICIENT OF WATER\OILNot 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

<pre>IRRITANCY OF MATERIALIrritant upon prolonged exposure. Eye irritant. SENSITIZING CAPABILITY OFNot available. MATERIAL CARCINOGENICITY OF MATERIALNot available. TERATOGENICITYNot available. MUTAGENICITYNot information is available and no adverse teratogenicity effects are anticipated. MUTAGENICITYNot information is available and no adverse mutagenicity effects are anticipated. REPRODUCTIVE EFFECTSNot available. SYNERGISTIC MATERIALSNot available.</pre>		50 ppm for Toluene.200 ppm for Methyl Sthyl Ketone.200 ppm for Tetrahydrofuran.
MATERIAL CARCINOGENICITY OF MATERIALNot available. TERATOGENICITYNo information is available and no adverse teratogenicity effects are anticipated. MUTAGENICITYNo information is available and no adverse mutagenicity effects are anticipated. REPRODUCTIVE EFFECTSNot available.		
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MATERIAL SAFETY DATA SHEET 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.

Ref: 00000318

Preparation Date : June.04.2012

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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, generatiaon 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 acidosid 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, gastointestinal system, blood and cardiovascular system, and may cause diabetis, 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.



IRON

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

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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

	Product Type:	Cored Electrode
The Lincoln Electric Company of Canada LP	Representative Classifications:	AWS E7018-H4R, CSA E4918-1
179 Wicksteed Avenue Toronto, Ontario M4G 2B9 CANADA Phone: (416) 421-2600		ectric Company, Cleveland, Ohio, USA , 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.

100 Part 100		1000 200	TLV	LD ₅₀	LC ₅₀ mg/m ³
Ingredients:	CAS No.	Wt. %	mg/m ³	(Route/Species)	(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	346 mg LCLo
Lithium compounds (as Li)	554-13-2	0.1-1	10*	(oral/rat) 4111 mg/kg LDLo (oral/human)	(inhalation/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 mper cubic meter. TLV value for iron oxide is 5 milligrams pmeter. (**) As respirable dust. (@) As V205 fume or dust.		(LDLo, (#)	Crystallin Agency fo	Lowest published to e silica (quartz) is on the I r Research on Cancer) an y Program) lists as posing	ARC (International d NTP (National
Section	IV - Phy	sical I	Data		

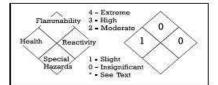
Physical data such as odor, vapor pressure, density, evaporation rate and freezing or boiling points are not listed as they are not applicable to this product and its use.

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 (c.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 followine:

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.

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MATERIAL SAFETY DATA SHEET

Z-50

HEALTH

HMIS SYMBOL			NFPA SYMBOL				
SECTION 1 - PR	RODUCT AN	D COMPANY IDENTI	FICATION	SECTION 9 - P	HYSICAL AND C	HEMICAL PROPERTIES	
Product Name: Chemical Family: Use: Manufacturer/Supp	lier: Jet-Li 3820	e bint compound, ube of Canada Ltd. - 97 Street NW nton, Alberta		Physical State: Odor Threshold: Vapor Pressure: Bolling Point: pH: Density (Typical): Evaporation Rate (E	Grey P Not Determ <0.01 Not determ Net 1.59 g Sutyi Acetate = 1.0); <1	ined Specific Gravity (Typical): 1.59 KPa Vapor Density: Not determined ined Melting Point: Not determined utral % VOC: Nil Vom ²	
		la T6E 5S8 s: (780) 463-7441 Fax: (780) 463-7454	SECTION 10 -	STABILITY AND P	REACTIVITY	
Emergency:	CCO	IS: 1-800-668-4284		Stability: Chemically stable under normal conditions. No photoreactive age			
Contraction of the	and the set of the set of the	VINFORMATION ON	(1998) [26] (1997) [26] [26]	Conditions to Avoid		Powerful sources of Ignition and extreme temperatures.	
Hazardous	UNPOSITION	MINFORMATION ON	INGREDIENTS	Materials to Avoid: Hazardous Decomp	osition Products:	Strong acids and oxidizing agents. May release CO _n , smoke and mitating	
Components		dous Blend	Talc	DECTION 44		vapors when heated to decomposition	
CAS NO. WT % OSHA PEL ACGIH TLV LD50 LC50 OTHER:	55 Not Det Not Det Not det Not det		14807-96-6 1 - 5 2mg/m ⁸ 2mg/m ³ lot determined lot determined N/A	SECTION 11 - TOXICOLOGICAL Exposure Limit of Material: LC50 of Ingredients, Species and Route LD50 of Ingredients, Species and Route Teratogenecity, Embryotoxicity and/or F Mutagenicity:		See Section 2 See Section 2 See Section 2 etotoxicity: Not Available Not Available	
SECTION 3 - H	AZARDS IDE	NTIFICATION		Effects of Long-Ter	rm (Chronic) Exposur produce possible sl	re: Long term dermal application may kin irritation. Elevated temperatures or	
Route of Entry: Eyes: Inhalation: Ingestion:	May cause in Viscous natu May cause di	ion, Ingestion, Skin itation to eyes re may block breathing pa arrhea if ingested. itation after prolonged ski	and the second se	Carcinogen: No	mechanical action r mists or vapors ma tract. NTP: No	nay form vapors or fumes. Inhalation of oi y cause irritation of the upper respiratory IARC: No OSHA: No	
Skin:		persons with hyper sensi		SECTION 12 - I	ECOLOGICAL IN	FORMATION	
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		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.					
	with soap and to passage. If bro	water. athing difficulty continues	s seek medical help.	SECTION 14 - TRANSPORT INFORMATION			
SECTION 5 - FI				TDG (Canada).		ure is not specifically listed in the Canadian	
Flammability: Extinguishing Medi Flash Point (COC): Explosive Propertie Autoignition Temp: Hazardous Combus Protective Equipme	stion Products:	Nil at ambient temp Use dry chemicals, foar water mist >221°C (430°F) LEL – 0.9% UEL - 7.0% >260°C (500°F) Oxides of carbon, smoki as products of incomplet Self-contained breathing	6 e and irritating vapors te combustion.	Land & Rall: Marine: Shipping Name: UN No.: Packing Group: Classification: Labeling Requirement Placard Requirement	Transport Not Regu N/A N/A N/A N/A N/A N/A	ation of Dangerous Goods regulations. lated	
SECTION 6 - AG	CCIDENTAL	RELEASE MEASURE	ËS	SECTION 15 -	REGULATORY I	NFORMATION	
residue with diatoma	ceous earth to a	s down the affected area ar roid a walking hazard. Ilow product to enter into dr		WHMIS: DSL: CPR Compliance:	D2 All components list This product has be	ed sen classified in accordance with the	
SECTION 7 - H					hazard criteria of th	ne Controlled Product Regulations and the of the information required by those	
Handling Procedures Storage Requirement	pressurize	handling precautions nece , out, heat or weld empty co cool, well ventilated place.		SECTION 16 -	regulations. OTHER INFORM		
Engineering Controls to keep exposure to should always be su	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		CPR - Controlled F DSL - Domestic St	Product Regulations			
		re close to work station. ONTROLS/PERSON/	AL PROTECTION			d herein is accurate and reliable to the best o	
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.		Jet-Lube of Canada Ltd.'s knowledge. Jet-Lube of Canada Ltd. does not warran guarantee its accuracy or reliability and shall not be liable for any loss or damage aris out of the use thereof. It is the users' responsibility to satisfy themselves that 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					

5 Shachihata

Safety Data Sheet

According to OSHA 29 CFR 1910.1200 HCS & Canada WHMIS

1.1. Product ide	ntifier		
Product Name		co-Marker 30,70,90,100 Color : (Black)	
(l'asses (astro		JK-30/1B,JK-30/2B, JK-70,JK-70/1B,JK-70/2B	
		JK-90/1B,JK-90/2B, JK-100,JK-100/1B,JK-100/2B	
	and all and a standard state	mical and restrictions on use	
Recommender		nent marker ink	
1.3. Details of th	e supplier of the s	afety data sheet	
Supplier	Company Name	: Jiffco International Ltd.	
	Address	: 835 - West 3rd Street North Vancouver , BC V7P 3K7 Canada	
	Telephone Fax	: 604-980-2685 : 604-980-8549	
	Contact (e-mail)	: sales@iiffco.net	
Manufacturer	Company Name	: Shachihata Inc.	
manalotator	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		
	Teleph	one : 604-657-9822	
ECTION 2. U	arard(a) identii	liestion	
	azard(s) identii	to OSHA 29 CFR 1910.1200 HCS 2012	
	ion of the substand ble liquids, Category		
	eye damage /eye irri		
2.1.2 Label elen	New Arrest and a second		
Hazard pict			
Tracard pro-	ogramo .		
	· · · · · · · · · · · · · · · · · · ·		
-			
Signal word		nger	
Hazard statem		hly flammable liquid and vapour	(H225)
	Cau	ises serious eye damage	(H318)
Precautionary	statement		
[Prevention]			

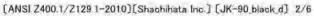
Keep away from heat/sparks/open flames/hot surfaces. - No smoking. (P210) Take precautionary measures against static discharge. (P243) Wear protective gloves/protective clothing/eye protection/face protection. (P280) Use only outdoors or in a well-ventilated area. (P271) Wash hands thoroughly after handling. (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. : Get medical advice/attention.

If eye irritation persists

(P337+P313)





and the second of the second s	The set of	
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-ventilate	d place. Keep container tightly closed.	(P403+P233)
[Disposal]		
Dispose of contents/col	ntainer to waste in accordance with	(P501)
local/regional/ nation	nal/international regulation (to be specified).	
2.1.3 Other hazards		
Under United States Re	egulations (29 CFR 1910.1200 - Hazard Communication Standard),	
this product is consider	ed hazardous.	
	the second s	

Canada : According to WHMIS

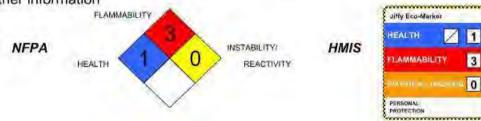
- 2.2.1 Classification of the substance or mixture
 - Class B2 : Flammable Liquids
 - Class D2B : Eye irritation
- 2.2.2 Label elements



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



SECTION 3: Composition/information on ingredients

Substance/Mixture : Mixture Ingredients

Chemical Name /	Composition	CAS	Classification (O	SHA HCS 2012)
Generic name	weight %	Registry No.	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. (ANSI Z400.1/Z129 1-2010)[Shachihata Inc.] [JK-90 black_d] 3/6

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 .	

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	1	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. Sh	ut 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 ha	Indling
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 stor	age, including any incompatibilities
Requirements for storage	: Keep containers tightly closed and store in a cool and dry place.
areas and containers	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

[ANSI Z400.1/Z129 1-2010][Shachihata Inc.] [JK-90_black_d] 4/6

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.

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 c	hemical properties
Appearance	: black liquid
Odor	: minor solvent odor
рН	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.
- Chemical stability The product is stable.
- 10.4. Conditions to Avoid
- High temperature, Direct sunlight, Fire
- 10.5. Incompatible Materials
- No data available

Acute toxicity

 Hazardous decomposition products CO, CO₂

SECTION 11: Toxicological information

11.1. Information on toxicological effects

: 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	s not contain any	component that is considere	d

a human carcinogen by IARC, ACGIH, OSHA or NTP .

CTION 12: Ecological info	ormation	
12.1. Ecotoxicity 12.2. Persistence and degradabili 12.3. Bioaccumulative potential 12.4. Mobility in soil 12.5. Other adverse effects	: No data available ty : No data available : No data available : No data available : No known significant effect	s or critical hazards.
CTION 13: Disposal cons	iderations	
	to official regulations. d Local regulations regarding disposal. ind, any water course or sewage system.	
CTION 14: Transport info	rmation	
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 · Label	: 3 (Flammable liquids.) 3
14.4. Packing group	DOT, TDG, IMO / IMDG, IATA / ICAO	3- H
14.5. Environmental hazards	Marine pollutant	: No
14.6. Special precautions for user	EMS Number	: F-E,S-D
		K. Alakara, M. M. Markara, M. Ma Markara, M. Markara, M Markara, M. Markara, M. Marka Markara, M. Markara, Markara, M. Markara, M. Markara, M. Markara, M
Jiffy Eco-Marker (JK-30, JK-70, JK-90		t of ink : less than 10ml)
sealed packets and articles containin	A46, and IMDG Code Special Provision 210 g less than 10 mL of a Class 3 liquid in Pac dous material/dangerous goods provided t	
UN proper shipping name : UN Classification :	(Amoun UN3175 Solids containing Flammable Liquid. n.o.s. 4.1 II	t of ink : over 10ml)
CTION 15: Regulatory inf	ormation	

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.

[ANSI Z400.1/Z129 1-2010][Shachihata Inc.] [JK-90_black_d] 6/6

WHMIS Ingredient Disclosure List (SOR/88-64) (WHMIS : Canadian Workplace Hazardous Material Information System) : Ethanol, Propan-1-ol, Benzyl alcohol

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 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.

00000612		MATERIAL	SAFETY DATA	SHEET	Page 1
			JIG-A-LOO INC. 5-2 KNOWLTON RD 3ROME LAKE, QC		
			J0E 1V0 CANADA		
PRODUCT: 10251-01-011 J	IG1601	JIG-A-LOO 311G			
		Ø			
Section	n 01: CH	IEMICAL PRODUC	T AND COMPA	NY IDENTIFICATION	
MANUFACTURER PRODUCT NAME CHEMICAL FAMILY MOLECULAR WEIGHT CHEMICAL FORMULA TRADE NAMES & SYNONYMS PRODUCT USES. FORMULATION NUMBER FORMULA/LAB BOOK #		JIG-A-LOO INC. 316-2 Knowlton I For Chemical En Spill Leak Fire E: Call Canutec Da DOMESTIC NOF INTERNATIONA 10251-01-011 JI CHLORINATED MIXTURE. 10251-01-011 JI LUBRICANT. 004-1-167-B.	Rd, Brome Lake, Qc hergency kposure or Accident y or Night RTH AMERICA 613-9 L, CALL 613-947-50 G1601 JIG-A-LOO 3 HYDROCARBON. LE.	48 (collect calls accepted) 11G	
Se	ction 02	: COMPOSITION/I	NFORMATION I	NGREDIENTS	
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		
ISOBUTANE	5-10 7-13	1000 ppm 1000 ppm	74-98-6 75-28-5	>5000 mg/kg DERMAL-RABBITS NOT APPLICABLE	NOT AVAILABLE 142,500 ppm (4h) INHAL -
	Sec	tion 03: HAZARD			RAT
ROUTE OF ENTRY: INGESTION INHALATION EYE CONTACT SKIN ABSORPTION SKIN CONTACT EFFECTS OF ACUTE EXPOSURE EFFECTS OF CHRONIC EXPOSU EXPOSURE LIMIT OF MATERIAL.	RE	MAY CAUSE HE METHYLENE CH AREAS AND CA MAY CAUSE IRI REPEATED COI IRRITATION. METHYLENE CH DEPRESSION A METHYLENE CH DEPRESSION A METHYLENE CH PERCHLOROET DERMATITIS. R	ADACHE, NAUSEA, ILORIDE VAPOURS N CAUSE UNCONS RITATION. NTACT MAY CAUSE ILORIDE -PROLONG ILORIDE OVEREXP ND CARDIAC SENS ILORIDE MAY HAVI HANE - PROLONGE EPEAT EXPOSURE	VOMITING AND WEAKNESS. CAN READILY ACCUMULATE CIOUSNESS. PROPELLANT IS DERMATITIS IN SENSITIVE IN GED OR REPEATED EXPOSURI OSURE MAY LEAD TO CENTR/	A SIMPLE ASPHYXIANT. DIVIDUALS. E MAY CAUSE SKIN AL NERVOUS SYSTEM M EFFECTS. IN CRACKING AND EY DAMAGE, DEPRESSION,
	S	ection 04: FIRST	AID MEASURES		
EMERGENCY FIRST AID PROCE	OURE	MINUTES AND (WATER. IF AFFI	GET MEDICÁL ATTE ECTED BY INHALAT	HIMMEDIATELY WITH PLENTY ENTION. FOR SKIN, WASH THO TON OF VAPOUR OR SPRAY M VOMITING, GET MEDICAL ATTI	ROUGHLY WITH SOAP AND IST, REMOVE TO FRESH AIR.
	Sec	tion 05: FIRE FIG	HTING MEASUR	RES	
AUTO IGNITION TEMPERATURE SPECIAL PROCEDURES		WATER FROM F PREVENT BUILI EQUIPMENT IN FIRE INVOLVING 	FOGGING NOZZLES D-UP IF EXPOSED 1	TO EXTREME TEMPERATURES	. FULL PROTECTIVE

00000612	MATERIAL SAFETY DATA SHEET	Page 2
PRODUCT: 10251-01-011 JIG1601 JIG-	A-LOO 311G	
Section	05: FIRE FIGHTING MEASURES	
LOWER FLAMMABLE LIMIT (% BY VOLUME) EXPLOSION DATA SENSITIVITY TO STATIC DISCHARGE SENSITIVITY TO IMPACT	NOT APPLICABLE.	
	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: FLASHBACK FLASH POINT(°C),TAG CLOSED-CUP (CONCENTRATE)	NONE.	
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 WATERCOUL	RSE.
Section	07: HANDLING AND STORAGE	
ENGINEERING CONTROLS	KEEP AWAY FROM HEAT, SPARKS, AND OPEN FLAMES. VENTILATION - LOCAL (MECHANICAL IF USED INDOORS ON A CONTINUOUS BASIS). STORE IN A COOL, WELL VENTILATED AREA NOT TO EXCEED 50 DEG C. NONE KNOWN.	
Section 08: EXPC	SURE CONTROLS/PERSONAL PROTECTION	
GLOVES/ TYPE RESPIRATORY/TYPE	WEAR CHEMICAL RESISTANT GLOVES. IF USED INDOORS ON A CONTINUOUS BASIS, USE OF A CARTRIDGE TYPE RESPIRAT((NIOSH/MSHATC 23C OR EQUIVALENT) IS RECOMMENDED.	DR
EYE/TYPE FOOTWEAR/TYPE OTHER/TYPE	SAFETY GLASSES. NOT NORMALLY REQUIRED.	
Section 09: P	HYSICAL AND CHEMICAL PROPERTIES	
PHYSICAL STATE APPEARANCE ODOR ODOR THRESHOLD VAPOUR PRESSURE(PSIG)-AEROSOL	CLEAR LIQUID. CHLORINATED HYDROCARBON. NOT AVAILABLE.	
@ 20 C BOILING POINT (°C)(CONC) EVAPORATION RATE n-BUTYL ACETATE = 1		
VAPOUR DENSITY (AIR=1) (BY WEIGHT) SOLUBILITY IN WATER g/L (20°C)		
pH SPECIFIC GRAVITY (LIQUID) COEFFICIENT OF WATER\OIL DIST FREEZING POINT: (°C) AEROSOL PERCENT VOLATILE	NOT APPLICABLE. 1.37-1.41. NOT AVAILABLE. NOT AVAILABLE.	
(BY WEIGHT). SPECIFIC GRAVITY (AEROSOL) AEROSOL PERCENT VOC (w/w)	1.03-1.07. 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 NO, WHICH CONDITIONS?	UNDER NORMAL CONDITIONS. NOT APPLICABLE.	
COMPATIBILITY WITH OTHER SUBSTANCES: NO, WHICH ONES? REACTIVITY CONDITIONS? HAZARDOUS POLYMERIZATION		
Section 11	: TOXICOLOGICAL INFORMATION	
REPRODUCTIVE EFFECTS	NO INFORMATION IS AVAILABLE AND NO ADVERSE REPRODUCTIVE EFFECTS ARE	
IRRITANCY OF MATERIAL SENSITIZING CAPABILITY OF MATERIAL CARCINOGENICITY OF MATERIAL		

METHYLENE CHLORIDE HAS BEEN LISTED AS A POTENTIAL CARCINOGEN BY IA	NRC .
PERCHLOROETHYLENE HAS BEEN LISTED AS A POTENIAL CARCINOGEN BY IAF	RC.

00000612	MATERIAL SAFETY DATA SHEET Page 3
PRODUCT: 10251-01-011 JIG1601 JIG	-A-LOO 311G
Section 1	1: TOXICOLOGICAL INFORMATION
	NO INFORMATION IS AVAILABLE AND NO ADVERSE TERATOGENIC EFFECTS ARE ANTICIPATED. NO INFORMATION IS AVAILABLE AND NO ADVERSE MUTAGENIC EFFECTS ARE ANTICIPATED.
Section 1	2: 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 1	4: TRANSPORTATION INFORMATION
T.D.G. CLASSIFICATION D.O.T. CLASSIFICATION	
IATA: IATA Shipping Description IATA Hazard Class ID Number: IATA Hazard Labels Required:	2.1 (6.1). UN1950.
IMDG/IMO: Classification Proper Shipping Name UN Class UN Number Marine Pollutant	2.1 (6.1). . 1950.
Section	15: REGULATORY INFORMATION
CANADIAN REGULATIONS:	
WHMIS CLASSIFICATION	
U.S. REGULATIONS:	SUBSTANCES LIST (DSL) OK ARE NOT REQUIRED TO BE LISTED.
HMIS RATING HEALTH HMIS RATING FLAMMABILITY HMIS RATING REACTIVITY HMIS RATING PERSONAL PROTECTION NFPA CODE 30B SARA 313 INFORMATION:	4 SEVERE HAZARD. 0 MINIMAL HAZARD. B.
CALIFORNIA PROPOSITION 65:	*75-09-2 METHYLENE CHLORIDE (DICHLOROMETHANE) 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) ALL COMPONENT OF THIS PRODUCT ARE LISTED ON THE TSCA INVENTORY. ANY
VOC (w/w%)	
Secti	ion 16: OTHER INFORMATION
NOTICE FROM JIG-A-LOO INC PREPARED BY PREPARATION DATE	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. TECHNICAL SERVICES Nov14/12



Product Name: Product Code: MSDS Manufacturer Number: Product Use/Restriction: Manufacturer Name: Address:	SP30 (2 oz. or 1 lbs. container) SP-30 SP-30 (2 oz./ 56.6 g. container) Flux Kester 800 W. Thorndale Avenue	3 1 1	>
General Phone Number:	Itasca, IL 60143 (630)-616-4000	HMIS	
Customer Service Phone Number:	(800)-2KESTER (253-7837)	Health Hazard	3
CHEMTREC:	For emergencies in the US, call CHEMTREC: 800-424- 9300 Outside of the U.S. and Canada: (703) 527-3887	Fire Hazard	1
Website:	msds@kester.com	Reactivity	1
MSDS Creation Date: MSDS Revision Date:	August 15, 2008 September 30, 2012	Personal Protection	x

SECTION 2 - COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CA S#	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.

Product Code: SP-30 (2 oz/ 56.6 g. container)

	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:

Zinc Chloride : Guideline ACGIH:

Guideline OSHA:

TLV-TWA: 1 mg/m3 TLV-STEL: 2 mg/m3 PEL-TWA: 1 mg/m3

TLV-TWA: 10 mg/m3 TLV-STEL: 20 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

Non regulated.

IATA Shipping Name: DOT Pictograms:

ORM-D

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

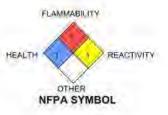
General Use:	Flux
HMIS Health Hazard:	3
HMIS Fire Hazard:	1
HMIS Reactivity:	1
HMIS Personal Protection:	X
MSDS Creation Date:	August 15, 2008
MSDS Revision Date:	September 30, 2012
Disclaimer:	The information contained herein is based on data considered accurate and is offered solely for information, 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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MATERIAL SAFETY DATA SHEET

KOPR-KOTE THERMAL GRADE



SECTION 1 - PR	ODUCT AND COM	MPANY IDENTI	FICATION		
Product Name:	KOPR-KOTE	THERMAL GRAD	E		
Chemical Family:	Mixture				
Use:	Lubricating grease anti-seize				
Manufacturer/Supple	ufacturer/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		675-6863		
	MPOSITION/INFO				
Hazardous	Talc	Graphite	Copper	Molybdenum Disulphide	
Components CAS NO. WT % OSHA PEL ACGIH TLV LD50 LC50 OTHER:	14807-96-6 3-7 2 mg/m ³ (dust) 2 mg/m ³ (dust) Not Available Not Available Not Applicable	7782-42-5 7-13 2.5 mg/m ³ 2 mg/m ³ 10000 mg/kg 64400 mg/m ³ Not Applicable	7440-50-8 5-10 1 mg/m ³ (dust) 1 mg/m ³ (dust) Not Available Not Available Not Applicable	1317-33-5 1-5 15 mg/m ³ 10 mg/m ³ >2000 mg/kg (oral,rat) >2820 mg/m ² (rat) Not Applicable	
SECTION 3 - HA	ZARDS IDENTIFIC	CATION			
Route of Entry: Eyes: Inhalation: Ingestion: Skin:	Eyes, Inhalation, Ing May cause irritation f Viscous nature may May cause diarrhea May cause irritation a	to eyes as a foreigr block breathing pas if ingested. after prolonged skir	ssages if inhaled.	ally for persons with hyper sensitivity.	
SECTION 4 - FIR	ST AID MEASUR	ES			
Eyes: Ingestion: Skin: Inhalation:	Do not induce vomiti Remove by wiping or	ng. Wash out mou r with a waterless h	th. Contact a physicia	by washing with soap and water.	
SECTION 5 - FIR	E FIGHTING MEA				
Flammability: Extinguishing Media: Flash Point (OC): Flammable Limits Explosive Properties: Auto-ignition Temp: Hazardous Combustio	in Products	>293°C (560°F) Upper (Not Avail Sensitivity to Sta Sensitivity to Im LEL - 0.9% UE >360°C (680°F)	Is, foam, halon, CO ₂ lable) Lower (Not Availa atic Discharge (Not Ava pact (Not Available) L - 7%	ble) lable) vapors as products of incomplete combustion.	
	CIDENTAL RELEA				
residue with diatomac	cess, then wipes down eous earth to avoid a w tions: Do not allow pro	alking hazard.			
	NDLING AND STO				
Handling Procedures: Storage Requirements	s: Store in a cool, we	ell ventilated place.		rrize, cut, heat or weld empty containers.	
SECTION 8 - EX	POSURE CONTR	OLS/PERSONA	L PROTECTION		
Exposure Limits; Talc OSHA PEL 2mg/n ACGIH TLV 2mg/n Engineering Controls: always be supplied to Personal Protective Eic Respiratory Protection Hand Protection: Eye Protection: Body Protection:	n ³ 2.5mg/m ³ 1mg n ³ 2mg/m ³ 1mg if user's operation balance air removed by quipment (PPE's) None required Protective glow	g/m ³ generates vapors or v exhaust ventilation l. ves for hypersensitiv sses if applied to mo	Ensure eyewash stati e persons	o keep exposure to airborne contaminants below th on and safety shower are close to work station.	e exposure limit. Make up air should
					LC msda: KOPR-KOTE THERMAL GRAD 11/16/2012

Effects of Short-Term (Acute) (Effects of Long-Term (Chronic rritancy of Product: Skin Sensitization: Respiratory Sensitization: Feratogenecity, Embryotoxicity & Mutagenicity: Carcinogen: Name of Synergistic Products/ SECTION 12 - ECOLOO Possible Effects: May g	te = 1.0): <0.01 TY AND REACTIVITY Chemically stable conditions. No phi- Powerful sources a Strong acids and o ducts: May release COx, LOGICAL INFORMATIO Exposure: No advere) Exposure: Long term or fumes. Product is Product is Reproductive Toxicity: Not Availa Reproduct is Not Availa	otoreactive agents. of ignition and extreme to ixidizing agents. smoke and irritating vap N e affects know. o dermal application may	pors when heated to decomposition. y produce possible skin irritation. Elevated temperatures or mechanical action may form vapors or vapors may cause irritation of the upper respiratory tract.
Boiling Point: H: Density: Coefficient of Water/Oil Distribi- Evaporation Rate (Butyl Aceta SECTION 10 - STABILI Stability: Conditions to Avoid: Materials to Avoid: Mat	>370°C (698°F) Neutral 1.10 g/cm ³ ution: Not Available te = 1.0): <0.01 TY AND REACTIVITY Chemically stable conditions. No phy Powerful sources of Strong acids and of Strong acids acids acids acids Strong acids aci	Freezing Point: under normal of oreactive agents. of ignition and extreme to ixidizing agents. smoke and irritating vap N se affects know. dermal application may inhalation of oil mists o is not known to be an irrit not known to produce s	Not Available emperatures. pors when heated to decomposition. y produce possible skin irritation. Elevated temperatures or mechanical action may form vapors or vapors may cause irritation of the upper respiratory tract.
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Feratogenecity, Embryotoxicity & Mutagenicity: Carcinogen: Vame of Synergistic Products/ SECTION 12 - ECOLOO Possible Effects: May g	Reproductive Toxicity: Not Availa Product is Not classi		
Carcinogen: Name of Synergistic Products/ SECTION 12 - ECOLOO Possible Effects: May g	Not classi		espiratory sensitization.
Name of Synergistic Products/ SECTION 12 - ECOLOO Possible Effects: May g		not a known mutagen.	
SECTION 12 - ECOLOG Possible Effects: May g	Effects: Not Availa	fiable as a human carcir	nogen IARC: Group 3 ACGIH: A4
Possible Effects: May g		ible.	I L MARTIN AND AND AND AND AND AND AND AND AND AN
Environmental Fate: Highly	penerate oil fractions that could a ict is non-reactive under ambien y unlikely to cause widespread of AL CONSIDERATIONS	t conditions. Bioaccum	
	local regulations for disposal of	petroleum products.	
SECTION 14 - TRANSF	PORT INFORMATION		
TDG (Canada):		listed in the Canadian	Transportation of Dangerous Goods regulations. The mixture is not regulated.
.and & Rail: Marine:	Not Regulated Regulated		
Shipping Name:	Environmentally Hazardous S	Substance, N.O.S (copp	er)
JN No.:	UN3077		
Packing Group: Classification:	III Class 9		
abeling Requirements:	Class 9 and Marine Pollutant	Labels	
Placard Requirements:	None	NA-2 707-5 500.0 5044	
abeling Requirements:			QI of 5L net Contents per containment.
Placard Requirements:	Limited Quantities – Non Rec		per containment or large containment.
	Large Containment - Class 9		
SECTION 15 -REGUL	ATORY INFORMATION	1	
WHMIS: Not Clas			
	onents listed		
	duct has been classified in ac on required by those regulation		ard criteria of the Controlled Product Regulations and the MSDS contains all of the
SECTION 16 - OTHER		na.	

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 1 – 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 – PHYSCIAL 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 – HEATH 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	Approximate	CAS	Occupational Exposure Limits	LD ₅₀ / LC ₅₀
Ingredient	Percent by Weight	Number	(OELs)	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:	Odour Threshold: None
Solubility: Insoluble in water		Not Applicable	

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 acetylide, 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	
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 *reporting not required when diameter of the pieces of solid metal released is equ	
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
	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. Urben, 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.



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 FLOID
NEW MSDS DATE:	
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.

6 1

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#				TLV (ACGIH)
Water		-		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



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: 2 OF 7

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS (CONTINUED)

MATERIALCAS#EINECS#CEILINGSTEL(OSHA/ACGIH)HAPIsopropanol67-63-0200-661-7NoneKnown400 ppmNoThis 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!



Magic Safety Products MAGIC PURE SIGHT LENS CLEANING ANTI-STAT, COMPANY IDENTITY: PRODUCT IDENTITY: ANTI-FOG FLUID

DATE: 11/14/11 PAGE: 3 OF 7

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.



Magic Safety Products MAGIC PURE SIGHT LENS CLEANING ANTI-STAT, COMPANY IDENTITY: PRODUCT IDENTITY: ANTI-FOG FLUID

DATE: 11/14/11 PAGE: 4 OF 7

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): FLASH POINT (TÈST METHOD): EVAPORATION RATE (n-BUTYL ACETATE=1): Not Applicable FLAMMABILITY CLASSIFICATION: Class I B 1.2 (Lowest Component) LOWER FLAMMABLE LIMIT IN AIR (% by vol): UPPER FLAMMABLE LIMIT IN AIR (% by vol): Not Available VAPOR PRESSURE (mm of Hg)@20 C VAPOR DENSITY (air=1): 18.1 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) : TOTAL VOC'S (TVOC): NONEXEMPT VOC'S (CVOC): HAZARDOUS AIR POLLUTANTS (HAPS): 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.

80 97 171*C/177 208 340*F(*=End Point) 39 C / 102 F (TCC) (Lowest Component) 12.0 Vol% / 115.6 g/L / 0.9 Lbs/Gal 18.0 Vol% / 144.5 g/L / 1.2 Lbs/Gal 18.0 Vol% / 144.5 g/L / 1.2 Lbs/Gal 0.0 Wt% /0.0 g/L / 0.000 Lbs/Gal



DATE: 11/14/11 PAGE: 5 OF 7

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 LOWEST KNOWN LD50 (ORAL)
Isopropanol	67-63-0	200-661-7	5840.0 mg/kg(Rats) LOWEST KNOWN LC50 (VAPORS)
Isopropanol	67-63-0	200-661-7	1600 ppm (Rats) LOWEST KNOWN LD50 (SKIN)
Isopropanol	67-63-0	200-661-7	16400.0 mg/kg (Rabbits)



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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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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.

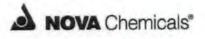
NOTICE

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 mixture

NOVA 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 allergiclike 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 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.

Material Name: Low Sulphur Diesel-S15

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 discolouration 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 Name: Low Sulphur Diesel-S15

MSDS ID: NOVA-0034

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)

Rerosine, petro	leuni, nyurouesununzeu (04742-01-0)
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 (7704-3	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/H20 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):		Lower Flammable Limit (LFL):	0.7%
Flammability Classification:			

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.

Material Name: Low Sulphur Diesel-S15

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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 (premating, 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

Material Name: Low Sulphur Diesel-S15

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).

MSDS ID: NOVA-0034

Material Name: Low Sulphur Diesel-S15

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.

WHIMS 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.

Material Name: Low Sulphur Diesel-S15

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/Rall; 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 limite 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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UNLESS SPECIFICALLY AGREED OTHERWISE, NOVA CHEMICALS DOES NOT TAKE RESPONSIBILITY FOR USE, TRANSPORTATION, STORAGE, HANDLING OR DISPOSAL OF THE PRODUCT/MATERIALS DESCRIBED HEREIN.



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

SUBSTANCE: LUBRIPLATE No. 105

MSDS No. - 0892150034001

1-973-589-9150

Emergency Telephone Number:

1-800-255-3924-CHEM-TEL (24 hour)

Telephone Number for information:

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 **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: 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

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	Pick up/sweep up and keep in suitable, closed containers for disposal.
containment and cleaning up	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.

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
рН	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

Addie Texiolity	
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 Availa	ble	
Aquatic Invertebrate	Not Availa	ble	
Terrestrial	Not Availa	Not Available	
Persistence and Degr	egradability Not Available		
Bioaccumulative Pote	ential	Not Available	
Mobility in Soil		Not Available	
PBT and vPvB Assess	sment	Not Available	
Other Adverse Effects	\$	Not Available	
Reproductive Toxicity	/	Not Available	
Respiratory/Skin Sens	sitization	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

TOOL	
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

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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

WHMIS CLASS: Not Controlled by WHMIS

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

SECTION II – HAZARDOUS COMPONENTS OF MIXTURES

NOT APPLICABLE

SECTION III – PHYSICAL DATE

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, CO Flammable Limits: L – n/a, U – n/a

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.

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, CO

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 :

Manufacturer name and address :

Refer to supplier

G.F. THOMPSON CO. LTD. 620 Steven Court, Unit 11 Newmarket, Ontario L3Y 6Z2

Emergency Phone #: (905) 898-2557

WHMIS CLASS: D2B

SECTION II - HAZARDOUS INGREDIENTS

Ingredients	CAS#	<u>%</u> (wt/wt)	LC50 ppm (Rat, ihl.)	LD50 mg/kg <u>(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 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 :

U	C	v	Ia	u	U	1
				1.55		

	n/av:	not available	
	n/ap:	not applicable	
	ARC :	International Agency for Research on Cancer	
10	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	
Referen	ces :		

ACGIH, <u>Threshold Limit Values and Biological Exposure Indices</u> for 1995-96.

International Agency for Research on Cancer Monographs, Supplement 7, 1988.
 N. Irving Sax. Dangerous Properties of Industrial Materials, Seventh Edition.

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

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 Manufacturer name and address: Refer to supplier.

WHMIS CLASS: B3, D2A, D2B

HMIS Rating:

<u>* - Chronic hazard 0 - Minimal 1 - Slight 2 - Moderate 3 - Serious 4 - Severe</u> Health: *2 Flammability: 2 Reactivity: 0

SECTION II - INGREDIENTS					
Ingredients	 CAS#		LC50 / 4 Hrs (Rat, ihl.)		======================================
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
5				790 (young, ma	le)

SECTION III - PHYSICAL DATA

N/Av

54.4 g/l, 1.6%

Physical state, odour and appearance:

Freezing / melting point: Evaporation rate (n-Butyl acetate = 1): Volatile, % by volume: Odour threshold: Solubility in water: Specific gravity: pH: Boiling point: Vapour density (Air = 1): Viscosity: Vapour pressure (mmHg): Coefficient of water/oil distribution: VOC: Medium grey, paste. Odour of alcohol.

65.6 – 187.8 °C / 150 - 370 °F (emulsion range) N/Av >99 (pure n-Butyl alcohol) N/Av Insoluble N/Av N/Av. N/Av. N/Av N/Av N/Av

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

<u>***Routes of exposure and acute effects***</u>

Exposure limit: ACGIH-TLV: Lead -0.05 mg/m^3 ; n-Butyl alcohol -20 ppm.

OSHA-PEL: Lead $-50 \mu \text{g/m}$ (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
Ene contecto	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:	•
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 equipn	nent: An eyewash station and safety shower should be made available in the immediate oment, including resistant apron, may be required according to workplace standards.
	*** STORAGE & HANDLING ***
Storage and handling co	

Storage and nanding Co	
Handling:	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.
Storage:	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

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 Manufacturer name and address: Refer to supplier.

WHMIS CLASS: B4, D1A, D2A, D2B

HMIS Rating:

Health: *2

* - Chronic hazard 0 - Minimal 1 - Slight 2 - Moderate 3 - Serious 4 - Severe

Flammability: 3 Reactivity: 0

SECTION II - INGREDIENTS					
Ingredients	 CAS#		LC ₅₀ / 4 Hrs (Rat, ihl.)	======================================	======================================
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.

MASTERS PRO-DOPE

Page 2 of 3

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). **Eves:** 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 confimed 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

MASTERS PRO-DOPE

Page 3 of 3

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

Additional notes or references:

Preparation date:

Legend: ACGIH: American Conference of Governmental Industrial Hygienists

- CAS: Chemical Abstract Service
- HMIS: Hazardous Materials Identification System
- IARC: International Agency for Research on Cancer

December 1, 2012

- 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.

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: Materials to avoid: Conditions of Reactivity: Hazardous Decomposition Products:

Strong oxidizers, Peroxides, Reducing agents High temperatures. Carbon oxides

VI. HAZARDS IDENTIFICATION

 Primary Routes of Exposure:
 Eye and skin contact, ingestion, inhalation

 Existing Conditions Aggravated by
 May aggravate preexisting dermatitis

 Exposure:
 Toxicity Information:
 (See Effects of Acute Exposure to Product)

None

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
Effects of Chronic Exposure:	irritation, central nervous system depression, low blood pressure, rapid heartbeat. 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 Pr	
WHMIS Hazard Class:	D2B TOXIC MATERIALS

VII. PREVENTATIVE MEASURES

Safety glasses.
Neoprene or nitrile gloves recommended.
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
Maintain good ventilation. Take up with an inert absorbent. Store in a closed waste container until disposal
Follow Canadian and local regulations for disposal
t: Store in a dry area below 35°C.
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	If swallowed, do not induce vomiting - seek medical advice. Never give anything by mouth to an
ngeston	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 skir irritation persists, call a physician.
Eye Contact:	Rinse immediately with plonty of water, also under the eyelids, for at least 15 minutes. Obtain medical attention.

IX. SHIPPING INFORMATION

Canadian	Trans	por	tation	of	Dangerous (Goods
-			1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			

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

Company: ITW Permatex Canada. 35 Brownridge Rd. Unit 1, Halton Hills, ON L76 0C6

Revision Number: 7

Revision Date: January 10, 2013

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

Cl#: Not applicable.

Synonym: Quick Silver; Colloidal Mercury; Metallic Mercury; Liquid Silver; Hydragyrum

Chemical Name: Mercury

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

Chemical Formula: Hg

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, tetracarbonynickel, nitromethane, silver perchlorate, chlorates, sulfuric acid, nitrates,); tetracarbonylnickel, oxygen, acetylinic compounds, ammonia, ethylene oxide, methylsiliane, calcium,

Special Remarks on Corrosivity:

The high mobility and tendency to dispersion exhibited by mercury, and the ease with which it forms alloys (amalga) 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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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.
In case of emergency	: 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!		
	heart rate. May	RE GAS. Can cause rapid suffocation. Can increase res cause dizziness and drowsiness. Self-contained breath be required by rescue workers.	
	the container ma	der pressure. In a fire or if heated, a pressure increase will ay burst or explode. Do not puncture or incinerate container Jse only with adequate ventilation.	
Routes of entry	: Inhalation		
Potential acute health effe	<u>cts</u>		
Inhalation	headaches, drov	cts are due to lack of oxygen. Moderate concentrations may vsiness, dizziness, excitation, excess salivation, vomiting, a . Lack of oxygen can kill.	
Ingestion	: As this product is	s a gas, refer to the inhalation section.	
Skin	: Contact with rap	idly expanding gas may cause burns or frostbite.	
Eyes	: Contact with rap	idly expanding gas may cause burns or frostbite.	
Potential chronic health ef	ffects		
Chronic effects	: No known signifi	cant effects or critical hazards.	
Carcinogenicity	: No known signifi	cant effects or critical hazards.	
Mutagenicity	: No known signifi	cant effects or critical hazards.	
Teratogenicity	: No known signifi	cant effects or critical hazards.	
Developmental effects	: No known signifi	cant effects or critical hazards.	
Fertility effects	: No known signifi	cant effects or critical hazards.	
Target organs	: No known signifi	cant effects or critical hazards	
Over-exposure signs/symp	<u>ptoms</u>		
Inhalation	: No specific data		
Ingestion	: No specific data		
Skin	: No specific data		
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2. Hazards identification

Eyes

: No specific data.

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**

Canada

Name carbon dioxide	<u>CAS number</u> 124-38-9	<mark>%</mark> 0.1 - 99.999
AND CONTAINS ONE OR MORE OF THE FOLLOWING GASES:	124 00 0	0.1 00.000
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.

First aid measures 4

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 pressu the container may burst or	re. In a fire or if heated, a pressure increase will occur a explode.	and
Extinguishing media				
Suitable	1	Use an extinguishing agen	t suitable for the surrounding fire.	
Not suitable	1	None known.		
Special exposure hazards	:	there is a fire. No action s training. Contact supplier	by removing all persons from the vicinity of the incident in nall be taken involving any personal risk or without suitab mmediately for specialist advice. Move containers from shout risk. Use water spray to keep fire-exposed containers	ole fire
Hazardous thermal decomposition products	:	Decomposition products m carbon dioxide carbon monoxide nitrogen oxides	ay include the following materials:	
Special protective equipment for fire-fighters	:		ppropriate protective equipment and self-contained breaull face-piece operated in positive pressure mode.	thing
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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	1	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				
Ingredient	List name	ppm	mg/m³	Other	ppm	mg/m³	Other	ppm	mg/m³	Other	Notations
carbon dioxide	US ACGIH 1/2009 AB 4/2009 BC 10/2009 ON 8/2008 QC 6/2008	5000 5000 5000 5000 5000	9000 9000 - 9000 9000	- - - -	30000 15000 30000	54000 54000 - 54000 54000	- - -	- - - -	- - - -	- - - -	
argon helium neon nitrogen	Simple asphyxiant.										[2] [2] [2] [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	1	Not applicable.
Burning rate	1	Not applicable.
Auto-ignition temperature	1	Not available.
Flammable limits	:	Not available.
Color	1	Colorless.
Odor	1	Not available.
Taste	1	Not available.
Molecular weight	1	Not applicable.
Molecular formula	1	Not applicable.
рН	1	Not available.
Boiling/condensation point	1	Not available.
Melting/freezing point	1	Not available.
Critical temperature	1	Not available.
Relative density	1	Not available.
Vapor pressure	1	Not available.
Vapor density	1	Not available.
Volatility	1	Not available.
Odor threshold	1	Not available.
Evaporation rate	1	Not available.
Viscosity	1	Not available.
lonicity (in water)	1	Not available.
Dispersibility properties	1	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 carbon dioxide		Result LC50 Inhalation Gas.	<mark>Species</mark> Rat	Dose 470000 ppm	Exposure 30 minutes	
Conclusion/Summary	: Not available	e.				
Chronic toxicity						
Product/ingredient name Not available.		Result	Species	Dose	Exposure	
Conclusion/Summary	: Not available	e.				
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C - CD 0.1 - 99.999, Ar 0-99.99, He 0-99.99, Kr 0-99.99, Ne 0-99.99, Ni 0-99.99, Xe 0-99.99 (E-6751-I)

11. Toxicological information

Product/ingredient name Not available.		Result		Species	Score	Exposure	Observation
<u>Sensitizer</u>							
Product/ingredient name		Route exposi		Species	Res	ult	
Not available.							
Conclusion/Summary	:	Not available.					
Carcinogenicity							
Product/ingredient name Not available.		Result		Species	Dos	e	Exposure
Conclusion/Summary	:	Not available.					
Classification							
Product/ingredient name Not available.		ACGIH	IARC	EPA	NIOS	H NTP	OSHA
Mutagenicity							
Product/ingredient name Not available.		Test		Experim	nent	Resi	ult
Conclusion/Summary	:	Not available.					
Teratogenicity							
Product/ingredient name		Result		Species	Dos	е	Exposure
Not available.							
Conclusion/Summary	:	Not available.					
Reproductive toxicity							
Product/ingredient name		Maternal toxicity	Fertility	Development toxin	s Spe	cies Dos	e Exposure
Not available.							
Conclusion/Summary	:	Not available.					
Synergistic products	:	Not available.					
12. Ecological in	fo	rmation					
Ecotoxicity	:	No known significa	nt effects or	r critical hazards.			
Aquatic ecotoxicity		-					
Product/ingredient name Not available.		Test		Result	Spe	cies	Exposure
Conclusion/Summary	:	Not available.					
Persistence/degradability							

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.

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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)	: Class A: Compressed gas.
Canadian lists	 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	he	: 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		
				1	

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
	Handback of Compressed Cases Fifth Edition
	nanubook of Compressed Gases, Filth Edition
Other special	: Not available.
considerations	
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.

10/15/2013.

16. Other information

ULTRA-HIGH-	Not applicable.
INTEGRITY	
CONNECTION:	

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 nformation, (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-30Product Description:Synthetic Base Stocks and AdditivesMSDS Number:17648Product Code:2015101010J2Intended Use:Engine oil

COMPANY IDENTIFICATION

Supplier:	Imperial Oil Products Division			
	240 4th Avenue			
	Calgary, ALBERTA.	T2P 3M9	Canada	
24 Hour Environmental	1-866-232-9563			
Telephone				
Transportation Emerge	ncy Phone Number	1-866	-232-9563	
Product Technical Information		1-800	-268-3183	
Supplier General Conta	nct	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

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/DMelting Point:N/APour 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

	Route of Exposure	
	nhalation	
sessment of the components.	Toxicity: No end point data for material.	
normal handling temperatures. components.	Irritation: No end point data for material.	
	ngestion	
sessment of the components.	Toxicity: No end point data for material.	
	Skin	
sessment of the components.	Toxicity: No end point data for material.	
ambient temperatures. Based on ts.	Irritation: No end point data for material.	
ts.		



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	3 = IARC 2B	5 = ACGIH A1
2 = IARC 2A	4 = ACGIH ALL	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



Product Name: MOBIL 1 10W-30 Revision Date: 28 Feb 2013 Page 8 of 9

4,4-METHYLENEBIS(2,6-BIS(1,1-		
DIMETHYLETHYL)-		

	REGULATORY LISTS SEARCHED		
1 = TSCA 4	3 = TSCA 5e	5 = TSCA 12b	
2 = TSCA 5a2	4 = TSCA 6	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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Material Safety Data Sheet

MONARCH KLIR CUT NO. 2

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 Petroleum Hydrocarbon plus Additives Chemical Name and Synonym Product Use Metalworking cutting fluid.

Material Identification and Use

NO700

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

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

0	A 11/4/
	Addition of water or foam may cause frothing. Do not cut, drill or weld empty containers.
	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
	From Burning; carbon monoxide, carbon dioxide and oxides of phosphorous.
	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.
	Wear self contained breathing apparatus when fire fighting in a confined space. Do not use water except as fog.

Fire and Explosion Hazards

Reactivity Data

Chemical Stability

Stable

መንስት ያጠንከት የተመንሻ ሽስ የበታቸው መንስ የመንሻ ሽን የሚሰሩ ደግ ማስራ የሆነ የስራ የሆነ የስራ የሆነ የስራ የሆነ የስራ የሆነ የስራ የሆኑ የሆኑ የሚሰሩ የሆኑ የሆኑ የመንስት ያጠንከት የተመንሻ ሽስ የበታቸው የመንሻ የመንሻ ሽን የሚሰሩ የሆኑ የስራ የሆኑ የስራ የሆኑ የስራ የሆኑ የስራ የሆኑ የስራ የሆኑ የሆኑ የሆኑ የሆኑ የሆኑ የሆኑ የሆኑ

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 H2S.
Hazardous Polymerization	Material is not known to polymerize.

Health Hazard Information

سوا والمربوب والاسواب والمرابع المربية المربي الموالي موت والمراجع موالكو مواليو موالي ومعرائها الواليو الواليو

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 الوالو والمراجع والمراجع

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) $60^{\circ}C$ (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 Phone number of Preparer Date Prepared Revised Date Tom Goodnight 1-800-500-6626 09/07/2000 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.



PRODUCT: NATIONAL VACUUM PUMP OIL	NFPA CODES:	Н	F	R
PRODUCT CODE: VPO		0	1	0
CHEMICAL NAME/FAMILY: PETROLEUM LU	BRICATING 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 PAGE 1 VPO

Current Issue Date: November, 2012

ND 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

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.



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.

This material is not classified as dangerous under IMDG regulat

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

EINECSAll components listed or polymer exempt.TSCAAll components listed.DSLAll 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.

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
Nionium (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
Yittrium (Y)	7440-65-5	1

% Alloying Elements (1)

UNS Numbers	AI	Cr	Co	Cu	Fe	Mn	Мо	Ni	Nb	Si	Та	ті	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

2. PF	REPARATION INFORMATION	
Prepared By: Telephone: Note:	UnifiedAlloys (780) 468-5656 Contact Supplier (Quality Department) for additional information	Preparation Date: January 1, 2013

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 Ávenue 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 expressidly 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.

UNIFIEDALLOYS

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)
- Explosion Data: sensitivity to mechanical impact. N/A (under normal conditions)
 Explosion Data: sensitivity to static discharge: N/A (under normal conditions)
- . Explosion Data. Scholivity to static discharge. WA (under normal condi-

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

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: googles or face shields should be utizlied 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 vaccumed. 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.

FIRST AID MEASURES 9.

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.



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Material Safety Data Sheet

· 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 Pse ensure that this MSDS is received by the approp 	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 riate person.
· Information department: Customer Service Centre:	1-866-385-5349

- 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)

HEALTH4Health = 4FIRE0Fire = 0REACTIVITYReactivity = 0

(Contd. on page 2)

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· General information:

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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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· 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 ventillation.

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

 \cdot 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 ventillation.

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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(Contd. of page 2)

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(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

- \cdot Additional information about design of technical systems:
- Adequate local ventillation.

Safety showers and eyewash stations should be nearby.

\cdot 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/m³, 5 ppm Long-term value: 5.6 mg/m³, 3 ppm

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

· Personal protective equipment:

\cdot 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 selfcontained breathing apparatus: demand or pressure-demand or combination supplied-air with auxiliary selfcontained 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

General Information	l	
Form:	Compressed gas	
Color:	Red-brown	
Odor:	Pungent	
· Change in condition		
	ting range: -11.2°C	
Boiling point/Boiling		
· Flash point:	< 21°C	

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Trade name: Nitrogen Dioxide

· 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.
- \cdot 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)

- · Primary irritant effect:
- on the skin: Caustic effect on skin and mucous membranes.
- on the eye: Strong caustic effect.
- Sensitization: No sensitizing effects known.
- \cdot 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.

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Trade name: Nitrogen Dioxide

(Contd. of page 5)

TDG and DOT regulations:	
HHALATION HAZARD	
Hazard class:	2
	UN1067
	DINITROGEN TETROXIDE (NITROGEN DIOXIDE)
	2.3
Maritime transport IMDG:	
	2.3 1067
	2.3
	No
	DINITROGEN TETROXIDE (NITROGEN DIOXIDE)
Air transport ICAO-TI and IATA-DGR	
ICAO/IATA Class:	2
UN/ID Number:	1067
	2.3
Propper shipping name:	DINITROGEN TETROXIDE (NITROGEN DIOXIDE)

15 Regulations

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· 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.	
	(Contd. on page 7)

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Reviewed on 02/16/2012

Trade name: Nitrogen Dioxide

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· 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	
· 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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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



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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 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: 24-HOUR EMERGENCY TELEPHONE NUMBER (905) 501-0802 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% **3 Hazards identification** · Hazard description: · WHMIS-symbols: A - Compressed gas · HMIS-ratings (scale 0 - 4) HEALTH 0 Health = 00 Fire = 0FIRE Reactivity = 0**REACTIVITY** 0

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Trade name: Nitrogen

· NFPA ratings (scale 0 - 4)



· 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 ventillation.

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 ventillation.
- · 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.

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· 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:

\cdot 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 ventillation.

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:

\cdot 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 selfcontained breathing apparatus: demand or pressure-demand or combination supplied-air with auxiliary selfcontained 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

· General Informatio	n	
Form:	Gaseous.	
Color:	Colorless	

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	(Contd. of page 3)
Odor:	Odorless
 Change in condition Melting point/Melting range Boiling point/Boiling range: 	
· Flash point:	Not applicable.
· 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:
- \cdot **Dangerous reactions** No dangerous reactions known.
- · Dangerous products of decomposition: No dangerous decomposition products known.

11 Toxicological information

- · Acute toxicity:
- \cdot LD/LC50 values that are relevant for classification: LC50 None available
- · Primary irritant effect:
- on the skin: No irritating effect.
- \cdot on the eye: No irritating effect.
- \cdot 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
 - The substance is not subject to classification.

12 Ecological information

- \cdot Additional ecological information:
- · General notes: Generally not hazardous for water

13 Disposal considerations

- · Product:
- \cdot **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.

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• TDG and DOT regulations:		
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· Hazard class:	2	
· Identification number:	UN1066	
· Proper shipping name (technical name		
· 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-D	CP.	
· All transport ICAO-11 and IATA-D	GR.	
· ICAO/IATA Class:	2	
· UN/ID Number:	1066	
·Label	2.2	
· Propper shipping name:	NITROGEN, COMPRESSED	
· UN "Model Regulation": UN1066, N	ITROGEN, COMPRESSED, 2.2	
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· 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.	
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· 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 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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rtment issuing MSDS: Customer Service Centre: 1-866-385-5349	
eviations and Acronyms:	
I: American Conference of Governmental Industrial Hygienists	
Chemical Abstract Service (Division of the American Chemical Society)	
JS Department of Transportation	
S: European Inventory of Existing Commercial Chemical Substances	
Globally Harmonized System of Classification and Labelling of Chemicals	
Hazardous Material Identification System	
International Air Transportation Association	
OGR: Dangerous Goods Regulations by the "International Air Transportation Association"	
International Civil Aviation Association	
II: Technical Instructions by the "International Civil Aviation Organization (ICAO)	
International Marine Code for Dangerous Goods	
S: Workplace Hazardous Material Information System	
Lethal Concentration, 50 Percent	
Lethal Dose, 50 Percent	
Not Applicable	





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*	Linde Gas North America LLC - Linde Merchant Production Inc Linde LLC 575 Mountain Ave. Murray Hill, NJ07974 Phone: 908-464-8100 www.lindeus.com 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 Linde Canada Limited 5860 Chedworth Way Mississauga, Ontario L5R 0A2 Phone: 905-501-1700 www.lindecanada.com
Chamical Emorganov Dhana Numha	r Chamtron 1, 200, 424, 0200 for LIC/ 702, 527, 2007 outside LIC

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	
	Contents under pressure	
	Keep at temperatures below 52°C/ 125°F	
Appearance Colorless	Physical State Compressed gas.	Odor Odorles

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

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, O₂, Salt, etc. in the moisture enhances the rusting of metals in air. Carbon steels and low alloy steels are acceptable for use at low er 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® composites, or Kel-F® are preferred non-metallic gasket materials.

Oxygen should not be used as a substitute for compressed air in pneumatic equipment since they generally conatin 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.

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.

	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, screwdriver, 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 segregrated. 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 Te	mperature	No information available.
Decomposition Temperature	No information available.	Boiling Point/ E	Boiling Range	-182.9 °C/ -297.3 °F
Freezing Point	-218.8 °C/ -361.8 °F	Molecular Weig	ght	32.00
Water Solubility	Slightly soluble	Evaporation Ra	te	No information available
Vapor Pressure	Above critical temp.	Vapor Density		1.326 kg/ m³ (0.083 lb/ ft³)
				@21.1°C
VOC Content (%)	Not applicable.	Partition Coeffi	cient:	Log P -0.65
		n-octanol/ wat	er	
Specific Vol. @ 21.1°C & 1 atm	12.1 ft³/ lb	Critical Pressur	e	731.4 psia
Critical Temperature	-118.57°C/ -215.4°F	Flammability Limits in Air		
		Upper	Not applicab	le
		Lower	Not applicab	le

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.

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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

UN1072 Oxygen, compressed, 2.2

2.2

5.1 UN1072

Hazard Class Subsidiary Class UN-Number Description

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 No information available. **Limited Quantity**

IMDG/ IMO

Proper Shipping NameOxygen, compressedHazard Class2.2Subsidiary Class5.1UN-NumberUN1072EmS No.F-C, S-WDescriptionUN1072, Oxygen, compressed, 2.2(5.1)

ADR

Proper Shipping Name	Oxygen, compressed
Hazard Class	2.2
UN-Number	UN1072
Classification Code	10
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 Gean Water Act (40 OFR 122.21 and 40 OFR 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 Gean 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	Х	Х	Х	-	Х

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 Stev 23 British Ar Latham, NY 1-800-572-0	nerican Blvd. 12110				
Issuing Date	05-Mar-201	5-Mar-2010				
Revision Date	27-Sep-2013					
Revision Number	2					
Revision Note	Not applicat	Not applicable.				
NFPA	Health Hazard 0	Flammability 0	Stability 0	Physical and Chemical Hazards OX		
HMIS	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

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.

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).

End of Safety Data Sheet



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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*	Linde Gas North America LLC - Linde Merchant Production Inc Linde LLC 575 Mountain Ave. Murray Hill, NJ07974 Phone: 908-464-8100 www.lindeus.com 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 Linde Canada Limited 5860 Chedworth Way Mississauga, Ontario L5R 0A2 Phone: 905-501-1700 www.lindecanada.com * May include subsidiaries or affiliate companies/ divisions. For additional product information contact your local customer service.
Chamical Emergency Phone Numbe	r Chamtrac: 1-800-424-9300 for US/ 703-527-3887 outside US

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 Odorles

OSHA Regulatory Status

This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

OXYGEN, REFRIGERATED LIQUID, Material Safety Data Sheet,	, Revision Date 27-Sep-2013, Page 2/	1
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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	O2

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 physican 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

OXYGEN, REFRIGERATED LIQUID, Material Safety Data Sheet, Revision Date 27-Sep-2013, Page 3 / 9

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

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 KeI-F® are preferred non-metallic gasket materials.

Oxygen should not be used as a substitute for compressed air in pneumatic equipment since they generally conatin 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.

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.

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, screwdriver, 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. Gose 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. Protect from physical damage. Cylinders should be stored upright with valve protection cap in place Storage 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 segregrated. 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 N		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 Wei	ight	32.00
Water Solubility	Slightly soluble	Evaporation R	ate	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 applicat	ble
		Lower	Not applicat	ble

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 Hazard Class Oxygen, refrigerated liquid 2.2

Subsidiary Class UN-Number Description

IATA

UN-Number Proper Shipping Name **Hazard Class** Subsidiary Class ERG Code Description Maximum Quantity for Passenger Maximum Quantity for Cargo Only **Limited Quantity**

IMDG/ IMO

Proper Shipping Name Hazard Class Subsidiary Class **UN-Number** EmSNo. Description

ADR

Proper Shipping Name	Oxygen, refrigerated liquid	
Hazard Class	2.2	
UN-Number	UN1073	
Classification Code	30	
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

5.1 UN1073

UN1073 Oxygen, refrigerated liquid, 2.2

UN1073 Oxygen, refrigerated liquid 2.2 5.1 2X UN1073, Oxygen, refrigerated liquid, 2.2(5.1) Forbidden Forbidden No information available.

Oxygen, refrigerated liquid 2.2 5.1 UN1073 F-C, S-W UN1073, Oxygen, refrigerated liquid, 2.2(5.1)

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 Gean 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 Gean 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	Х	Х	Х	-	Х

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



Latham, NY	Product Stewardship 23 British American Blvd. Latham, NY 12110 1-800-572-6501		
05-Mar-201	0		
27-Sep-201	27-Sep-2013		
2	2		
Not applica	ble.		
	Flammability 0	Stability 0	Physical and Chemical Hazards OX Personal Protection -
	Latham, NY 1-800-572- 05-Mar-201 27-Sep-201 2	Latham, NY 12110 1-800-572-6501 05-Mar-2010 27-Sep-2013 2 Not applicable. h Hazard 3 Flammability 0	Latham, NY 12110 1-800-572-6501 05-Mar-2010 27-Sep-2013 2 Not applicable. h Hazard 3 Flammability 0 Stability 0

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.

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).

End of Safety Data Sheet



Date:	2/23/2012	MSDS No.:	CAN-W1050
Trade Name:	Pipeliner '	70S-G	
Sizes:	All		
Supersedes:	2/25/2009		

SHEET MATERIAL SAFETY DATA For Welding Consumables and Related Products

Conforms to Workplace Hazardous Materials Information System (WHMIS) Rev. November, 1988

Section I & II - Preparation and Product Information

	Product Type:	Carbon Steel Electrode
The Lincoln Electric Company of Canada LP 179 Wicksteed Avenue Toronto, Ontario M4G 2B9 CANADA Phone: (416) 421-2600	Representative Classifications:	AWS ER70S-G
	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. (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.

			TLV	LD_{50}	LC ₅₀ mg/m ³
Ingredients:	CAS No.	Wt. %	mg/m ³	(Route/Species)	(Route/Species)
Carbon steel wire		100	10*	Not Available	Not Available
Nominal wire composition:					
Total manganese	7439-96-5	1-10	0.2	9 g/kg (oral/rat)	2.3 LCLo (inhalation/human)
Total copper including plated coating	7440-50-8	< 0.5	0.2(a)	0.12 mg/kg LDLo (oral/human)gastrointestinal	Not Available
Iron	7439-89-6	bal.	10*	Not Available	Not Available
Notes:		(LDLo, LO	CLo) Lowe	est published toxic concent	tration.

(*) Not listed. The ACGIH guideline for total particulate is 10 milligrams per cubic meter. TLV value for iron oxides is 5 milligrams per cubic meter.

Values are for copper fume. (a)

Section IV - Physical Data

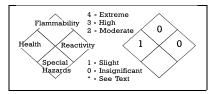
Physical data such as odor, vapor pressure, density, evaporation rate and freezing or boiling points are not listed as they are not applicable to this product and its use.

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: Pipeliner 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.

LD 50 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	n of the substance/mixture and of the company/undertaking
1.1 Product ide	entifier
Trade name: P	owdered Chalk; Blue, Green, Orange
	r: Section 16 lentified uses of the substance or mixture and uses advised against ant information available.
Application of	the substance / the preparation Product Component
Manufacturer/S The L.S. Starrel 121 Crescent S Athol, MA 0133 (978) 249-3551	tt Company t. 1
1.4 Emergency	telephone number:
ChemTel Inc.	+1 (813)248-0585
	not classified according to the CLP regulation. according to Directive 67/548/EEC or Directive 1999/45/EC Not applicable.
Classification a	
The product ha for preparations	of the EU" in the latest valid version.
The product ha for preparations Classification	of the EU" in the latest valid version. system:
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The product ha for preparations Classification The classificati literature data. The classificati supplemented b 2.2 Label eleme Labelling acco Hazard pictogr Signal word N/ Hazard stateme Safety data she Hazard descrip WHMIS-symbo NFPA ratings (of the EU" in the latest valid version. system: ion is according to the latest editions of the EU-lists, and extended by company an ion is in accordance with the latest editions of international substances lists, and i by information from technical literature and by information provided by the company. ents rding to Regulation (EC) No 1272/2008 N/A rams N/A /A ents et available on request. otion: Is: Not hazardous under WHMIS. scale 0 - 4) th = 1
The product ha for preparations Classification The classification iterature data. The classificati supplemented b 2.2 Label eleme Labelling acco Hazard pictogr Signal word N/ Hazard statem Safety data she Hazard descrip WHMIS-symbo NFPA ratings (of the EU" in the latest valid version. system: ion is according to the latest editions of the EU-lists, and extended by company an ion is in accordance with the latest editions of international substances lists, and i by information from technical literature and by information provided by the company. ents rding to Regulation (EC) No 1272/2008 N/A rams N/A /A ents et available on request. otion: Is: Not hazardous under WHMIS. scale 0 - 4) th = 1

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Trade name: Powdered Chalk; Blue, Green, Orange

(Contd. of page 1)

· HMIS-ratings (scale 0 - 4)

Health = *1 HEALTH FIRE Fire = 0

REACTIVITY Reactivity = 0

* - Indicates a long term health hazard from repeated or prolonged exposures.

HMIS Long Term Health Hazard Substances

14808-60-7 Quartz (SiO2)

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.

	calcium carbonate substance with a Community workplace exposure limit	50-100%
CAS: 14808-60-7 EINECS: 238-878-4	Quartz (SiO2) Xn R48/20 STOT RE 2, H373	< 1,0%

wording of the list

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.

(Contd. on page 3)

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(Contd. of page 2)

Trade name: Powdered Chalk; Blue, Green, Orange

• 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)

Printing date 26.09.2012

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Revision: 26.09.2012

Trade name: Powdered Chalk; Blue, Green, Orange

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Additional in 8.1 Control p	formation about design of technical facilities: No further data; see item 7. arameters
	vith limit values that require monitoring at the workplace:
	ium 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 Q	
PEL (USA) REL (USA)	see Quartz listing 0,05* mg/m³ *respirable dust; See Pocket Guide App. A
TLV (USA)	0,025* mg/m ³ *as respirable fraction
	0,025 mg/m ³ ACGIH A2; IARC 1
EV (Canada)	0,10* mg/m ³ *respirable fraction
8.2 Exposure Personal pro General prot The usual pre Respiratory p Protection of Material of gl Eye protection Safet	tective equipment: ective and hygienic measures: cautionary measures are to be adhered to when handling chemicals. protection: Not necessary if room is well-ventilated. hands: Not required. oves Not required.

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Trade name: Powdered Chalk; Blue, Green, Orange

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 Not determined. Odour threshold: 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. Not determined. · Ignition temperature: Decomposition temperature: Not determined. · Self-igniting: Product is not selfigniting. Danger of explosion: Product does not present an explosion hazard. · Explosion limits: Not determined. Lower: 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. Not applicable. · Evaporation rate 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.

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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.

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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.

14.1 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 Ann	ex II of	
MARPOL73/78 and the IBC Code	Not applicable.	

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.

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Trade name: Powdered Chalk; Blue, Green, Orange

TOCA (Tassia Subatawaya Control Act)	(Contd. of page
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 (SiO2)	
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 no	ot 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.

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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)



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 presen 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		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

	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.

Material name: D8J36Series

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 Measu	ires	
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 / Perso Occupational exposure limits No exposure limits noted for in Personal protective equipment	ngredient(s).	
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 Prop	erties	
Appearance	Not available.	
Physical state	Not available.	
Form	Not available.	
Color	Black. or Dark Grey	
Odor	Not available.	
Odor threshold	Not available.	
рН	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	5)		
Acute			
Oral			
LD50	Guinea pig	6500 mg/kg	
	Rat	6500 mg/kg	
Substituted diol (CAS Proprie	etary)		
Acute			
Dermal			
LD50	Rabbit	> 2000 mg/kg	
Inhalation			
LC50	Rat	> 5.1 mg/l, 4 Hours	
Oral			
LD50	Rat	> 5000 mg/kg	
Tetraethylene glycol (CAS 1	12-60-7)		
Acute			
Dermal			
LD50	Rabbit	22570 mg/kg	
Oral			
LD50	Rat	32700 mg/kg	
		29 g/kg	
Carcinogenicity	2B) and by the State of Califor organizations indicate that exp	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 ecole	ogical 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 g	oods.				
IATA Not regulated as dangerous g	oods				
IMDG					
Not regulated as dangerous g	oods.				
RID					
Not regulated as dangerous goods	i.				
Further information	Not a dangerous good under DOT, IATA,	ADR, IMDG, or RID.			
15. Regulatory Information					
WHMIS status	Non-controlled				
Other information	Evenue Limite (Coo Contine 9), Evenution	e regulation of Minister of Labour and Casial Dalias dated			
other mormation	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/NDSL), 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):	 Product and Company Identification: Alternate Trade Names Hazards Identification: Other hazards Fire Fighting Measures: Suitable extinguishing media Physical & Chemical Properties: Multiple Properties Toxicological Information: Further information Disposal Considerations: Disposal instructions 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



MATERIAL SAFETY DATA SHEET



SECTION 1 – PRODUCT INFORMATION

Product Name: Propane

		Supplier:	Superior Propane
Trade Name: LPG (Liqu	uefied Petroleum Gas), LP-Gas		A Division of Superior Plus LP 1111 - 49th Avenue N.E.
Chemical Formula:	СзНв		Calgary, AB T2E 8V2 Business: (403) 730-7500
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		% 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 carbon:	s 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	pH:	Not available
	stored under pressure	Solubility in Water:	Slight, 6.1% by volume @ 17.8°C
Boiling Point:	-42°C @ 1 atm	Specific Gravity:	0.51 (water = 1)
Freezing Point:	-188°C	. ,	
Evaporation Rate:	Rapid (Gas at normal ambient conditions)	Appearance/Odour:	Colourless liquid and vapour while stored under pressure. Colourless and odourless
Vapour Pressure:	1435 kPa (maximum) @ 37.8°C		gas in natural state at any concentration.
·			Commercial propane has an odourant
Vapour Density:	1.52 (Air = 1)		added, ethyl mercaptan, which has an odour similar to boiling cabbage.

Coefficient of Water/Oil Distribution: Not available

Odour Threshold:

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

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 aredeficient 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 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.

4800 ppm

Special Fire Fighting Equipment: Protective clothing, hose monitors, fog nozzles, self-contained breathing apparatus material, drains and openings to building

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.

cylinders.

Empty cylinders and tanks may contain product residue.
 Do not pressurize, cut, heat or weld empty containers.

Do not store with oxidizing agents, oxygen, or chlorine

 Transport, handle and store according to applicable federal and provincial codes and regulations.

Transportation of Dangerous Goods (TDG) TDG Classification: Flammable Gas 2.1 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.: PREPARED BY: DATE PREPARED: (416) 445-3400 Health, Safety and Environment 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: 207	12 02 22 F	Page 1 of 4
Prepared by: Amy Slattery	Checked by: Star	n Rodriguez 🏸	Approved by:	H



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 r

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: 207	12 02 22	Page 2 of 4
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PRODUCTS:

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	

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

MSDS: PVC Pipe and Fittings	Revision Level: #5	Prepared Date: 207	12 02 22	Page 3 of 4
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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.

MSDS: PVC Pipe and Fittings	Revision Level: #5	Prepared Date: 20	12 02 22	Page 4 of 4
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R	Protec	ctive R E			ΡΟΧΥ Ρ	RIMER
	& Mar Coati	ine		Part G Part G Part G Part H	B67A5 B67H5 B67R5 B67V5	Light Gray Tan Red Oxide
WILLIAMS.		P			B07 V3	Hardener
Revised: Februa	- ·					4.45
		DESCRIPTION			ECOMMENDED US	
 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 				For use as a shop or field applied epoxy primer where a variable recoat window is required due to construction schedules, distribu- tion logistics and environmental considerations. Affords flexibility in projects when completion schedules cannot be specified. • Primer for structural steel • Paper mills • Storage tanks • Power plants • Suitable for use in USDA inspected facilities • Nuclear Power Plants • DOE Nuclear Fuel Facilities • Nuclear fabrication shops • DOE Nuclear Weapons Facilities • This product meets specific design requirements for non-safe- ty related nuclear plant applications in Level II, III and Balance of Plant, and DOE nuclear facilities*.		
P	корист С н	ARACTERISTICS	6	ty related nuclear p of Plant, and DOE	lant applications in Le	evel II, III and Balance
Finish:	Flat		-	* Nuclear qualification	is are NRC license sp	ecific to the facility.
Color:	Red	Oxide, Tan, Light	Gray	Perfor	MANCE CHARACT	ERISTICS
Volume Solids:	65%	± 2%, mixed		Substrate*: Steel		
Weight Solids:		± 2%, mixed		Surface Preparation	*: SSPC-SP6/NACE	3
VOC (EPA Method mixed	d 24): Unrec Redu	luced: <320 g ced 5%: <340 g	g/L; 2.67 lb/gal g/L; 2.88 lb/gal	System Tested*:		
Mix Ratio:		y volume	, _, g	1 ct. Recoatable Ep *unless otherwise noted be	boxy Primer @ 5.0 mil Blow	s (125 microns) dft
Bacomm	andod Spra	odina Poto no	r ocot:	Test Name	Test Method ASTM D4060, CS17	Results
<u>Necolini</u>	iended Spre	ading Rate pe Minimum	Maximum	Abrasion Resistance	wheel, 1000 cycles, 1 kg load	200 mg loss
Wet mils (micro		6.0 (150)	9.0 (225)	Accelerated Weathering - QUV ¹	ASTM D4587, QUV- A, 5,000 hours	Passes
Dry mils (micron ~Coverage sq f		4.0 * (100) 175 (4.3)	6.0 * (150) 260 (6.4)	Adhesion	ASTM D4541	1050 psi
Theoretical covera (m²/L) @ 1 mil / 25 *See Performance	ge sq ft/gal microns dft Tips section	1040 (25.5)		Corrosion Weathering	ASTM D5894, 13 cycles, 4,368 hours	Rating 10 per ASTM D714 for Blistering; Rating 7 per ASTM D610 for Rusting
NOTE: Brush c achieve maximu	or roll application m film thicknes	n may require mu s and uniformity o	ltiple coats to f appearance.	Direct Impact Resistance	ASTM D2794	160 in. lbs.
Drvina Sche	edule @ 6.0	mils wet (150	microns):	Dry Heat Resistance	ASTM D2485	250°F (121°C) (dis- colors)
	@ 35°F/1.5°C	@ 77°F/25°C 50% RH	@ 120°F/49°C	Flexibility	ASTM D522, 180° bend, 1" mandrel	Passes
To touch:	1 hour	15 minutes	10 minutes	Moisture Condensa- tion Resistance	ASTM D4585, 100°F (38°C), 2000 hours	Passes, no cracking or delamination
Tack free: To recoat:	2 hours	30 minutes	15 minutes	Pencil Hardness	ASTM D3363	3H
minimum: maximum:	6 hours 1 year	2 hours 1 year	30 minutes 1 year	Salt Fog Resistance ¹	ASTM B117, 5,600 hours	Passes, no cracking or delamination
To cure: If maximum recoat i	14 days time is exceede	14 days d, abrade surface	2 days before recoating.	Slip Coefficient, Red Oxide**	AISC Specification for Structural Joints Using ASTM A325 or ASTM A490 Bolts	Class A, 0.50
Drying time is tem Pot Life: Sweat-in-time:	8+ hours 1 hour	8 hours 30 minutes	3 hours 10 minutes	Surface Burning*	ASTM E84/NFPA 255	Flame Spread Index 15; Smoke Develop- ment Index 30
Shelf Life: Flash Point: Reducer/Clean Below 80°F (27°C Above 80°F (27°C In California:	Up: C): C):	36 months, uno Store indoors a to 100°F (38°C) 80°F (27°C), PM Reducer #54, F Reducer #100, R7K104 Reducer R7K11	it 40°F (4.5°C)). MCC, mixed R7K54 R7K100 or	**Refer to Slip Certificat Epoxy coatings may da Provides performance specifications: Mil-P- Footnotes:	rimer @ 4.6 mils (115 5.0 mils (125 microns) ion document urken or yellow following comparable to produc 23377, Mil-P-53022	01): microns) dft dft g application and curing. ts formulated to federal
L]	¹ Acrolon 218 HS topc	oat	

Protective RECOATABLE EPOXY PRIMER &

SHERWIN WILLIAMS.

Marine

Coatings

 PART G
 B67A5

 PART G
 B67H5

 PART G
 B67R5

 PART H
 B67V5

LIGHT GRAY TAN RED OXIDE HARDENER

PRODUCT INFORMATION

4.45

Recommended Systems			SURFACE PREPARATION		
	Dry Film Ti <u>Mils</u>	hickness / ct. (Microns)	Surface must be clean, dry, and in sound condition. Remove all oi dust, grease, dirt, loose rust, and other foreign material to ensur adequate adhesion.		
Steel, catalyzed epoxy topcoat:1 ct.Recoatable Epoxy Primer2 cts.Tile-Clad HS Epoxy	4.0-6.0 2.5-4.0	(100-150) (63-100)	Refer to product Application Bulletin for detailed surface preparation information.		
Steel, polyurethane topcoat: 1 ct. Recoatable Epoxy Primer 1-2 cts. Hi-Solids Polyurethane	4.0-6.0 3.0-4.0	(100-150) (75-100)	Minimum recommended surface preparation: Iron & Steel: SSPC-SP6/NACE 3, 2 mil (50 micron) profile Galvanizing*: SSPC-SP1		
Steel, acrylic epoxy topcoat:1 ct.Recoatable Epoxy Primer2 cts.Water Based Catalyzed Epoxy	4.0-6.0 2.5-3.0	(100-150) (63-75)	*See Surface Preparations section on page 3 for application of FIRETE intumescent coating systems Surface Preparation Standards Condition of ISO 8501-1 Swedish Std. Surface BS7079:A1 SIS055900 SSPC NACE		
Steel, acrylic topcoat:1 ct.Recoatable Epoxy Primer2 cts.DTM Acrylic Coating	4.0-6.0 2.5-4.0	(100-150) (63-100)	White MetalSa 3Sa 3SP 51Near White MetalSa 2.5Sa 2.5Sp 102Commercial BlastSa 2.5Sa 2.5Sp 102Brush-Off BlastSa 1Sa 1Sp 74Hand Tool CleaningPitted & RustedD St 2D St 2Sp 2Power Tool CleaningPitted & RustedD St 3D St 3SP 3		
Galvanized: 1 ct. Recoatable Epoxy Primer	4.0-6.0	(100-150)	TINTING		
2 cts. Tile-Clad HS Epoxy	2.5-4.0	(63-100)	Do not tint.		
FIRETEX ONLY:			Application Conditions		
Steel & Galvanized Substrates being p 1 ct. Recoatable Epoxy Primer	2.0-5.0	FIRETEX only: (50-125)	Temperature: air and surface:35°F (1.6°C) minimum, 140°F (60°C) maximummaterial:50°F (10°C) minimum At least 5°F (2.8°C) above dew point		
			Relative humidity: 85% maximum		
			Refer to product Application Bulletin for detailed application information.		
			O RDERING INFORMATION		
			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		
			SAFETY PRECAUTIONS		
			Refer to the MSDS sheet before use.		
The systems listed above are represent other systems may be appropriate.	ative of the	product's use,	Published technical data and instructions are subject to change without notice. Contact your Sherwin-Williams representative for additional technical data and instructions.		
	_		WARRANTY		
Disclaimer The information and recommendations set forth based upon tests conducted by or on behalf of T Such information and recommendations set forth pertain to the product offered at the time of pub Williams representative to obtain the most recein Application Bulletin.	i in this Produ The Sherwin-V herein are sub Ilication. Cons	Villiams Company. ject to change and sult your Sherwin-	The Sherwin-Williams Company warrants our products to be free of manufactu ing defects in accord with applicable Sherwin-Williams quality control procedures Liability for products proven defective, if any, is limited to replacement of the defect tive product or the refund of the purchase price paid for the defective product a determined by Sherwin-Williams. NO OTHER WARRANTY OR GUARANTE OF ANY KIND IS MADE BY SHERWIN-WILLIAMS, EXPRESSED OR IMPLIED STATUTORY, BY OPERATION OF LAW OR OTHERWISE, INCLUDING MER CHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.		

Protective RECOATABLE EPOXY PRIMER & Marine Part G B67A5 Light Gray

Revised: February 11, 2013

APPLICATION BULLETIN

SURFACE PREPARATIONS

Coatings

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.

Surface Preparation Standards

	Condition of Surface	ISO 8501-1 BS7079:A1	Swedish Std. SIS055900	SSPC	NACE
White Metal Near White Metal Commercial Blast		Sa 3 Sa 2.5 Sa 2	Sa 3 Sa 2.5 Sa 2	SP 5 SP 10 SP 6	1 2 3
Brush-Off Blast	Rusted	Sa 1 C St 2	Sa 1 C St 2	SP 7 SP 2	4
Hand Tool Cleaning	Pitted & Rusted	D St 2	D St 2	SP 2	-
Power Tool Cleaning	Rusted Pitted & Rusted	C St 3 D St 3	C St 3 D St 3	SP 3 SP 3	-

 PART G
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 PART G
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 PART G
 B67R5

 PART H
 B67V5

LIGHT GRAY Tan Red Oxide Hardener

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Application Conditions

Temperature:

material:

air and surface:

maximum 50°F (10°C) minimum At least 5°F (2.8°C) above dew point

35°F (1.6°C) minimum, 140°F (60°C)

Relative humidity:

APPLICATION EQUIPMENT

85% maximum

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

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.

Protective RECOATABLE EPOXY PRIMER &

Marine Coatings

 Part G
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 Part H
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LIGHT GRAY TAN RED OXIDE HARDENER

APPLICATION BULLETIN

4.45

Application Procession	Deserve Tree
Application Procedures	Performance Tips
Surface preparation must be completed as indicated. Mix contents of each component thoroughly with low speed power exitation. Make partain as nigment remains on the bettern of the	
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.	When using spray application, use a 50% overlap with each pass of the gun to avoid holidays, bare areas, and pinholes. If necessary,
If reducer solvent is used, add only after both components have been thoroughly mixed, after sweat-in.	Spreading rates are calculated on volume solids and do not include an application loss factor due to surface profile, roughness or po- rosity of the surface, skill and technique of the applicator, method of application, various surface irregularities, material lost during
Apply paint at the recommended film thickness and spreading rate as indicated below:	mixing, spillage, overthinning, climatic conditions, and excessive film build.
Recommended Spreading Rate per coat: Minimum Maximum	Excessive reduction of material can affect film build, appearance, and adhesion.
Wet mils (microns) 6.0 (150) 9.0 (225) Dry mils (microns) 4.0* (100) 6.0* (150) ~Coverage sq ft/gal (m²/L) 175 (4.3) 260 (6.4)	Do not apply the material beyond recommended pot life.
Theoretical coverage sq ft/gal (m²/L) @ 1 mil / 25 microns dft 1040 (25.5)	Do not mix previously catalyzed material with new.
*See Performance Tips section NOTE: Brush or roll application may require multiple coats to achieve maximum film thickness and uniformity of appearance.	In order to avoid blockage of spray equipment, clean equipment before use or before periods of extended downtime with Reducer #54, R7K54.
Drying Schedule @ 6.0 mils wet (150 microns): @ 35°F/1.5°C @ 77°F/25°C @ 120°F/49°C	Material must be at least 50°F (10°C) prior to catalyzing.
50% RH To touch: 1 hour 15 minutes 10 minutes Tack free: 2 hours 30 minutes 15 minutes	Quik-Kick Epoxy Accelerator is acceptable for use. See data page 4.99 for details.
To recoat:minimum:6 hours2 hours30 minutesmaximum:1 year1 year1 yearTo cure:14 days14 days2 days	When coating over aluminum and galvanizing, recommended dft is 2-4 mils (50-100 microns).
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	Refer to Product Information sheet for additional performance characteristics and properties.
Application of coating above maximum or below minimum	SAFETY PRECAUTIONS
recommended spreading rate may adversely affect coating performance.	Refer to the MSDS sheet before use.
CLEAN UP INSTRUCTIONS	Published technical data and instructions are subject to change without notice. Contact your Sherwin-Williams representative for additional technical data and 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.	WARRANTY
DiscLAIMER The information and recommendations set forth in this Product Data Sheet are based upon tests conducted by or on behalf of The Sherwin-Williams Company. Such information and recommendations set forth herein are subject to change and	as determined by Sherwin-Williams. NO OTHER WARRANTY OR GUARANTEE

The information and recommendations set forth in this Product Data Sheet are based upon tests conducted by or on behalf of The Sherwin-Williams Company. Such information and recommendations set forth herein are subject to change and pertain to the product offered at the time of publication. Consult your Sherwin-Williams representative to obtain the most recent Product Data Information and Application Bulletin.

STATUTORY, BY OPERATION OF LAW OR OTHERWISE, INCLUDING MER-

CHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

MATERIAL SAFETY DATA SHEET

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
*for Chemical Emergency ON	ILY (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	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 C	HMIS Codes		
Health	2		
Flammability	3		
Reactivity	0		

F

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 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

LASH 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.

Less Water and Federally Exempt Solvents

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	
C COMPOUNDS (VOC The	eoretical - As Packa	(ded)

VOLATILE ORGANIC COMPOUNDS (VOC Theoretical - As Packaged) 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.

PETRO CANADA

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 Canutec 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)	1	
		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.

Date of issue : 10/10/2012.	Internet: www.petro-canada.ca/ms	ds	Page: 1/8
Petro-Canada is a Suncor Energy b	usiness	™ Trademark of Suncor Energy Inc. Used un	nder licence.

2. Hazards identification

Skin	: Irritating to skin.
Eyes	: Irritating to eyes.
Potential chronic health ef	fects
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 informat	ion (Section 11)

See toxicological information (Section 11)

3. Composition/information on ingredients

Name	CAS number	%
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, CO ₂ , 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 (NOx), 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).
Deveene	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.
рН	: 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 COx, NOx, phenols, polycyclic aromatic hydrocarbons, aldehydes, ketones, smoke and irritating vapours when heated to decomposition.

11. Toxicological information

Acute toxicity

Product/ingredient name Gasoline			Result LD50 D		Species Rabbit	>	Dose >5000 mg		Expo -	sure
Toluene			LD50 O LD50 D		Rat Rabbit		13600 mg, 12125 mg,		-	
louene			LD50 D		Rat		636 mg/kg		-	
				halation	Rat		7585 ppm		4 hou	rs
			Vapour							
Benzene			LD50 D		Rabbit		>8240 mg		-	
			LD50 O		Rat		930 mg/kg		-	
				halation	Rat	1	13700 ppr	n	4 hou	rs
Ethanol			Vapour LD50 O	ral	Rat	-	7060 mg/k	a	_	
Emanor				halation	Rat		-32380 pp		4 hou	rs
			Vapour			-	0-000 pr			
Conclusion/Summary	1	Not availa	able.							
Chronic toxicity										
Conclusion/Summary	:	Not availa	able.							
Irritation/Corrosion										
Conclusion/Summary		Not availa	able.							
Sensitiser										
Conclusion/Summary	. :	Not availa	able.							
Carcinogenicity										
Conclusion/Summary	. :	Not availa	able.							
Classification										
Product/ingredient name			ACGIH	IARC	EPA	Ν	IOSH	NTP		OSHA
Gasoline			A3	2B	-	-		-		-
Toluene			A4	3	D	-		-		-
Benzene			A1	1	A	+		Prover	า.	+
Ethanol			A3	-	-	-		-		-
<u>Mutagenicity</u>										
Conclusion/Summary	1	Not availa	able.							
Teratogenicity										
Conclusion/Summary	-	literature;	however, l	based upo	n about the n professior atogen is not	nal judgem	nent regar			
Reproductive toxicity										

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

Europe inventory

15. Regulatory information

United States	
HCS Classification	: Flammable liquid Irritating material
	Carcinogen
<u>Canada</u>	
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).
•	ssified in accordance with the hazard criteria of the Controlled Products Regulations and 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.

: All components are listed or exempted.

16. Other information	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	: Health * 2			
Information System (U.S.A.)	Flammability 3			
	Physical hazards 0			
	Personal protection H			
National Fire Protection Association (U.S.A.)	: Health 2 0 Instability Special			
References	: Available upon request. ™ Trademark of Suncor Energy Inc. Used under licence.			
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			Healt Ratin	:h	ability Rating	Reactiv Rating	<i>i</i> ity
Updated: 11/1/2011	al True - 4	wheel-		Haza	ard Rating		
Product: All Type 27, 28, 29, an	d Type T	wheels		NFPA HAZA	RD RATING COL	DE	
	S	ECTION II	- COMPOSITION	١		_	
	% By	OSHA		OSHA	ACGIH	Other	Carcin-
Ingredient	Weight	Regulate	Cas #	PEL	TLV	Limits	ogen
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
SECT	ion III - P	HYSICAL/	CHEMICAL CHA	RACTERISTICS	1		
Boiling Point		N/A	Specific G	ravity (H2()=1)		2 - 4
Vapor Pressure (mm Hg.)		N/A					N/A
Vapor Density (AIR=1)		N/A					N/A
				Appearance/Odor Dark colored solid.			
May give off some odor in use.						e odor in use.	
	SECTION	I IV - FIRE	AND EXPLOSIO	N DATA			
Means Of Extinction Wate	r or carbo	n dioxide.	Lower And	Lower And Upper Explosion Limits N/A			
Flammable Limits		N/A	Special Fir	e Fighting Proced	ures		None
Flash Point		N/A	Unusual Fi	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 Polymerzation will not occur Dust and organic fumes are generated in use. Do not exceed TLV's. SECTION VI - HEALTH HAZARD DATA Signs and Symptoms of Exposure Route(s) of Entry Emergency and First-Aid procedures May cause coughing and shortness of breath during Terminate exposure and remove to Dust Inhalation grinding. May affect breathing capacity. fresh air. Obtain medical assistance. No known adverse effects, but not recommended. Obtain medical assistance. Ingestion N/A Absorption Not absorbed through skin. Grinding wheel may cause abrasions. Dust may Terminate exposure and remove to Skin contact cause skin irritation. fresh air. Obtain medical assistance. Eve 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.



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 Ethylbenzen	e				
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!



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:NecessaryMECHANICAL (GENERAL):AcceptableSPECIAL:NoneOTHER:NonePlease refer to ACGIH document, "Industrial Ventilation, A Manual of
Recommended Practices", most recent edition, for details.Manual of

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 DATE: 05/01/13 PAGE: 4 OF 7

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 11.0 pH (Neutrality): MELTING POINT/FREEZING POINT: Not Available 100 100 190*C/212 212 375*F(*=End Point) BOILING RANGE (IBP, 50%, Dry Point): No Flash to Boiling Point FLASH POINT (TEST METHOD): EVAPORATION RATE (n-BUTYL ACETATE=1): Not Applicable FLAMMABILITY CLASSIFICATION: Class IIIB LOWER FLAMMABLE LIMIT IN AIR (% by vol): UPPER FLAMMABLE LIMIT IN AIR (% by vol): 0.95 (Lowest Component) 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) : TOTAL VOC'S (TVOC): 0.0 Vol% /0.0 g/L / 0.000 Lbs/Gal 6.3 Vol% / 59.8 g/L / 0.4 Lbs/Gal 0.0 Vol% /0.0 g/L / 0.000 Lbs/Gal NONEXEMPT VOC'S (CVOC): 0.0 Wt% /0.0 g/L / 0.000 Lbs/Gal HAZARDOUS AIR POLLUTANTS (HAPS): 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 PAGE: 5 OF 7

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) 720.0 mg/kg(Rats)

Quaternary Ammonium Chloride (Mixture)



COMPANY IDENTITY: Magic Safety Products PRODUCT IDENTITY: MAGIC HYGENIC CLEANSING FLUID DATE: 05/01/13 PAGE: 6 OF 7

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

6

DOT SHIPPING NAME:	UN3082, None. (When weight of product in container is >=RQ):
	BULK: Environmenally hazardous substances, liquid, n.o.s.
	, 9, PG-III
IATA / ICAO:	UN3082, None. (When weight of product in container is >=RQ):
	BULK: Environmenally hazardous substances, liquid, n.o.s.
	, 9, PG-III, 9, UN3082, PG-III
IMO / IMDG:	UN3082, None. (When weight of product in container is >=RQ):
	BULK: Environmenally hazardous substances, liquid, n.o.s.
	, 9, PG-III, 9, UN3082, PG-III
EMERGENCY RESPONSE	GUTDEBOOK 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 PAGE: 7 OF 7

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.



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MATERIAL SAFETY DATA SHEET

Section 1 – Product & Company Identification

Product Name: Product Catalog No	RIDGID Nu-Clear Thread Cutting Oil 41565, 70835, 41575, 41585
Company Name:	Ridge Tool Company
Address	400 Clark Street
9.0.7.1.2.6.0.0000000000000000000000000000000	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.



- 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.

Component:	CAS #	% By Weight
Mineral Oil	64742-54-7	> 95
Sulfur Additive Package	Mixture	< 5

This product does not contain silicone.

RIDGID

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	



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 selfcontained 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.



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 / m3 (as mist) 10 mg / m3 (as mist) 5 mg / m3 (as mist
Sulfur Additive Package No information		



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.



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



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%



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.



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.



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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 RECOM-MENDATIONS 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.

MATERIAL SAFETY DATA SHEET Page 1 RUSTEX H.S. LOW VOC PRIMER GREY HMIS CODES: H F R P PRODUCT NAME:

2 2 0 G

PRODUCT IDENTIFIER: 71044

71044

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 ABREVIATIONS : N/AP - NOT APPLICABLE N/AV - NOT AVAILABLE

REPORTABLE COMPONENTS	CAS NUMBER	WEIGHT PERCENT	0.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	540-98-5	1-5	US (ACGIH) TWA 100ppm
TITANIUM DIOXIDE	13463-67-7	1-5	TLV (ACGIH): 10 mg/m3, total duat, 8 hr. TWA
ETHYLBENZENE	100-41-4	1-5	TWA: 100ppm LD50 (ORAL-RAT): 3500 mg/kg
			LD50; SKIN:17800 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:0.0 ml/kg(RABBIT)
METHYL PROPYL KETONE	107-87-9	1-6	ACGIH TLV: 200 ppm TWA & 250 ppm STEL
			OSHA PEL: 200 ppm & 700 mg/m3
CARBON BLACK PIGMENT	1333-86-4	0.1-1	ACGIN 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: B0.0 deg C SPECIFIC GRAVITY (H2O=1): 1.47

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Page 2

 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

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.

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 SECTION VI - TOXICOLOGICAL DATA

INHALATION HEALTH RISKS AND SYMPTOMS OF EXPOSURE

Page 3

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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. Ethylbenezene 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.

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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.

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.

PREPARED BY: TECHNICAL DEPARTMENT

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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.



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 Amendements 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 - IDENTIFICAT		
Manufacturer/Supplier Na Address: Website:	me: HOBART BROTHERS COMPANY 101 TRADE SQUARE EAST, TROY, OH 45373 www.hobartbrothers.com	Telephone No: +1 (937) 332-4000 Emergency No: +1 (800) 424-9300
Product Type:	SHIELDED METAL ARC WELDING (SMAW) ELECTRODES	
GROUP A: Product For: AWS Specification:	CARBON STEEL E6010, E6011, E6012, E6013, E6022, E7014, E7024-1	
GROUP B: Product For: AWS Specification:	LOW HYDROGEN CARBON STEEL E7016, E7018, E7018-1, E7018-M	
GROUP C: Product For: AWS Specification:	LOW HYDROGEN, LOW ALLOY STEEL E7018-A1, E7018-G, E8018-B2, E8018-B2L, E8018-B6, E8018-B8, E8018-C1, E8018-C2, E8018-C3, E8018-C E9018-M, E10018-D2, E10018-M, E10518-M, E11018-M, E12018-M	i, E9015-B9, E9018-B3, E9018-B3L,
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	REGULATORY HAZARD CLASSIFICATION/DESIGNATION 67/548/EEC ^Δ	IARC ^E	NTP ^z	OSHA ^H	65 ⁰
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 ⁰ - 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	KΣΣ	$X^{\Sigma\Sigma}$	XΣΣ
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 ^w - R40; T - R43, R48/23	1	К	Х	Х
POTASSIUM OXIDE	12136-45-7	235-227-6	None				
SILICA	14808-60-7	238-878-4	Xn - R48/20, R40/20	1^{Ψ}	К	Х	Х
(Amorphous Silica Fume)	69012-64-2	273-761-5	None	3	К		Х
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 ΣΣ – Chromium (VI) Trioxide 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:





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.

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.

Funes 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



GROUP AND %WEIGHT

С

<2 <5 <2 <7

<5 <2

<2

<5

D

<1 <2

<2

<7

<2 <2

<5

в

<2

<8

<2

<2

<2

<10

Α

<2

<7

<2

<14

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.

INGREDIENT

NICKEL

SILICA

SILICON

MOLYBDENUM

SODIUM OXIDE

TITANIUM DIOXIDE

POTASSIUM OXIDE

(Amorphous Silica Fume)

STRONTIUM CARBONATE

CAS

7439-98-7

7440-02-0

12136-45-7

14808-60-7

69012-64-2

7440-21-3

1313-59-3

1633-05-2

13463-67-7

EINECS

231-107-2

231-111-4

235-227-6

238-878-4

273-761-5

231-130-8

215-208-9

216-643-7

236-675-5

SECTION 3 - HAZARDOUS INGREDIENTS

CONTENT PERCENTAGE BY INGREDIENTS						
			GRO	UP AN	D %WE	IGHT
INGREDIENT	CAS	EINECS	Α	В	С	D
ALUMINUM OXIDE	1344-28-1	215-691-6	<5			
CALCIUM CARBONATE	1317-65-3	215-279-6	<2	<2		
CELLULOSE	9004-34-6	232-674-9	<5	<5	<5	<5
CHROMIUM	7440-47-3	231-157-5			<9	
FLUORSPAR	7789-75-5	232-188-7		1-12	4-15	
IRON	7439-89-6	231-096-4	70-90	60-80	60-90	70-90
MAGNESIUM CARBONATE	546-93-0	208-915-9	<2	<5	<1	<1
MANGANESE	7439-96-5	231-105-1	1-5	1-5	1-5	1-5
MICA	12001-26-2	None	<5			

Deelses indicate	المسمالية مسمعاته		n the group of products
Dasnes Indicate	e the ingredient i	s not present withi	n 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 ALUMINUM OXIDE## CALCIUM CARBONATE CELLULOSE CHROMIUM#	CAS 1344-28-1 1317-65-3 9004-34-6 7440-47-3	EINECS 215-691-6 215-279-6 232-674-9 231-157-5	OSHA PEL 5 R* 5 R*, 5 (as CaO) 5 R* 1 (Metal) 0.5 (Cr II & Cr III Cpnds) 0.005 (Cr VI Cpnds)	ACGIH TLV 1 R* {A4} 3 R*, 2 (as CaO) 10 0.5 (Metal) {A4} 0.5 (Cr III Cpnds) {A4} 0.05 (Cr VI Sol Cpnds) {A1} 0.01 (Cr VI Insol Cpnds) {A1}	EU OEL 1.5 R*(Aerosol) - Germany; 2 - Poland 3 R* (Aerosol) – Switzerland; 10 I* (Aerosol) – UK 3 R* (Aerosol) – Switzerland; 10 I* (Aerosol) – UK 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 Fe₂O₃) – Switzerland 7*** (as Fe₂O₃) - 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
(Amorphous Silica Fume)		273-761-5	0.8	3 R*	2 I*; 4 I*** - Denmark
SILICON+	7440-21-3	231-130-8	5 R*	3 R*	4 R* (Aerosol); 10 I* (Aerosol) - Denmark
SODIUM OXIDE	1313-59-3	215-208-9	5 R*	3 R*	1.5 R*(Dust NOS - Aerosol) - Germany
STRONTIUM CARBONATE		216-643-7	5 R*	3 R*	1.5 R* (as Dust - NOS) - Germany
TITANIUM DIOXIDE	13463-67-7	236-675-5	15 (Dust)	10 {A4}	1.5 R* - 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 or "Interview" - NIOSH REL TWA and STEL \diamond - Limit of 0.1 mg/m³ is for Inhalable Mn in 2013 by ACGIH $\diamond \bullet$ - Limit of 0.02 mg/m³ is for Respirable Mn in 2013 by 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, 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 CHEMCIAL 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 - Fluorides - Fluorides - Voure way 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. Potasium 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 Dixide - 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.)

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

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 R24/25 - Toxic in contact with skin and if swallowed through inhalation R26 – Very toxic by inhalation R35 – Causes severe burns R48/20/22 – Harmful: danger of serious damage to health by prolonged exposure through inhalation and if swallowed R48/23 - Toxic: danger of serious damage to health by prolonged exposure R36/37 - Irritating to eyes and respiratory system R40 – Limited evidence of a carcinogenic effect through inhalation R40/20 – Harmful: possible risk of irreversible effects through inhalation R50 – Very toxic to aquatic organisms R53 - May cause long-term adverse effects in the aquatic environment R42/43 – May cause sensitization by inhalation and skin contact R43 – May cause sensitization by skin contact R62 – Possible risk of impaired fertility

R45 – May cause cancer

USA:

For additional information please refer to the following sources:

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.



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Silicone Construction Sealant

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Manufacturer N	ame:	Momentive perf 260 Hudson Riv Waterford NY 12	ver Rd	naterial	
Revised:		07/11/2012	on Complia		
Prepared by CHEMTREC		Product Regulate 1-800-424-9300	ory Complia	ance	
MSDS Contact		1-888-443-9466			
Information		4information@m	omentive.c	om	
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. Color: Colorless

Form: Solid

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.



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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.



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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: METHOD Autoignition Temperature: FLAMMABLE LIMITS LEL: FLAMMABLE LIMITS UEL: > 93 °C; 199 °F Estimated <u>None</u> Not applicable Not applicable

No

SENSITIVITY TO MECHANICAL IMPACT:

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.



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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
Octamethylcyclotetras	556-67-2	Z_INTL_OEL, REL	5 ppm
iloxane			

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).



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9. PHYSICAL AND CHEMICAL PROPERTIES

BOILING POINT (℃):

VAPOR PRESSURE (20 C) (MM HG):

VAPOR DENSITY (AIR=1):

FREEZING POINT:

PHYSICAL STATE: ODOR: ODOR THRESHOLD: COLOR: EVAPORATION RATE (BUTYL ACETATE=1):

SPECIFIC GRAVITY:

DENSITY: pH:

VOLATILE ORGANIC CONTENT: SOLUBILITY IN WATER (20 C): SOLUBILITY IN ORGANIC SOLVENT (STATE SOLVENT): Partition Coefficient: n-octanol/water: No data available.

No data available.

No data available.

No data available.

Solid Acetic acid. No data available. Colorless No data available.

No data available.

ca. 1.06 g/cm3 No data available.

1.5 %(m) Insoluble Soluble in toluene

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 as a known human carcinogen. A MSDS for formaldehyde is available from Momentive. See Section 11 for additional information on formaldehyde.

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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



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10, 30, 150, or700 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 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.



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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	y (positive listing)
substances Japan Inventory of Existing & New	y (positive listing)
Chemical Substances (ENCS)	, (Peenine
China Inventory of Existing	y (positive listing)
Chemical Substances Korea Existing Chemicals	y (positive listing)
Inventory (KECI)) (poentre nem g)
Canada NDSL Inventory	n (Negative listing)
Philippines Inventory of Chemicals	y (positive listing)
and Chemical Substances (PICCS)	
TSCA list	y (positive listing)
New Zealand Inventory of	y (positive listing)
Chemicals	
Japan Industrial Safety & Health	n (Negative listing)
Law (ISHL) Listing	quantity restricted or special

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

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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 NF = none found EST = estimated NA = not applicableUNKN = 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

: 1-401-739-9550

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

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

Phone

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 Skin? YES Inhalation? YES Eves? 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. May cause irritation to respiratory system. Existing INHALATION: 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		10 mg/m ³ (Fume)
CAS NO.: 121125-02-9	37-20	20 mg/m ³ (STEL)
GLYCERINE	15 mg/m ³ (Total)	10 mg/m ³ (Mist)
CAS NO.: 56-81-5	5 mg/m ³ (Resp)	Haraca and the source attraction and
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 None CAS Number

8 Wt.

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 CRF 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 upto-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

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	e CAS Number	00
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

Еуе

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.

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.

 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

_____ 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 LC50: No data available LD50: 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	CAS	Occupational Exposure Limits	LD ₅₀ / LC ₅₀
	Percent by Weight	Number	(OELs)	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

Odour:

None

Appearance: Ductile lustrous white metal

Vapour Pressure: Negligible @ 20°C

Specific Gravity: 10.49

Vapour Density: Not Applicable Evaporation Rate:

Not Applicable

Solid Boiling Point/Range: 2212°C

Physical State:

Coefficient of Water/Oil Distribution: Not Applicable **pH:** Not Applicable

Melting Point/Range: 961°C

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 *reporting not required if the diameter of the metal pieces released is equal to or	
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. Urben 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. Cohrssen & 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.

MSDS # 682.00

Section 1:

Sodium Metal

Page 1 of 2 ScholA

Chemist

CANUTEC (Canada): 613-424-6666

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

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	HMIS (0 to 4)
WARNING! Flammable solid, dangerous when wet. Flammable solid, keep away from all ignition sources.	Health 2
Contact with water produces flammable gas. Corrosive	Fire Hazard 3
Target organs: None available	Reactivity 3

This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Section 3:	Composition / Information on Ingredients	
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Sodium (7440-23-5), >99%

First Aid Measures

Always seek professional medical attention after first aid measures are provided.

	in ago seen professional inearear according and ineasures 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 tbsp of activated charcoal mixed
	with 8 oz water.
Inhalation:	Remove to fresh air. If not breathing, give artificial respiration.

Section 5:

Section 4:

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.

Sodium

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.	pН	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	n
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:

EINECS: Listed (231-132-9).

Regulatory Information

TSCA: All components are listed or are exempt.

WHMIS Canada: B6, E: Reactive flammable material, Corrosive.

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.



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
	0 0		Not classified as dangerous	Not controlled	Not Regulated
Emergency Overview:		use. Appearance	ce, Color and Odor: White	not expected when handling t paste; faint odor. nazardous by the OSHA haza	
			29 CFR 1910.1200).	azardous by the OoriA haza	
			his is not a controlled produ		
			Union (EU): This product is C and its amendments.	not classified as dangerous a	according to Directive
Potential Health Effects		ACUTE (sł	nort term): see Section 8 f	or exposure controls	
Relevant Route(s) of Exp	oosure:	Skin contac	ct, Inhalation.		
	Inhalation:	concentrati breathing.	ons may cause nasal and r	th normal use. Over exposur espiratory irritation, sore throa lso cause dizziness, headach sphyxiation.	at, coughing and difficulty
	Ingestion:	quantities r	may cause abdominal and c	exposure. Low oral toxicity. hest pain, nausea, vomiting, ring swallowing or from vomit	diarrhea or dizziness.
	Skin:	This produ	ct has been tested and four	d to be non-irritating to skin.	
	Eye:		ct has been tested and four irritation as a foreign object	id to be non-irritating to eyes. in the eye.	Solids may cause
		CHRONIC	(long term): see Section 1	1 for additional toxicologic	al data
				normal use. Prolonged or rep damage to the respiratory tra	
Medical Conditions Agg Exposure:	ravated by	Not availab	le		
Interactions With Other	Chemicals:	Not availab	le		
Potential Environmental	Effects:	Not availab	le		



Section 3: Composition / Information on Ingredients

Hazardous Ingredients:

Chemical Name	CAS No.	<u>Wt.%</u>	EINECS / ELINCS	<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

<u>Note</u>: See Section 16 for the full text of the R-phrases above.

Section 4: First Aid Measures

- **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: Flammability: 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.



Section 7: Handling and Storage

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Handling:Avoid contact with eyes and skin; do not breathe fumes. Do not ingest. Keep out of reach of<br/>children. Use this material with adequate ventilation. Keep container closed when not in use.<br/>Wash thoroughly with detergent and water after handling, before eating, drinking, smoking or using<br/>the toilet.Storage:Store in a cool, dry area, away from incompatible materials (see Section 10).
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Section 8: Exposure Controls/Personal Protection

Exposure Guidelines

Ingredient	<u>ACGIH TLV</u>	<u>U.S. OSHA PEL</u>	<u>Ontario (Canada)</u>	<u>UK OEL</u>
	(8-hr. TWA)	(8-hr. TWA)	<u>TWAEV</u>	(8-hr. TWA)
Ammonium Chloride	10 mg/m ³ (fume);	10 mg/m ³ (fume);	10 mg/m ³ ;	10 mg/m ³ (fume);
	20 mg/m ³ STEL	20 mg/m ³ STEL	20 mg/m ³ STEV	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.



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)
Chronic Toxicity Data	
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



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

Canada

TSCA Status: All ingredients in the product are listed on the TSCA inventory.

	SARA Title III Sec. 302/304: Sec: 311/312: Sec. 313: CERCLA RQ:	None Not applicable Not applicable Not applicable
	California Prop 65:	This product is not known to contain chemicals known to the State of California to cause cancer or reproductive harm.
	State Right-to-Know Lists :	Ammonium chloride can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.
1		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> .
	WHMIS Classification:	Not controlled
	DSL:	All component substances are listed on Canada's Domestic Substances List (DSL).



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:	While LEHDER Environmental Services Limited believes that the data set forth herein is accurate, as of the date hereof, LEHDER makes no warranty with respect thereto and expressly disclaims all liability for reliance thereon. Such data is offered solely for your consideration, investigation and verification.



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

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 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

*For a full list of subsidiary companies, please refer to our website <u>www.specialmetals.com</u> 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. 7449-98-7
Nickel	CAS No. 7440-02-0
Niobium	CAS No. 7440-03-1
Tantalum	CAS No. 7440-03-1
Titanium	CAS No. 7440-25-7
Tungsten	CAS No. 7440-33-7
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 APPENDX 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.

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 LaborIn Canada:Canadian Standards Association, CAN/CSA – W17.2-M87In 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.
 Odor: Odorless

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:

- Ú.S. National Toxicology Program 10th Report On carcinogens 1.
- Health and Safety Executive UK EH40 Occupational exposure limits; EH42 Monitoring Strategies for toxic 2. 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.
- З. EH Health and Safety Executive's publications (www.hse.gov.uk)
- HSC. Information approved for the classification, packaging and labeling of dangerous substances for supply and 4. 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/EECSixth amendment of Council Directive 67/548/EEC 79/831/EEC8.
- The Chemicals (Hazard Information and Packaging for Supply) Regulations 2002 No. 1689 9
- 10. International Agency for Research on Cancer. Monographs on the evaluation of carcinogenic risks to humans. Vol. 49 Chromium Nickel and Welding, 1990.
- Approved Code of Practice ISBN 0 7176 0859X 11.
- 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.

Alloy	Alum-	Chrom-	radenan _{Cobalt}	Copper	Iron	Manga-	Molyb-	Nickel	Nio-	Silicon	Tant-	Titan-	Tung-	Yttrium
	inum	ium	3	Copper		nese	denum		bium	Childon	alum	ium	sten	Oxide
INCONEL® alloy 050	0.2	20 22	3		18 2.5		9 14	50 58	1				3	
INCONEL® alloy 22	0.2				2.5		14						3	
INCONEL® alloy 600 & 600T		16			-			76						
INCONEL® alloy 600SP		15			8			77						
INCONEL® alloy 601	1	24			14			61						
INCONEL® alloy 601GC	1	24			14		0	61						
INCONEL® alloy 603XL		22			•		3	73	0	2				
INCONEL® alloy 604		16			8	0		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	
NCONEL® alloy 690 & 690T		29			9			62						
NCONEL® 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			

Special Metals Corporation Material Safety Data Sheet

Alloy Designation Alum- inum Chrom- ium Cobalt Copper Iron Manga- nese Molyb- denum Nickel Nic- bium Silicon Titan- ium Yttrium Oxide INCOLOY® alloy 20 20 4 38 3 34 1 <th>Nitrogen 0.2 0.35</th>	Nitrogen 0.2 0.35
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 INCOLOY® alloy 25-6MO 20 1 45 0.5 6 25 INCOLOY® alloy 25-6MO 20 1 41 1 7 27 INCOLOY® alloy 27-7MO 22 1 41 1 7 27 INCOLOY® alloy 330 19 44 36 1 1 INCOLOY® alloy 330Cb 19 48 34 1 INCOLOY® alloy 800 20 45 1 1 INCOLOY® alloy 800HT 20 45	
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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
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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	

Table 2. INCOLOY®, NILO® and NI-SPAN-C® alloys

 $\ensuremath{\textcircled{B}}$ Registered trademarks of the Special Metals Corporation group of companies

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

Table 3. NIMONIC® and NIMOLOY alloys Tradename and Nominal Composition (% weight)

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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
NIOTHERM® Positive	14		85	1		
NIOTHERM® Negative			96	4		

Table 4. BRIGHTRAY®, KOTHERM® and NIOTHERM® alloys Tradename and Nominal Composition (% weight)

Special Metals Corporation Material Safety Data Sheet

Alloy Designation	Alum- inum	Chrom- ium	Cobalt	Iron	Manga- nese	Molyb- denum	Nickel	Nio- bium	Rheni- um	Tant- alum	Titan -ium	Tung -sten	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	

Table 5A. Miscellaneous Designations Tradename and Nominal Composition (% weight)

® Registered trademarks of the Special Metals Corporation group of companies

	Tradename and Nominal Composition (% weight)												
Alloy Designation	Aluminum	Chromium	Cobalt	Iron	Manga- nese	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			

Table 5B. Miscellaneous Designations

I	radename a	and Nomir	nal Cor	nposition (%	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		

Table 6. MONEL® alloys, FERRY® alloy and Cupro 107

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			Tradena	ame an	d Nominal Con	nposition (% wei	ght)			
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	

Table 7. UDIMET® and UDIMAR® alloys

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Table 8. Nitinol alloys

	Tradename	and Nom	inal Compo	osition	% weight	t)	
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

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)

	maaoman			mpoon	aon (70 n oigin)			
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		

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/m^3 (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/m ³ (Dust & fume as Co)
-	PEL: 0.1 mg/m ³ (As Co metal)
	CAS No. ⁽²⁾ : 7440-48-4
	LD ₅₀ : 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.

 $EH40 - MEL 0.1 mg/m^3$ (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 Fe ₂ O ₃ fume the TLV is 5 mg/m ³ as Fe)
•	PEL: No limit set (For Fe_2O_3 dust & fume the PEL is 10 mg/m ³ as Fe)
	CAS No. ⁽²⁾ : 7439-89-6
	LD ₅₀ : 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/m ³ elemental and inorganic compounds, as Mn
-	PEL: 5 mg/m ³ (Ceiling, as Mn compounds); 5 mg/m ³ (Fume, as Mn)
	CAS No. ⁽²⁾ : 7439-96-5
	LD ₅₀ : 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 my produce a goutlike 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 LD_{50} 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.*

L1140-40. NO IIIIII SEL

 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 LD_{50} 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/m^3 (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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Daido-Special Metals Ltd A Joint Venture Company

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Wyman Gordon

400 East Willow Enid, OK 73701 Phone +1 (580) 237-4212 Fax +1 (281) 856-3222

Wyman Gordon Beijing

Rm 1703, Office Tower 1, China Central Place No. 81 Jian'guo Road Chaoyang District, Beijing P.R. China 100025 Phone (8610) 5969505 Fax (8610) 5969506

Wyman Gordon

Houstoun Road Livingston, West Lothian EH54 5BZ, Scotland Phone +44 (0) 1506 446200 Fax +44 (0) 1506 446300

Wyman Gordon

 708
 South Elmira

 Russellville, AR 72802

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 +1 (281) 856-3222





Material Safety Data Sheet

SPECTRUS BD1550

Issue Date: 09-JAN-2012 Supercedes: 13-JUN-2011

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

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		(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)14Freeze Point (C)-10 14 Vapor Density (air=1) > 1.00 Viscosity(cps 70F,21C) 50 % Solubility (water) 100.0 Odor Slight Appearance Colorless To Light Yellow Physical State Flash Point Liquid P-M(CC) > 200F > 93C 9.8 pH As Is (approx.) 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:
```

DZB

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	В	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

SPECTRUS OX1203

Issue Date: 17-SEP-2013 Supercedes: 16-SEP-2013

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

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
                               White
Appearance
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

CODE TRANSLATION

Health	2	Moderate Hazard
Fire	1	Slight Hazard
Reactivity	1	Slight Hazard

Spea	cial	
(1)	Protective	Equipmer

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

CHANGE LOG

	EFFECTIVE DATE	REVISIONS TO SECTION:	SUPERCEDES
MSDS status:	09-SEP-1998 10-SEP-1998 23-SEP-1999 21-APR-2000 22-SEP-2000 06-DEC-2000 03-JAN-2001 22-MAR-2001 18-FEB-2002 19-FEB-2002 20-FEB-2002 25-JAN-2005 14-JAN-2008 08-FEB-2008 17-JUN-2009 07-JUN-2011	;EDIT:9 4 8 12 15 15 3,4 3,4 3,4 3,4 16 3,4,8 7 10 3,8 2,4,10,11,14, 15 14	** NEW ** 19-DEC-1997 09-SEP-1998 23-SEP-1998 21-APR-2000 22-SEP-2000 06-DEC-2000 03-JAN-2001 22-MAR-2001 18-FEB-2002 20-FEB-2002 20-FEB-2002 25-JAN-2005 14-JAN-2008 08-FEB-2008 17-JUN-2009 07-JUN-2011 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*	
for Chemical Emergency ONLY (spill, lea	ak, fire, exposure, or accident)

SECTION 2 - COMPOSITION/INFORMATION ON INGREDIENTS

% by Weight	CAS Number	Ingredient	Units	Vapor Pressure
14	74-98-6	Propane	A REAL AND A	
		ACGIH TLV	2500 PPM	760 mm
		OSHA PEL	1000 PPM	100 1111
13	106-97-8	Butane	A A A A A A A A A A A A A A A A A A A	
		ACGIH TLV	800 PPM	760 mm
		OSHA PEL	800 PPM	107.101
21	108-88-3	Toluene		
		ACGIH TLV	20 PPM	22 mm
		OSHA PEL	100 ppm (Skin)	2270206
	And the second s	OSHA PEL	150 ppm (Skin) STEL	
33	67-64-1	Acetone		
		ACGIH TLV	500 PPM	180 mm
		ACGIH TLV	750 PPM STEL	
		OSHA PEL	1000 PPM	
2	763-69-9	Ethyl 3-Ethoxypropionate		
		ACGIH TLV	Not Available	1.11 mm
		OSHA PEL	Not Available	
1	13463-67-7	Titanium Dioxide	WITH PASSAGE	
		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:

UFL

12.8

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.

LEL

1.0

SECTION 5 - FIRE FIGHTING MEASURES

FLASH POINT Propellant < 0 °F

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.

E111

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	1 (Z. 197 2)
VOLATILE VOLUME	90%	
EVAPORATION RATE	Faster than ether	
VAPOR DENSITY	Heavier than air	
SOLUBILITY IN WATER	N.A.	
VOLATILE ORGANIC COMPOUNDS (VOC Th	eoretical - As Packa	aged)
Volatile Weight 51.05%	Less Water and Fe	derally 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				
	1.	LC50 RAT	4HR	Not Available	
and the second s		LD50 RAT		Not Available	
106-97-8	Butane			Hot Attaliable	-
		LC50 RAT	4HR	Not Available	
		LD50 RAT	~225	Not Available	
108-88-3	Toluene				
		LC50 RAT	4HR	4000 ppm	
		LD50 RAT		5000 mg/kg	
67-64-1	Acetone		1.00	eeee nignig	
		LC50 RAT	4HR	Not Available	
	and the state of the state of the	LD50 RAT		5800 mg/kg	
763-69-9	Ethyl 3-Ethoxyprop	pionate		coop mgmg	
	a state and the state of the st	LC50 RAT	4HR	Not Available	
	and the second se	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

% by WT	% Element
21	
	21

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:	For any Transportation or Medical Chemical Emergencie	
Black Swan Mfg. Co. 4540 W. Thomas St. Chicago, IL 60651-3318	<u>INFOTRAC</u>	
Tel.: 800-252-5796 Fax: 773-227-3705	(800) 535-5053 <u>OR</u> (352) 323-3500	
Web Site : <u>www.blackswanmfg.com</u> E-mail : <u>info@blackswanmfg.com</u>	24 hours per day - 7 days a week	
Product Name: Stainless Putty	Recommended Use: Putty used for setting closet bowls,	

Recommended Use: Putty used for setting closet bowls, s strainers and many other applications.

	SECTIO	$1 \times 2 - \mathbf{n} \mathbf{A} \mathbf{L} \mathbf{A} \mathbf{K} \mathbf{I}$	D(S) IDENTIFICATION	
Labels	NFP	NFPA		Classification
None Signal Word None	HEALTH HAZARD 4 – Deadly 3 - Extreme Danger 2 – Hazardous 1 - Slight Hazardous Not 0 - Normal Material F	FIRE HAZARD Flash Points 4 – Below 73°F 3 – Below 100°F 2 – Above 100°F, exceeding 200°F 1 – Above 200°F 0 – Will not burn	Health Acute Toxicity:Not Established Skin Irritation: Not Established Eye Irritation: Not Established Skin Sensitization: NO	
<u>HMIS</u>	SPECIFIC HAZARD Oxidizer OX Acid ACID Alkali ALK Corrosive COR chemical	REACTIVITY 4 – May detonate 3 – Shock and heat may detonate 2 – Violent	<u>Physi</u> Flammability:	<u>cal</u> Not Established
	Use NO WATER W Radioactive	change 1 – Unstable if	Hazardous Statements	Precautionary Sta
	heated	0 – Stable	None	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

Handling

No special precautions.

Storage 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 need **Ventilation**: Local ventilation is adequate.

Personal Protective Equipment – Respiratory: None. Skin: None. Eyes: None.

Appearance: Odor: pH: Established	Beige Putty Mild Petroleum Not Established	Flash Point: Specific Gravity: Solubility (H2O):	Not Established 2.14 Insoluble	Vapor Pressure: Flammability: Flammability Limits:	Not Esta Not Esta LEL – N
Melting Point: Established	Not Established	Evaporation Rate :	Not Established		UEL –
Freezing Point: Boiling Point:	Not Established Not Established	Vapor Density: VOC:	Not Established 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 Persistance & 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 involve interest of safety, you should notify your employees, agents and contractors of the information on the sheets. DAT 11/01/2013

Page 2 of 2

MATERIAL NAME: STAINLESS STEEL SYNONYMS: Includes all Sheet products, Plate, Strip, Bar, Slab, Ingot, Structural shapes and Tubular Products.	Russel Metals	SUPPLIER: RUSSEL METALS INC. ADDRESS: 1900 MINNESOTA COURT, MISSISSAUGA ONTARIO. CANADA. L5N 3C9. TEL: 905-819-7295 FAX: 905-819-7262
WHMIS CLASS: D2A, D2B		FORM #: MSDS-04-2011. DATE: NOVEMBER 2011

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 ACGH's T.V. The individual complex compounds within the fume may have lower exposure limits than the general fume.

COMPONENT	CAS NUMBER	TLV ACGIH (mg/m³)	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)	υ	5	25	30
NICKEL	7440-02-0	1.5 (Metal, Inhalable) 0.2 (Insoluble, linhalable) 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_2O_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-METALLI	C 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.

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:	<u>CHROMIUM</u> : IARC lists certain hexavalent chromium compaunds 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. <u>NICKEL</u> : IARC lists metallic nickel under its Group 28 category - "possibly carcinogenic to humans". Nickel m cause skin sensitivity <u>COBALT</u> : Cobalt dust may result in an asthma-like condition (cough, shortness of breath). IARC lists metallic cobalt under its Group 28 category - "possibly carcinogenic to humans". Nickel m cause skin sensitivity <u>COBALT</u> : Cobalt dust may result in an asthma-like condition (cough, shortness of breath). IARC lists metallic cobalt under its Group 28 category - "possibly carcinogenic to humans". <u>IRON</u> : Inhalation overexposures may cause a benign pneumoconiosis (siderosis) with few or no symptoms. <u>MANGANESE</u> : Existing studies are inadequate to assess its carcinogenicity. Susceptible to Parkinson's disease, metal fume fever and kidney damage.
	ancer (IARC) - Summaries & Evaluations (2008). epared by the National Toxicology Program (NTP).
4. FIRST AID MEASURES	
EYES: SKIN:	FLUSH EYES WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES. SEEK MEDICAL ATTENTION IF EYE IRRITATION PERSISTS. MAINTAIN GOOD PERSONAL HYGIENE. WASH AFFECTED AREA WITH MILD SOAP AND WATER.
INHALATION:	SEEK MEDICAL ATTENTION IF SKIN IRRITATION PERSISTS. 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 meiting 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. venfilation, 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.
DTHER (Specify):	N/A
CHEMICAL AND PHYSICAL PROPERTIES	
HYSICAL STATE: Solid	APPEARANCE: Silver Grey Metallic (Steel) ODOUR: Not Applicable
OILING 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

COEFFICIENT WATER/OIL DISTRIBUTION:	Not Applicable				
10. STABILITY AND REACTIVITY	and the second sec				
CHEMICAL STABILITY:	Yes. Steel products are stable under normal storage and handling conditions.				
HAZARDOUS POLYMERIZATION:	Hazardous polymerization cannot occur.				
NCOMPATIBILITY TO OTHER SUBSTANCES:	Yes				
CONDITIONS OF REACTIVITY:	Contact with mineral of	acids will release flammable hyd	drogen gas.		
HAZARDOUS DECOMPOSITION PRODUCTS:	N/A				
11. TOXICOLOGICAL INFORMATION					
RRITANCY OF MATERIAL:	See Section 3.	SENSITIZATION OF MATER			
D ₅₀ (of Material):	Not established	LC ₅₀ (of Material):	Not established		
AUTAGENCITY OF MATERIAL:	N/A				
REPRODUCTIVE EFFECTS:	N/A				
ERATOGENICITY OF MATERIAL:	N/A				
CARCINOGENICITY OF MATERIAL:	human carcinogens" of carcinogenicity to hum <u>NICKEL</u> : IARC lists meto	certain hexavalent chromium c and metallic chromium under its rans". Jilic nickel under its Group 28 cc allic cobatt under its Group 28 c	Group 3 category - "not class ategory - "possibly carcinogen	ifiable as to their ic to humans".	
YNERGISTIC MATERIALS:	N/A				
IOTE:	contain contaminants t	g fume has an exposure limit of from fluxes or welding consuma litis in sensitive Individuals due to	bles. Prolonged skin contact r	may cause reddening and	
2. ECOLOGICAL INFORMATION					
сотохісіту:		he material as a whole. Howev e environment, Metal dusts may			
NVIRONMENTAL FATE:	No data available.				
NVIRONMENTAL DEGRADATION:	No data available.				
3. DISPOSAL INFORMATION				the second s	
ASTE DISPOSAL:	Steel scrop should be re	acycled whenever possible.			
ENERAL INFORMATION:					
	Dispose of in accordance	ce with applicable federal, pro-	vincial/state or local regulation	ns.	
4. TRANSPORTATION INFORMATION					
ENERAL SHIPPING INFORMATION:	Material not regulated t	for shipping.			
SHIPPING NAME AND DESCRIPTION: UN NUMBER: CLASS: PACKING GROUP/RISK GROUP:	N/A N/A N/A N/A				
RANSPORT REGULATIONS: Canadian Transportation of Dangerou US Deportment of Transport (DOT) Haze			on March 2011).		
5. REGULATORY INFORMATION		and the second second	1		
EGULATORY INFORMATION:		egulations relating to a Russel M r all regulatory compliance resp		complete and should not	
DDITIONAL CANADIAN REGULATIONS: WHMIS CLASSIFICATION: DOMESTIC SUBSTANCES LIST: OTHER CANADIAN REGULATIONS:		ls Causing Other Toxic Effects, material are on the federal DSL	Inventory.		
DDITIONAL U.S. REGULATIONS: SARA:		material are subject to the repo Amendments and Reauthorizati			
CHEMICAL NAME	SARA 302 (40 CFR 355, Appendia No	SARA 304 (40 CFR Table 302.4)	SARA 313 (40 CFR 372.65) Yes	CERCLA Reportable Quantities None listed	
Chromium	No	No	Yes	5,000 lbs	
Cobalt Copper	No	No	Yes	None listed	
Manganese	No	No	Yes	5,000 lbs None listed	
Nickel	110	140	103	None listed	

	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		
Vanac	dium	No	No	No	None listed		
SARA TH	RESHOLD PLANNING QUANTITY:		old Planning Quantities for the tory requirement filing threshold				
	VENTORY STATUS: REPORTABLE QUANTITY (RQ):	The components of this material are listed on the Toxic Substances Control Act Inventory. RQ's for Hazardous Substances in the Comprehensive Environmental Response, Compensation, and Liability					
CALIFORNIA (PROPOSITION 65):		Act are: Chromium = 5000 lb. (2270 kg); Copper = 5000 lb. (2270 kg); Nickel = 100 lb. (45 kg). 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.					
DDITIONAL EUR	OPEAN UNION REGULATIONS:						
RoHS & V	VEEE:		ean Union Directive "Restriction Equipment" (2002/95/EC) and t				
Lead (Lead is not intentionally added to stainless steel however, it may exist in trace levels. Although not analyzed,					
	lead lev		elow the EU Directive limit of 0. lead exemption limit of up to 0		ent in steel.		
Chrom	lium VI (Cr +6):		ate of chromium does not norm				
6. OTHER INFO	ORMATION						
NFPA C HMIS C			erated.				
REPARED BY:	RUSSEL METALS INC. AND EN	VIROTEST INC. DATE:	NOVEMBER 2011				
LEPHONE:	905-819-7295	NOTE:	CONTACT SUPPLIER FOR ADD	ITIONAL PRODUCT INFORM	MATION		
SCLAIMER:		ED HEREIN BASED ON DATA C	ONSIDERED ACCURATE. HOWE	VER, NO WARRANTY IS EX	PRESSED OR IMPLIED		

Material Safety Data Sheet

Material Name STEEL Supplier Samuel, Son & Co. LTD. Synonyms Address Includes all sheet products, plate, strip, bar, slab, ingot, 2360 Dixie Road and tubular products Mississauga, Ontario WHMIS Class D2A, D2B L4Y 1Z7 Phone (905) 279-5460 Material Use Toll Free Manufacture of Articles 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 >99 5 30g/kg(ld oral rat) 7439-89-6 10 0.2 9g/kg(ld oral rat) Manganese 7439-96-5 2.2 5 С Nickel 7440-02-0 2.05 1 1 N/A

N/A

Chromium 7440-47-3 1.65 0.5 0.5 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.

Zinccrometal-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	a Evaporation Rate: N/a Boiling point: N/a Vapour pressure: N/a	
Vapour density: N/a Freezing point	int: 1530 c Density: 7.86 Coefficient water/oil distribution: N/a	
PH: N/a Odour threshold: N/a B	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

Section 1

Product Identification & Use

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.



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 RESPIRATORY TRACT IRRITATION.
Potential short term health effects	Eye, Skin contact, Inhalation, Ingestion.
Routes of exposure Eyes	Contact with hot sulfur will cause severe burns to eyes.
Lyes	At high concentrations product causes severe burns to eyes. 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 500pm, 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.
larget 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.

1. Product and Company Identification

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		
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.

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 General hygiene considerations	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. 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.	

8. Exposure Controls / Personal Protection

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 H2S. Note: H2S deadens the sense of smell. Absence of rotten eggs smell does not mean absence of H2S.	
Odor threshold	<0.15 ppm for H2S	
Physical state	Solid	
рН	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/m3 dust in air	
Flammability limits in air, upper, % by volume	1400 g/m3 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	

Not available Not available 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	
Еуе	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 500pm, 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 - A	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	9
	13. Dis	posal Considerations
Disposal instructions	Dispose in a	ccordance with all applicable regulations.

	14 Transport Information
Contaminated packaging	Not available
Waste from residues / unused products	Not available
Disposal instructions	Dispose in accordance with all applicable regulations.

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)

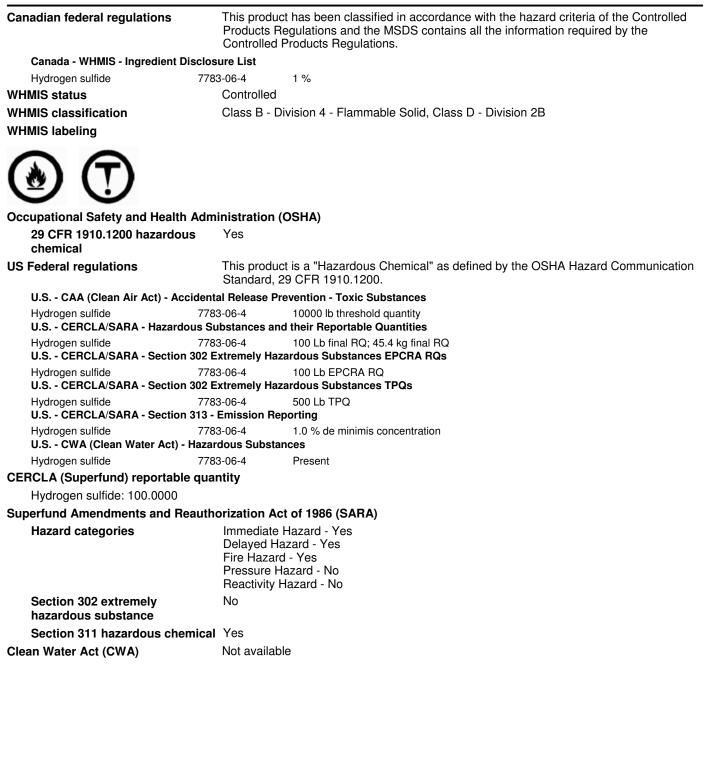
Basic shipping requirements: Proper shipping name

Hazard class

name SOLID: Sulfur, UN1350, Class 4.1, PG III; LIQUID: Sulfur, molten, UN2448, Class 4.1, PGIII 4.1



15. Regulatory Information



State reg	ulations		t does not contain a chemical known to the State of C n defects or other reproductive harm.	alifornia to cause
U.S	California - 8 CCR Section	339 - Director's Li	st of Hazardous Substances	
Sulfur		7783-06-4 7704-34-9	Present Present	
	· Louisiana - Reportable Qua	7783-06-4		
	ogen sulfide • Massachusetts - Right To I		100 Lb final RQ; 45.4 kg final RQ	
	5	7783-06-4		
Sulfur	ogen sulfide	7704-34-9	Extraordinarily hazardous Present	
	Minnesota - Hazardous Sul		1 Coont	
		7783-06-4	Present	
,	New Jersey - Right to Know			
	ogen sulfide	7783-06-4	sn 1017	
Sulfur	0	7704-34-9	sn 1757	
U.S	New York - Reporting of Re	eleases Part 597 -	List of Hazardous Substances	
,	ogen sulfide • North Carolina - Control of	7783-06-4 Toxic Air Pollutar	100 Lb RQ (air); 100 lb RQ (land/water) hts	
Hydro	ogen sulfide	7783-06-4	0.12 mg/m3 (chronic toxicants)	
U.S	Ohio - Extremely Hazardou	s Substances - Th	reshold Quantities	
Hydro	ogen sulfide	7783-06-4	500 Lb TQ	
U.S	Pennsylvania - RTK (Right	to Know) List		
Hydro	ogen sulfide	7783-06-4	Environmental hazard	
Sulfur		7704-34-9	Present	
U.S	Rhode Island - Hazardous			
	ogen sulfide	7783-06-4	Toxic; Flammable	
Sulfur		7704-34-9	Flammable	
Inventory	y name			
Cour	ntry(s) or region	Inventory n	ame	On inventory (yes/no)*
Cana	ada	Domestic Su	ubstances List (DSL)	Yes
Cana	ada	Non-Domes	tic Substances List (NDSL)	No
Unite	ed States & Puerto Rico	Toxic Subst	ances Control Act (TSCA) Inventory	Yes
A "Ye	s" indicates that all componer		omply with the inventory requirements administered by the g	governing country(s)

LEGEND HMIS/NFF		Health / 2
evere erious loderate light	4 3 2 1	Flammability 1 Physical Hazard 0 Personal Protection X
linimal sclaimer	0	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 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.

	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.

16. Other Information



b. Othe	er ir	itormation
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Hazard	0	
rotoction		1

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 adhérés 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

Irving Oil Refining G.P.



BLACK SWAN MFG. CO.

GHS SAFETY DATA SHEET



	SECTION 1 - ID	ENTIFICATION					
	omas St. 60651-3318 2-5796	For any Transportation or Medical Chemical Emergencies call: <u>INFOTRAC</u> (800) 535-5053 <u>OR</u> (352) 323-3500 24 hours per day - 7 days a week					
Product Name: Swan Seal		Recommended Use: To seal threaded pipes on metal and plastic connections.					
1.0	SECTION 2 - HAZARI	D(S) IDENTIFICATION					
Labels Linitumi Signal Word Warning HMIS HEALTH 1 FLAMMABILITY 2 REACTIVITY 0	NFPA HEALTH HAZARD 4 - Deadly M Unreme Dates 2 - Marandow 1 - Slight Haradow 0 - Sterror Marenel SPECIFIC HAZARD Outdoor OX Anal ACID Atali ALLS Cornsuse COR U-S Stor WATER W Radioacting Y	GHS Classification Health Environmental Acute Toxicity:Not Established Acute Aquatic Toxicity: Not Established Skin Irritation: Cat. 3 Acute Aquatic Toxicity: Not Established Skin Sensitization: NO Chronic Aquatic Toxicity: Not Established Physical Flammability: Not Established					
Haza H317: May cause an allergic sk	rdous Statements in reaction.	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					
SE	CTION 3 - COMPOSITION / IN	FORMATION ON INGREDIENTS					

lazardous Chemicals	CAS#	EINECS#	REACH	Approx %	
		ALC: NAMES OF	Pre-registration Number		
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.

Page 1 of 3

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

Handling 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.

Storage Keep container closed and upright when not in use. Do not store near heat, sparks, or open flames.

SECTION 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

and the state of the	Exposure L	imits		
Hazardous Chemicals	ACGIH-TLV	ACGIH-STEL	OSHA-PEL	
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)	Contracting annual	UEL - 10.69
Freezing Point:	Not Established	Vapor Density:	>1.00 (AIR=1)		Second Contents
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

Second States	Toxicity		
Hazardous Chemicals	LDso	LC 50	
ETHYLENE GLYCOL N-BUTYL ETHER	N/A	N/A	

Likely Routes of Exposure: Skin Contact and Eye Contact

Symptoms and Effect - Inhalation: Posssible 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 Persistance & 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

IPEX		GHS S	AFETY I	DATA SI	HEET		Date Bevised:	.IUN 2013		
	IPEX 636 CLR Low VOC Primer for PVC and CPVC Plastic Pipe Supersedes: JAN 2012									
SECTION I - PROD	UCT AND COMPANY	IDENTIFIC	ATION							
PRODUCT NAME:	IPEX 636 CLR Low VOC P	rimer for PVC	and CPVC P	lastic Pipe						
PRODUCT USE:	Low VOC Primer for PVC a	nd CPVC Plas	tic Pipe							
Date Revised: JUN 2013 Supersedes: JAN 2012 Date Revised: JUN 2013 Supersedes: JAN 2012 DETEX 636 CLR Low VOC Primer for PVC and CPVC Plastic Pipe 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 1nc. MANUFACTURER: IPS Corporation 807 Pharmacy Avenue Scarborough, Ontario M1L 3K2, CAN 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 Acute Toxicity: Category 4 Category 3 Skin Irritation: Category 3 Category 2 GHS LABEL: OR OR Signal Word: Danger WHMIS CLASSIFICATION: CLASS B, DIVISION 2 Lizard Statements H225: Highly flammable liquid and vapor H319: Causes serious eye irritation P210: Keep away from heat/sparks/open flames/nb surfaces – No smoking P251: Noole kondurfungas/mist/vapors/apray P280: Weep rotective glowes/protective clothing/eye protection										
	807 Pharmacy Avenue				17109 South	Main Street, Gardena, CA	90248-3127			
	Scarborough, Ontario M1L	3K2, CAN				, ,	9			
	Date Revised: JUN 2013 Date Revised: JUN 2013 Supersed: JUN 2013 MERGENCY: Transportation: CHEMTEL Tel. 800: 255-3924, 813-248-0585 (International) Mergency 2 MERGENCY: Transportation: CHEMTEL Tel. 800: 255-3924, 813-248-0585 (International) Pole Supersed: Category 4 Acute Toxicity: None Known Flanmable Liquid Category 2 INSUME Toxicity: Category 3 Flanmabl									
			-0585 (Interna	tional)	Medical: CH	EMTEL Tel. 800.255-3924,	813-248-0585	(International)		
	ARDS IDENTIFICATIO	N								
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		Acute Toxicit					nysicai	Category 2		
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Skin Sensitization:										
Eye:	Category 2B									
GHS LABEL:	OR OR	*	×		1:	WHMIS CLASSIFICATION:	CLASS B, D	IVISION 2		
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Data Revised: JUN 2013 Big Revised: JUN 2013 Supersede:: JUN 2013 Description: PRODUCT AND COMPANY IDENTIFICATION MANUFACTURER: IPS Corporation MANUFACTURER: IPS Corporation B07 Pharmacy Avenue T1019 South Main Street, Gardena, CA 90248-3127 Scaborough, Ontario M1L 3K2, CAN MANUFACTURER: IPS Corporation Big Corporation: CHEMTEL Tel. 800.255-3924, 813-248-0585 (International) Medica: CHEMTEL Tel. 480.255-3924, 813-248-0585 (International) Medica: CHEMTEL Tel. 800.255-3924, 813-248-0585 (International) Marking and more international intrinsion: Category 2 Marking and analysis Supplication: Category 2 <th< td=""><td></td></th<>										
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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 wate	r for 15 minute	s and seek me	dical advice	immediately.				
Skin contact:	Remove contaminated clothi	ng and shoes.	Wash skin the	oroughly with	oap and wat	er. If irritation de	evelops, see	k medical ad	vice.	
Inhalation:	Remove to fresh air. If breat	hing is stoppe	d, give artificial	respiration.	breathing is	difficult, give oxy	gen. Seek	medical advi	ce.	
Ingestion:	Rinse mouth with water. Giv	e 1 or 2 glass	es of water or r	nilk to dilute.	Do not induce	e vomitina. Seel	medical ad	vice immedia	atelv.	
	IGHTING MEASURES	9				y			,	
Suitable Extinguishing M			n dioxide gas, f	oam, Halon, v	ater fog.		HMIS	NFPA	0-Minimal	
Unsuitable Extinguishing		,			Janes legi	Health	2	2	1-Slight	
Exposure Hazards:	Inhalation and		ct			Flammability	3	3	2-Moderate	
Combustion Products:	Oxides of carb					Reactivity	0	0	3-Serious	
						PPE	B	U U	4-Severe	
Protection for Firefighte	rs: Self-contained	breathing app	paratus or full-fa	ace positive pr	essure airline		2			
SECTION 6 - ACCI	DENTAL RELEASE ME	ASURES								
Personal precautions:	Keep away fro	m heat, spark	s and open flan	ne.						
	Provide sufficie	ent ventilation	, use explosion	-proof exhaus	ventilation e	quipment or wea	ar suitable re	spiratory pro	tective equipment.	
	Prevent contact	ct with skin or	eyes (see secti	ion 8).						
Environmental Precautio	ns: Prevent produ	ct or liquids co	ontaminated wit	h product fron	n entering sev	wers, drains, soil	or open wat	er course.		
Methods for Cleaning up	: Clean up with	sand or other	inert absorbent	material. Tra	nsfer to a clo	sable steel vess	el.			
Materials not to be used	for clean up:	Aluminum or	plastic containe	ers						
SECTION 7 - HAND	LING AND STORAGE									
	ng of vapor, avoid contact with									
Keep away fro	om ignition sources, use only e	electrically gro	unded handling	equipment ar	d ensure ade	equate ventilation	n/fume exha	ust hoods.		
Do not eat, dr	ink or smoke while handling.									
Storage: Store in ventil	ated room or shade below 44°	C (111°F) and	l away from dire	ect sunlight.						
	om ignition sources and incom						ounds, strong	g oxidizers a	nd isocyanates.	
Follow all pred	cautionary information on conta	ainer label, pro	oduct bulletins a	and solvent ce	menting litera	ature.				
	AUTIONS TO CONTR		SURE / PER							
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 airbo	orne concentra	ations below ex	posure limits.						
Personal Protective Equi	pment (PPE):			•						
Eye Protection:	Avoid contact with eyes, wea	r splash-proof	f chemical gogg	gles, face shie	ld, safety glas	sses (spectacles) with brow g	guards and s	ide shields,	
-	etc. as may be appropriate for	or the exposur	e.							
Skin Protection:	Prevent contact with the skin	as much as p	ossible. Butyl r	ubber gloves	should be use	ed for frequent ir	nmersion.			
	Use of solvent-resistant glove							al adhesive a	application	
	practices and procedures are									
Respiratory Protection:	Prevent inhalation of the solv				doors and/o	r windows to ens	ure airflow a	and air chanc	jes. Use local	
. ,	exhaust ventilation to remove									
	With normal use, the Exposu									
			,						•	

IPEX

GHS SAFETY DATA SHEET

IPEX 636 CLR Low VOC Primer for PVC and CPVC Plastic Pipe

Date Revised: JUN 2013 Supersedes: JAN 2012

SECTION 9 - PHYS					
Appearance:	Clear, thin lic	uid		Odor Threshold:	
Odor:	Ethereal			Odor Threshold:	0.88 ppm (Cyclohexanone)
pH: Molting/Ercorting Poir	Not Applicab		component: TUE	Poiling Pones	ECOC (1220E) to 15000 (2100E)
Melting/Freezing Poir		3.3°F) Based on first melting		Boiling Range:	56°C (133°F) to 156°C (313°F)
Boiling Point: Flash Point:		Based on first boiling compo TCC based on Acetone	ment. Acetone	Evaporation Rate:	> 1.0 (BUAC = 1)
Specific Gravity:	-20°C (-4°F) 0.858 @23°(Flammability: Flammability Limits:	Category 2 LEL: 1.1% based on Cyclohexanone
Solubility:		on soluble in water. Resin po	rtion congrates out	Fighting Linits.	UEL: 12.8% based on Acetone
Partition Coefficient r		Not Available	ition separates out.	Vapor Pressure:	190 mm Hg @ 20°C (68°F) Acetone
Auto-ignition Temper		F) based on THF		Vapor Density:	>2.0 (Air = 1)
Decomposition Temp				Other Data: Viscosity:	Water-thin
VOC Content:		d as directed, per SCAQMD F	Rule 1168 Test Method 316		
		· .		A, ¥00 content ia. <u><</u> 550 g/i.	
	BILITY AND REACTIV				
Stability:		Stable			
Hazardous decompos	ition products:	None in normal use. When	forced to burn, this product	gives off oxides of carbon a	nd smoke.
Conditions to avoid:		Keep away from heat, spark	ks, open flame and other ign	ition sources.	
Incompatible Material	s:	Oxidizers, strong acids and	bases, amines, ammonia		
SECTION 11 - TOX	ICOLOGICAL INFOR	MATION			
ikely Routes of Exposure	Inhalation, E	e and Skin Contact			
cute symptoms and effe	sts:				
Inhalation:	Severe overexposure may	result in nausea, dizziness, he	eadache. Can cause drows	iness, irritation of eyes and r	nasal passages.
Eye Contact:					nation on contact with the liquid.
Skin Contact:		natural skin oils resulting in s			
Ingestion:		g, diarrhea and mental sluggi			
Chronic (long-term) effect					
Foxicity:	LD50		LC ₅₀		
Tetrahydrofuran (THF)	Oral: 2842 m	a/ka (rat)		hrs. 21,000 mg/m ³ (rat)	
Methyl Ethyl Ketone (MEK		g/kg (rat), Dermal: 6480 mg/k		hrs. 23,500 mg/m ³ (rat)	
Cyclohexanone		g/kg (rat), Dermal: 948 mg/kg	0 ()	hrs. 8,000 PPM (rat)	
Acetone				0,100 mg/m ³ (rat)	
	Oral: 5800 m				
Reproductive Effects	Teratogenicity	Mutagenicity	Embryotoxicity	Sensitization to Product	
Not Established	Not Established	Not Established	Not Established	Not Established	Not Established
SECTION 12 - ECO	LOGICAL INFORMA	ΓΙΟΝ			
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.				
	TE DISPOSAL CONS				
	gulations. Consult disposal e				
	SPORT INFORMATI				
Proper Shipping Name:		iquid, n.o.s. (Acetone, Tetrah	ydrofuran)		
Hazard Class:	3				
Secondary Risk:	None			CEPTION for Ground Ship	
Identification Number:	UN 1993		Quantity: Up to 1L per inne		
Packing Group:	PG II		ommodity: Depending on p	ackaging, these quantities n	nay qualify under DOT as "ORM-D" .
Label Required:		mable Liquid			
Marine Pollutant:	NO			7.0.1	
				HUN	
	TDG CLASS		FLAMMABLE LIQUID 3	Appendix Total	
	SHIPPING N		Flammable Liquid, n.o.s. (A	Acetone, Tetranydroturan)	
		R/PACKING GROUP:	UN 1993, PG II		
	ULATORY INFORMA				
	formation: Highly Flam	nable, Irritant		SCA, Europe EINECS, Can	
Symbols:	F, Xi		AICS, Ko	orea ECL/TCCL, Japan MITI	(ENCS)
Risk Phrases:	R11: Highly flammable.				
	R20: Harmful by inhalation.			ed exposure may cause skin o	
	R36/37: Irritating to eyes and	respiratory system.	R67: Vapors	may cause drowsiness and di	izziness
Safety Phrases:	S9: Keep container in a well-	ventilated place.	S26: In case of contact with	eyes, rinse immediately with a	plenty of water and seek medical advice.
	S16: Keep away from source			easures against static discharg	
	S25: Avoid contact with eyes			dical advise immediately and s	
SECTION 16 - OTH					
Specification Informa		0 () 11 11 2			nt with the requirements of the Europe
Department issuing d	ata sheet:	Safety Health & Environment	ntal Affairs	Directive on RoHS (Restrie	ction of Hazardous Substances).
Training necessary:		Yes, training in practices an	nd procedures contained in p	roduct literature.	
Reissue date / reason		6/11/2013 / Updated GHS S	Standard Format		
Intended Use of Prod	uct:	Primer for PVC and CPVC	Plastic Pipe		
Reissue date / reason Intended Use of Prod	uct:	6/11/2013 / Updated GHS S	Standard Format Plastic Pipe		based on surrent state of

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
IPEX SYS 636 GRY Low VOC Cement for PVC Plastic Pipe

Supersedes: JAN 2012

SECTION I - PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: PRODUCT USE:

IPEX SYS 636 GRY Low VOC Cement for PVC Plastic Pipe Low VOC Solvent Cement for PVC Plastic Pipe

IPEX Inc. MANUFACTURER: IPS Corporation 807 Pharmacy Avenue

Scarborough, Ontario M1L 3K2, CAN

17109 South Main Street, Gardena, CA 90248-3127 P.O. Box 379, Gardena, CA 90247-0379 Tel. 1-310-898-3300 Medical: CHEMTEL Tel. 800.255-3924, 813-248-0585 (International)

EMERGENCY: Transportation: CHEMTEL Tel. 800.255-3924, 813-248-0585 (International)

SECTION 2 - HA											
INS CLASSIFICATIO	Health			Enviro	nmental			Ph	ysical		
Acute Toxicity: Skin Irritation: Skin Sensitization: Eye:	Category 4 Category 3 NO Category 2E	3	Acute Toxicity Chronic Toxic	y:	None Known None Known		Flammable Liq		,	Category 2	
GHS LABEL:		OR	*	×	Signal Word: Danger		WHMIS CLASSIF	ICATION:	CLASS B,	DIVISION 2	
1225: Highly flammable liq 1319: Causes serious eye 1332: Harmful if inhaled 1335: May cause respirato 1336: May cause drowsing 2UH019: May form explos	uid and vapor irritation ory irritation oss or dizziness ive peroxides	<u>Statements</u>			P261: Avoid bre P280: Wear prof P304+P340: IF I P403+P233: Sto P501: Dispose c	athing dust/fum ective gloves/p NHALED: Rem re in a well ven	Precautionary arks/open flames/h ue/gas/mist/vapors/ protective clothing/e love victim to fresh tillated place. Keep ainer in accordance	ot surfaces – I spray eye protection/ air and keep a container tigh	No smoking face protection at rest in a posi- tly closed	n sition comfortable for	breathing
SECTION 3 - CO	OMPOSITION	INFORMA									
Tetrahydrofuran (THF) Methyl Ethyl Ketone (N Cyclohexanone All of the constituents of * Indicates this chemic	of this adhesive pr al is subject to the	reporting requ	uirements of Se	203-631-1 inventory of o ection 313 of t	the Emergency	Number 29-22-0000 28-24-0000 8-25-0000 Inces mainta Planning and	ined by the US Community Rig	ght-to-Know	exempt fror Act of 1986		
# indicates that this ch			5's List of chen	nicals known	to the State of C	alifornia to c	ause cancer or	reproductive	toxicity.		
SECTION 4 - FII Contact with eyes:			th planty of wa	tor for 15 min	utes and seek r		a immadiataly				
Skin contact: Inhalation: Ingestion: SECTION 5 - FII	Remove co Remove to Rinse mout	ntaminated clo fresh air. If bre n with water. C	thing and shoe eathing is stopp Give 1 or 2 glas	es. Wash skin bed, give artifi	thoroughly with thoroughly with cial respiration.	i soap and w If breathing i	ater. If irritation is difficult, give c ce vomiting. Se	xygen. See	k medical a	dvice.	_
Suitable Extinguish				on dioxide ga	s, foam, Halon,	water fog.		HMIS	NFPA	0-Minimal	
Unsuitable Extingu Exposure Hazards: Combustion Produc	ishing Media:	Water spray Inhalation ar		act		Ū	Health Flammability Reactivity PPE	2 3 0 B	2 3 0	1-Slight 2-Moderate 3-Serious 4-Severe	
Protection for Firef	ghters:	Self-contain	ed breathing a	oparatus or fu	Il-face positive	oressure airlin		D		4 00 0010	
SECTION 6 - AC	CIDENTAL F										
Personal precaution Environmental Prec Methods for Cleanin Materials not to be u	autions: ig up: ised for clean up	Provide suff Prevent con Prevent proo Clean up wit	tact with skin o duct or liquids o h sand or othe Aluminum or	n, use explosi r eyes (see se contaminated	ion-proof exhau ection 8). with product fro ent material. Tr	m entering s	equipment or w ewers, drains, s losable steel ve	oil or open w		protective equipm	ent.
SECTION 7 - HA				and alathing							
Storage: Do not ex Store in v Keep aw	ay from ignition so at, drink or smoke ventilated room or ay from ignition so I precautionary inf	ources, use on while handling shade below ources and inco ormation on co	ly electrically g J. 44°C (110°F) a ompatible mate ontainer label, j	rounded hand and away from erials: caustics product bulleti	direct sunlight. s, ammonia, ino ns and solvent	rganic acids, cementing lit	chlorinated con erature.			ls. rs and isocyanates	S.
EXPOSURE LIMITS:		ponent	ACGIH TLV	ACGIH STEL		OSHA STEL:					
	Tetrahydrof Methyl Ethy Cyclohexan	Ketone (MEK	50 ppm	100 ppm 300 ppm 50 ppm	200 ppm 200 ppm 50 ppm						
Engineering Contro Monitoring: Personal Protective Eye Protection:	Is: Use local ex Maintain bre Equipment (PPE	haust as neec athing zone ai	led. rborne concen	trations below	v exposure limits		asses (spectacl	es) with brow	w quards ar	d side shields	
Skin Protection:	etc. as may Prevent con	be appropriate tact with the sl	e for the exposi kin as much as	ure. possible. But	lyl rubber glove	s should be u	used for frequen dequate protecti	t immersion.	•		
Respiratory Protect	practices an on: Prevent inha	d procedures alation of the s	are used for m	aking structur n a well-ventila	al bonds. ated room. Ope	n doors and	/or windows to e	nsure airflov	v and air ch	anges. Use local	

SUPPLIER:

Date Revised: JUN 2013

IPEX

GHS SAFETY DATA SHEET

IPEX SYS 636 GRY Low VOC Cement for PVC Plastic Pipe

Date Revised: JUN 2013 Supersedes: JAN 2012

SECTION 9 - PHYS	ICAL AND CHEMICA	L PROPERTIES				
Appearance:	Gray, mediu	m syrupy liquid				
Odor: Ketone				Odor Threshold:	0.88 ppm (Cyclohexanone)	
pH:	Not Applicat					
		63.3°F) Based on first melting		Boiling Range:	66°C (151°F) to 156°C (313°F	-)
Flash Point:	Boiling Point: 66°C (151°F) Ba		onent: THF	Evaporation Rate: Flammability:	> 1.0 (BUAC = 1)	
Specific Gravity:				Flammability Limits:	Category 2 LEL: 1.1% based on Cyclohe	avanone
Solubility:		on soluble in water. Resin portion separates out.			UEL: 11.8% based on THF	exalience
Partition Coefficient	•	Not Available		Vapor Pressure:	129 mm Hg @ 20°C (68°F)ba	ased on THF
		F) based on THF		Vapor Density:	>2 (Air = 1)	
Decomposition Tem				Other Data: Viscosity:	Medium bodied	
VOC Content:	When applie	d as directed, per SCAQMD	Rule 1168, Test Method 31	6A,VOC content is: < 510	g/l.	
SECTION 10 - STABILITY AND REACTIVITY						
Stability:		Stable				
Hazardous decompo	•		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, spark		nition sources.		
Incompatible Materia	ils:	Oxidizers, strong acids and	bases, amines, ammonia			
SECTION 11 - TOX	ICOLOGICAL INFOR	MATION				
Likely Routes of Exposur	re: Inhalation, E	ye and Skin Contact				
Acute symptoms and effe	ects:					
Inhalation:	Severe overexposure may	result in nausea, dizziness, l	headache. Can cause drow	wsiness, irritation of eyes ar	nd nasal passages.	
Eye Contact:				•	mmation on contact with the liq	luid.
Skin Contact:		e natural skin oils resulting in		ay occur with prolonged co	ntact.	
Ingestion:		ng, diarrhea and mental slug	gishness.			
Chronic (long-term) effec	ts: None known LD50	to humans	LC ₅₀			
Toxicity:				hun 01 000 mmm (mm ³ (mmt)		
Tetrahydrofuran (THF)	Oral: 2842 n	,		hrs. 21,000 mg/m ³ (rat)		
Methyl Ethyl Ketone (MEr Cyclohexanone		ng/kg (rat), Dermal: 6480 mg/ ng/kg (rat), Dermal: 948 mg/k	• • •	hrs. 23,500 mg/m ³ (rat) hrs. 8,000 PPM (rat)		
-	1	5 5 C //	5 ()	, , ,		1
Reproductive Effects	Teratogenicity	Mutagenicity	Embryotoxicity	Sensitization to Product		
Not Established	Not Established	Not Established	Not Established	Not Established	Not Established	
SECTION 12 - ECOLOGICAL INFORMATION						
		IION				
Ecotoxicity:	None Known		(VOC) to the air takes pla	ce, typically at a rate of < 5	10.0/	
Ecotoxicity: Mobility:	None Known In normal use, emission of	volatile organic compounds	(VOC's) to the air takes pla	ce, typically at a rate of \leq 5	10 g/l.	
Ecotoxicity: Mobility: Degradability:	None Known In normal use, emission of Biodegradable		(VOC's) to the air takes pla	ce, typically at a rate of \leq 5	10 g/l.	
Ecotoxicity: Mobility: Degradability: Bioaccumulation:	None Known In normal use, emission of Biodegradable Minimal to none.	volatile organic compounds	(VOC's) to the air takes pla	ce, typically at a rate of \leq 5	10 g/l.	
Ecotoxicity: Mobility: Degradability: Bioaccumulation: SECTION 13 - WAS	None Known In normal use, emission of Biodegradable Minimal to none. TE DISPOSAL CONS	volatile organic compounds	(VOC's) to the air takes pla	ce, typically at a rate of \leq 5	10 g/l.	
Ecotoxicity: Mobility: Degradability: Bioaccumulation: SECTION 13 - WAS Follow local and national re	None Known In normal use, emission of Biodegradable Minimal to none. STE DISPOSAL CONS gulations. Consult disposal	volatile organic compounds SIDERATIONS expert.	(VOC's) to the air takes pla	ce, typically at a rate of \leq 5	10 g/l.	
Ecotoxicity: Mobility: Degradability: Bioaccumulation: SECTION 13 - WAS Follow local and national re SECTION 14 - TRAI	None Known In normal use, emission of Biodegradable Minimal to none. STE DISPOSAL CONS gulations. Consult disposal VSPORT INFORMAT	volatile organic compounds SIDERATIONS expert.	(VOC's) to the air takes pla	ce, typically at a rate of \leq 5	10 g/l.	
Ecotoxicity: Mobility: Degradability: Bioaccumulation: SECTION 13 - WAS Follow local and national re SECTION 14 - TRAI Proper Shipping Name	None Known In normal use, emission of Biodegradable Minimal to none. TE DISPOSAL CONS gulations. Consult disposal NSPORT INFORMATI Adhesives	volatile organic compounds SIDERATIONS expert.			10 g/l.	
Ecotoxicity: Mobility: Degradability: Bioaccumulation: SECTION 13 - WAS Follow local and national re SECTION 14 - TRAI Proper Shipping Name: Hazard Class:	None Known In normal use, emission of Biodegradable Minimal to none. TE DISPOSAL CONS egulations. Consult disposal NSPORT INFORMATI Adhesives 3	volatile organic compounds SIDERATIONS expert. ON	EXCEPT	ON for Ground Shipping		
Ecotoxicity: Mobility: Degradability: Bioaccumulation: SECTION 13 - WAS Follow local and national re SECTION 14 - TRAI Proper Shipping Name: Hazard Class: Secondary Risk:	None Known In normal use, emission of Biodegradable Minimal to none. STE DISPOSAL CONS egulations. Consult disposal NSPORT INFORMAT Adhesives 3 None	volatile organic compounds SIDERATIONS expert. ON DOT Limited	EXCEPT Quantity: Up to 5L per inn	ION for Ground Shipping er packaging, 30 kg gross v	veight per package.	
Ecotoxicity: Mobility: Degradability: Bioaccumulation: SECTION 13 - WAS Follow local and national re SECTION 14 - TRAI Proper Shipping Name: Hazard Class: Secondary Risk: Identification Number:	None Known In normal use, emission of Biodegradable Minimal to none. STE DISPOSAL CONS gulations. Consult disposal NSPORT INFORMAT Adhesives 3 None UN 1133	volatile organic compounds SIDERATIONS expert. ON DOT Limited	EXCEPT Quantity: Up to 5L per inn	ION for Ground Shipping er packaging, 30 kg gross v		
Ecotoxicity: Mobility: Degradability: Bioaccumulation: SECTION 13 - WAS Follow local and national re SECTION 14 - TRAI Proper Shipping Name: Hazard Class: Secondary Risk: Identification Number: Packing Group:	None Known In normal use, emission of Biodegradable Minimal to none. STE DISPOSAL CONS gulations. Consult disposal NSPORT INFORMAT Adhesives 3 None UN 1133 PG II	volatile organic compounds SIDERATIONS expert. ON DOT Limited Consumer Co	EXCEPT Quantity: Up to 5L per inn ommodity: Depending on	ION for Ground Shipping er packaging, 30 kg gross v packaging, these quantities	veight per package.	
Ecotoxicity: Mobility: Degradability: Bioaccumulation: SECTION 13 - WAS Follow local and national re SECTION 14 - TRAI Proper Shipping Name: Hazard Class: Secondary Risk: Identification Number:	None Known In normal use, emission of Biodegradable Minimal to none. STE DISPOSAL CONS gulations. Consult disposal NSPORT INFORMAT Adhesives 3 None UN 1133 PG II	volatile organic compounds SIDERATIONS expert. ON DOT Limited	EXCEPT Quantity: Up to 5L per inn ommodity: Depending on	ION for Ground Shipping er packaging, 30 kg gross v	veight per package. may qualify under DOT as "OF	
Ecotoxicity: Mobility: Degradability: Bioaccumulation: SECTION 13 - WAS Follow local and national re SECTION 14 - TRAI Proper Shipping Name: Hazard Class: Secondary Risk: Identification Number: Packing Group: Label Required:	None Known In normal use, emission of Biodegradable Minimal to none. STE DISPOSAL CONS gulations. Consult disposal VSPORT INFORMAT Adhesives 3 None UN 1133 PG II Class 3 Flan	volatile organic compounds SIDERATIONS expert. ON DOT Limited Consumer Co	EXCEPT Quantity: Up to 5L per inn ommodity: Depending on	ON for Ground Shipping er packaging, 30 kg gross v packaging, these quantities G INFORMATION	veight per package. may qualify under DOT as "OF E LIQUID 3	
Ecotoxicity: Mobility: Degradability: Bioaccumulation: SECTION 13 - WAS Follow local and national re SECTION 14 - TRAI Proper Shipping Name: Hazard Class: Secondary Risk: Identification Number: Packing Group: Label Required:	None Known In normal use, emission of Biodegradable Minimal to none. STE DISPOSAL CONS gulations. Consult disposal VSPORT INFORMAT Adhesives 3 None UN 1133 PG II Class 3 Flan	volatile organic compounds SIDERATIONS expert. ON DOT Limited Consumer Co	EXCEPT Quantity: Up to 5L per inn ommodity: Depending on j TDG CLASS:	ION for Ground Shipping er packaging, 30 kg gross v packaging, these quantities G INFORMATION FLAMMABL ADHESIVES	veight per package. may qualify under DOT as "OF E LIQUID 3	
Ecotoxicity: Mobility: Degradability: Bioaccumulation: SECTION 13 - WAS Follow local and national re SECTION 14 - TRAI Proper Shipping Name: Hazard Class: Secondary Risk: Identification Number: Packing Group: Label Required: Marine Pollutant:	None Known In normal use, emission of Biodegradable Minimal to none. STE DISPOSAL CONS gulations. Consult disposal VSPORT INFORMAT Adhesives 3 None UN 1133 PG II Class 3 Flan	volatile organic compounds SIDERATIONS expert. ON DOT Limited Consumer Consumer	EXCEPT Quantity: Up to 5L per inn ommodity: Depending on J TDG CLASS: SHIPPING NAME:	ION for Ground Shipping er packaging, 30 kg gross v packaging, these quantities G INFORMATION FLAMMABL ADHESIVES	veight per package. may qualify under DOT as "OF E LIQUID 3	
Ecotoxicity: Mobility: Degradability: Bioaccumulation: SECTION 13 - WAS Follow local and national re SECTION 14 - TRAI Proper Shipping Name: Hazard Class: Secondary Risk: Identification Number: Packing Group: Label Required: Marine Pollutant: SECTION 15 - REG	None Known In normal use, emission of Biodegradable Minimal to none. STE DISPOSAL CONS egulations. Consult disposal NSPORT INFORMAT Adhesives 3 None UN 1133 PG II Class 3 Flan NO	volatile organic compounds SIDERATIONS expert. ON DOT Limited Consumer Consumer	EXCEPT Quantity: Up to 5L per inn ommodity: Depending on j TDG CLASS: SHIPPING NAME: UN NUMBER/PACKING C	ION for Ground Shipping er packaging, 30 kg gross v packaging, these quantities G INFORMATION FLAMMABL ADHESIVES	veight per package. may qualify under DOT as "OF E LIQUID 3 3 3 II	
Ecotoxicity: Mobility: Degradability: Bioaccumulation: SECTION 13 - WAS Follow local and national re SECTION 14 - TRAI Proper Shipping Name: Hazard Class: Secondary Risk: Identification Number: Packing Group: Label Required: Marine Pollutant: SECTION 15 - REG	None Known In normal use, emission of Biodegradable Minimal to none. TE DISPOSAL CONS Igulations. Consult disposal NONE UN 1133 PG II Class 3 Flan NO	volatile organic compounds SIDERATIONS expert. ON DOT Limited Consumer Consumer	EXCEPT Quantity: Up to 5L per inn ommodity: Depending on j TDG CLASS: SHIPPING NAME: UN NUMBER/PACKING C Ingredient Listings: USA 1	ION for Ground Shipping er packaging, 30 kg gross v packaging, these quantities G INFORMATION FLAMMABL ADHESIVES SROUP: UN 1133, PC	veight per package. may qualify under DOT as "OF E LIQUID 3 3 3 II nada DSL, Australia	
Ecotoxicity: Mobility: Degradability: Bioaccumulation: SECTION 13 - WAS Follow local and national re SECTION 14 - TRAI Proper Shipping Name: Hazard Class: Secondary Risk: Identification Number: Packing Group: Label Required: Marine Pollutant: SECTION 15 - REG Precautionary Label	None Known In normal use, emission of Biodegradable Minimal to none. STE DISPOSAL CONS gulations. Consult disposal NOPERATION OF CONS Adhesives 3 None UN 1133 PG II Class 3 Flan NO CULATORY INFORMAP Information: Highly Flamm F, Xi R11: Highly flammable.	volatile organic compounds SIDERATIONS expert. ON DOT Limited Consumer Consumer	EXCEPT Quantity: Up to 5L per inn ommodity: Depending on TDG CLASS: SHIPPING NAME: UN NUMBER/PACKING C Ingredient Listings: USA T AICS, Ko	ON for Ground Shipping er packaging, 30 kg gross v backaging, these quantities G INFORMATION FLAMMABL ADHESIVES ROUP: UN 1133, PC 'SCA, Europe EINECS, Ca rea ECL/TCCL, Japan MIT	weight per package. may qualify under DOT as "OF E LIQUID 3 3 3 II nada DSL, Australia I (ENCS)	
Ecotoxicity: Mobility: Degradability: Bioaccumulation: SECTION 13 - WAS Follow local and national re SECTION 14 - TRAI Proper Shipping Name: Hazard Class: Secondary Risk: Identification Number: Packing Group: Label Required: Marine Pollutant: SECTION 15 - REG Precautionary Label Symbols:	None Known In normal use, emission of Biodegradable Minimal to none. STE DISPOSAL CONS agulations. Consult disposal VSPORT INFORMAT Adhesives 3 None UN 1133 PG II Class 3 Flan NO SULATORY INFORMAP Information: Highly Flamm F, Xi R11: Highly flammable. R20: Harmful by inhalation.	volatile organic compounds SIDERATIONS expert. ON DOT Limited Consumer Consumer	EXCEPT Quantity: Up to 5L per inn ommodity: Depending on j TDG CLASS: SHIPPING NAME: UN NUMBER/PACKING C Ingredient Listings: USA T AICS, Ko R66: Repeate	ION for Ground Shipping er packaging, 30 kg gross v backaging, these quantities G INFORMATION FLAMMABL ADHESIVES AROUP: UN 1133, PC TSCA, Europe EINECS, Ca rrea ECL/TCCL, Japan MIT d exposure may cause skin d	veight per package. may qualify under DOT as "OF E LIQUID 3 3 II nada DSL, Australia I (ENCS) ryness or cracking	
Ecotoxicity: Mobility: Degradability: Bioaccumulation: SECTION 13 - WAS Follow local and national re SECTION 14 - TRAI Proper Shipping Name: Hazard Class: Secondary Risk: Identification Number: Packing Group: Label Required: Marine Pollutant: SECTION 15 - REG Precautionary Label Symbols: Risk Phrases:	None Known In normal use, emission of Biodegradable Minimal to none. STE DISPOSAL CONS agulations. Consult disposal SPORT INFORMAT Adhesives 3 None UN 1133 PG II Class 3 Flan NO SULATORY INFORMA Information: Highly Flamm F, Xi R11: Highly flammable. R20: Harmful by inhalation. R36/37: Irritating to eyes and	volatile organic compounds SIDERATIONS expert. ON DOT Limited Consumer Consumer	EXCEPT Quantity: Up to 5L per inn ommodity: Depending on j TDG CLASS: SHIPPING NAME: UN NUMBER/PACKING C Ingredient Listings: USA T AICS, Ko R66: Repeate R67: Vapors i	ION for Ground Shipping er packaging, 30 kg gross v backaging, these quantities G INFORMATION FLAMMABL ADHESIVES AROUP: UN 1133, PC TSCA, Europe EINECS, Ca rrea ECL/TCCL, Japan MIT d exposure may cause skin d may cause drowsiness and di	veight per package. may qualify under DOT as "OF E LIQUID 3 3 II nada DSL, Australia I (ENCS) ryness or cracking zziness	
Ecotoxicity: Mobility: Degradability: Bioaccumulation: SECTION 13 - WAS Follow local and national re SECTION 14 - TRAI Proper Shipping Name: Hazard Class: Secondary Risk: Identification Number: Packing Group: Label Required: Marine Pollutant: SECTION 15 - REG Precautionary Label Symbols:	None Known In normal use, emission of Biodegradable Minimal to none. STE DISPOSAL CONS egulations. Consult disposal VSPORT INFORMAT Adhesives 3 None UN 1133 PG II Class 3 Flan NO SULATORY INFORMA Information: Highly Flamm F, Xi R11: Highly flammable. R20: Harmful by inhalation. R36/37: Irritating to eyes and S9: Keep container in a well-	volatile organic compounds SIDERATIONS expert. ON DOT Limited Consumer Consumer	EXCEPT Quantity: Up to 5L per inn ommodity: Depending on 1 TDG CLASS: SHIPPING NAME: UN NUMBER/PACKING C Ingredient Listings: USA T AICS, Ko R66: Repeate R67: Vapors I S26: In case of contact with	ION for Ground Shipping er packaging, 30 kg gross v packaging, these quantities G INFORMATION FLAMMABL ADHESIVES BROUP: UN 1133, PC TSCA, Europe EINECS, Ca prea ECL/TCCL, Japan MIT d exposure may cause skin d may cause drowsiness and di eyes, rinse immediately with p	veight per package. may qualify under DOT as "OF E LIQUID 3 3 II nada DSL, Australia I (ENCS) ryness or cracking zziness ilenty of water and seek medical a	
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I his 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 o 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 IDENTIFICATION AND USE MATERIAL NAME COPPER & AILOYS SYNONYMS: COPPER, COPPER AILOY ASIM UNS C11000, C12200, C14500, C22000, C26000, C36000, C51000, C54400, C65000, C70400, C70600, C71000, C71500, C93200 AND C95400. WHMIS CLASS: D2A, D2B	Russel Metals	SUPPLIER: RUSSEL METALS INC. ADDRESS: 1900 MINNESO TA COURT, MISSISSAUGA, ONTARIO. CANADA. L5N 3C9. TEL: 905-819-7295 FAX: 905-819-7262 FORM #: MSDS-03-2011. DATE: NO VEMBER 2011		
WILLIG OLAGE DEA, DEB				
1. PRO DUC T INFO RMA TIO N				
MATERIAL NAME COPPER AND COPPER ALLOYS				

DATE:

NO VEMBER 2011

FORM #: MSDS-03-2011

MANUFAC TURE OF ARTICLES MATERIAL USE:

2. HAZARDO US ING REDIENTS

BASEMETAL

(ALL VALUES ARE EXPRESSED AS WEIG HTPERC ENTAND ARE APPRO XIMATES)

COMPONENT	C.A.S. NUMBER	$\mathbf{IIV} (\mathbf{ACGIH} \cdot \mathbf{mg}/\mathbf{m}^3)$	ID_{50}	% WEIGHT
C O PPER	7440-50-8	1.0 (Dust) 0.2 (Fum e)	U	70-99.9
IRO N	7439-89-6	5.0 (a s Iron Oxide-Respirable)	30,000 mg/kg Oral-Rat	up to 4.0
IFAD	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
NIC KEL	7440-02-0	1.5 (Me ta l, Inha la ble) 0.2 (Inso luble , Inha la ble) 0.1 (So luble , Inha la ble)	>9,000 mg/kg Oral-Rat	up to 30.0
PHO SPHO RUS	7723-14-0	0.1 (Ye llo w)	U	up to 0.25
SILICON	7440-21-3	10.0 (Inha la ble), 3.0 (Respira ble-as non fibrous Silic on Carbide)	3,160 mg/kg Oml-Rat	up to 3.0
TIN	7440-31-5	2.0 (MetalorOxide)	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

NO TES:

Thre shold 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 IDENTIFIC ATIO N	
RO UIES OF ENTRY:	None in its natural solid form. Inha la tion of metal partic ulate 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 initation to the eyes. Fumes can cause eye initations.
SKIN:	May cause skin imitations. Prolonged skin contact with coated coppermay cause skin imitation in sensitive individuals. Workers with anemia, kidney damage, digestive, respiratory, nervous systems, pregnant women and fertile females warrant particular attention.
INHA LA TION:	Dust may initate nose and throat. If heated, copper fumes may cause metal fume fever, a delayed, benign, transient flu-like condition.
TARGET ORGANS:	Re spira to ry syste m , re p ro d uc tive syste m , skin, live r & kid ne ys.
ACUTE EFFEC TS:	<u>COPPER & ZINC</u> : Can cause metal fume fever, a metallic taste in the mouth, dryness or imitation of the throat, and coughing. After 4-48 hours symptoms can include sweating, shivering, headache, fever, muscle aches, nausea, vomiting, weakness, and tiredness. <u>TEILURIUM</u> : Poison by ingestion.
CHRONIC EFFECTS:	<u>IRO N</u> : May cause a benign pneumoconiosis (side rosis). <u>IEAD</u> : Chronic exposures may cause lead poisoning that can affect the digestive system, nervous system, reproductive systems, musc les and joints. IARC lists lead and its inorganic compounds under its Group 2B category - "possibly care inogenic to humans". <u>MANGANESE</u> Existing studies are inadequate to assess its care inogenic ity. Susceptible to Parkinson's disease, metal fume feverand kidney damage. <u>NCKEL</u> : IARC lists metallic nickel under its Group 2B category - "possibly care inogenic to humans". Nickel may cause skin sensitivity.

International Agency for Research on Cancer (IARC) - Summaries & Evaluations (2008). 3rd Annual Report on Carcinogens as prepared by the National Toxic ology Program (NTP).

4. FIRST A ID MEASURES	
EYES:	DUSTAC IS AS A FOREIGN BODY. FLUSH EYES WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES. SPEK MEDICAL ATTENTION IF EYE IRRITATION PERSISTS.
SKIN:	MAINTAIN GOOD PERSONAL HYGIENE. WASH AFFECTED AREA WIIH MILD SOAP AND WATER. SEEK MEDICAL ATIENTION IF SKIN IRRITATION PERSISTS.
INHA IA TION:	REMOVE TO FRESH AIR. CHECK FOR CLEAR AIRWAY, BREATHING AND PRESENCE OF PULSE. IF NECESSARY ADMINISTER CPR. CONSULTA PHYSICIAN IMMEDIATELY.
ING ESTION:	RARE IN INDUSIRY. DUST MAY IRRITATE MOUTH AND GASIRO INTESTINAL TRACT. IF ING ESTED, SEEK MEDICALATTENTION PROMPTLY.
5. FIRE FIG HIING MEASURES	
FIAMMABILITY CLASSIFICATION:	No, not flammable.
MEANS OF EXTINCTION:	None. Use extinguishers appropriate for sumounding materials.
FIASH POINT(°C):	N/A AUTO-IGNITION TEMP (°C): N/A
UPPER FLAMMABLE LIMIT% BY VOL:	N/A LOWER FIAMMABLE LIMIT% BY VO L: N/A
SENSITIVITY TO STATIC DISCHARGE	N/A EXPLOSION DATA (SENSILIVITY TO IMPACT): No
HAZARDO US C O MBUSTIO N PRO DUC TS:	Copperoxide and smaller amounts of other metallic oxides.
UNUSUA L FIRE HA ZA RDS:	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.
SPEC IAL FIRE FIG HIING:	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 PRO CEDURES:	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.
7. HANDLING AND STORAGE	
HANDLING:	Operations with the potential forgenerating high concentrations of a irborne particulates should be evaluated and controlled as necessary. Practice good house keeping. Avoid breathing metal fumes and/ordust. Fating, drinking orsmoking should not be allowed in areas where this alloy is processed, handled orstored.
STO RAGE	Store away from corrosive chemicals, such as acids.
8. EXPOSURE CONTROLS	
ENG INEERING CONTROIS: (e.g. ventilation, enclosures, specify)	General or loc al exhaust during welding or grinding operations.
PERSO NA L PRO TEC TIVE EQ UIPMENTE	Dependent upon process being performed on materialeach operation must be addressed for suitable equipment.
GLOVES (Specify):	We arg loves 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.
O THER (Spec ify):	With molten metal, use full body cover clothing suitably treated to prevent burns.
9. CHEMICALAND PHYSICAL PROPERITES	
PHYSICAL STATE: So lid	APPEARANCE: Reddish metallic solid ODOUR: Not Applic able
BO ILING PO INT: 2324°C (4215°F)	VAPO UR PRESSURE: Not Applicable VAPO UR DENSITY: Not Applicable
MELTING POINT: 1150°C	DENSITY: 8.90 pH: Not App lic a b le
EVAPORATION RATE: Not Applic able	SO IUBILITY: No t Ap p lic a b le
C O EFFIC IENT WATER/ O IL DISTRIBUTIO N:	No t Applic a b le
10. STABILITY AND REACTIVITY	
CHEMICAL STABILITY:	Yes. Copperand its alloys are stable undernormal storage and handling conditions.
HAZARDO US PO LYMERIZATION:	Ha za rd o us po lym e riza tion c a nnot o c c ur.
INCOMPATIBILITY TO OTHER SUBSTANCES:	Yes
C O NDITIO NS O F REACTIVITY:	Copper reacts violently with a cetylene, ammonium nitrate, bromates, chlorates, iodates. Copper foil bums 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

p o ta ssi	um peroxide. May tum green on prolong	ed contact with air, due to f	omnation of cupric carbonate	
CONDITIONS TO AVOID:	Reacts violently with hydro. Reaction with acidscould		ontact with acids, hydrogen g	asmay evolve.
HAZARDO US DEC OMPOSITION PRODUCIS:		explosion – doesnotdecom han fire and explosion – doe		
11. TO XIC O LO GICAL INFORMATION				
IRRITANCY OF MATERIAL	See Section 3.	SENSITIZATION OF MATERI	AL: Workers with skin sensitivit, attention.	y wanant particular
LD_{50} (of Material):	Unknown for copper.	LC 50 (of Material):	No t e sta b lishe d	
MUIAGENCIIY OF MATERIAL:	N/A			
REPRO DUC TIVE EFFEC TS:	<u>LEAD</u> : Clinic a l studies on te <u>TELLURIUM</u> : Reproductive e		ndicate adverse reproductive	e ffe c ts.
TERATO G ENIC HY OF MATERIAL	N/A			
CARCINOGENICITY OF MATERIAL	humans" <u>MANGANESE</u> : Existing studi	es are inadequate to assess	erits Group 2B category - "pos its carcinogenicity. egory - "possibly carcinogenic	
SYNERGISTIC MATERIALS:	N/A			
NO TE:	Prolonged skin contact ma chromium content in the c		ng of skin or de matitis in sensi	tive individuals due to
12. ECOLOGICALINFORMATION				
EC O TO XIC IIY:			er, individual components of t migrate into soil and groundw	
ENVIRO NMENTAL FATE:	No data available.			
ENVIRO NMENTAL DEG RADATION:	No data available.			
13. DISPO SAL INFO RMATIO N				
WASTE DISPOSAL:	Recovercopperformecych	ng.		
GENERAL INFORMATION:	Dispose of in accordance	with applicable federal, prov	vincial/state or local regulation	ns.
14. TRANSPORTATION INFORMATION				
GENERAL SHIPPING INFORMATION:	Material not regulated for s	hipping.		
SHIPPING NAME AND DESC RIPTION: UN NUMBER: CIASS:	N/A N/A N/A			
PACKING GROUP/RISK GROUP:	N/A			
PACKING GROUP/RISK GROUP: TRANSPOKT REGULATIONS: Canadian Transportation of Dangerous US Department of Transport (DOT) Haza	Goods Regulations (TDG) Ma		on Mawh 2011).	
TRANSPO RT REG UIA TIO NS: Canadian Thansportation of Dangerous	Goods Regulations (TDG) Ma		on Mawh 2011).	
TRANSPORT REGULATIONS: Canadian Transportation of Dangerous US Department of Transport (DOT) Haza	Goods Regulations (TDG) Ma rdous Materials shipping infon The following listing of regu	nation (Title 49 - Tiansportatio	e tals Inc. product may not be	complete and should not
 TRANSPORT REGULATIONS: Canadian Transportation of Dangerous US Department of Transport (DOT) Haza 15. REGULATO RY INFORMATION 	Goods Regulations (TDG) Ma rdous Materials shipping infor The following listing of regu be solely relied upon for al Class D2A/D2B: Materials C	nation (Title 49 - Transportation lations relating to a Russel M iregulatory compliance resp	e tals Inc. product may not be onsibilitie s.	complete and should not
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TRANSPORT REGULATIONS: Canadian Transportation of Dangerous US Department of Transport (DOT) Haza 15. REGULATORY INFORMATION REGULATORY INFORMATION: ADDITIONAL CANADIAN REGULATIONS: WHINTS CLASSIFICATION: DOMESTIC SUBSTANCES LIST OTHER CANADIAN REGULATIONS: SARA: CHEMICALNAME Aluminum	Goods Regulations (TDG) Mardous Materials shipping information of the following listing of regulation for all be sole by relied upon for all Class D2A/D2B: Materials C The components of this mark N/A The components of this mark the function of the superfund America SARA 302 (40 CFR355, Appendix A No	nation (Title 49 - Transportation lations relating to a Russel M regulatory compliance resp a using O ther Toxic Effects. terial are on the federal DSI terial are subject to the repo endments and Reauthorizat SARA 304 (40 CRR Table 302.4) No	ie tals Inc. product may not be onsibilitie s. .Inventory. rting requirements of Sections ion Act (SARA – Oct. 2006), as (40 CFR 372.65) Yes	302, 304 and 313 of follows: CERCIA Reportable Quantities None listed
TRANSPORT REGULATIONS: Canadian Transportation of Dangerous US Department of Transport (DOT) Haza 15. REGULATORY INFORMATION REGULATORY INFORMATION: ADDITIONAL CANADIAN REGULATIONS: WHIMIS CLASSIFICATION: DOMESTIC SUBSTANCES LIST OTHER CANADIAN REGULATIONS: SARA: CHEMICALNAME	Goods Regulations (TDG) Ma rdous Materials shipping infor <i>The following listing of regu</i> <i>be sole ly relied upon for all</i> Class D2A/D2B: Materials C The components of this ma N/A The components of this ma Title III of the Superfund Am SARA 302 (40 CFR355, Appendix A	nation (Title 49 - Transportation lations relating to a Russel M regulatory compliance resp a using O ther To xic Effects. terial are on the federal DSL terial are subject to the repo endments and Reauthorizat SARA 304 (40 CFR Table 302.4)	e tals Inc. product may not be onsibilitie s. Inventory. rting requirements of Sections ion Act (SARA – Oct. 2006), as SARA 313 (40 CFR 372.65)	302, 304 and 313 of follows: CERCIA Reportable Quantities
TRANSPORT REGULATIONS: Canadian Transportation of Dangerous US Department of Transport (DOT) Haza 15. REGULATO RY INFORMATION REGULATO RY INFORMATION: ADDITIONAL CANADIAN REGULATIONS: WHMIS CLASSIFICATION: DOMESTIC SUBSTANCES LIST OTHER CANADIAN REGULATIONS: SARA: CHEMICALNAME Aluminum Copper	Goods Regulations (TDG) Mardous Materials shipping inform The following listing of regulation be sole by relied upon for all Class D2A/D2B: Materials C The components of this markow N/A The components of this markow The components of this markow (40 CFR355, Appendix A No No	nation (Title 49 - Transportation) lations relating to a Russel M regulatory compliance resp a using Other Toxic Effects. terial are on the federal DSL terial are subject to the report endments and Reauthorization SARA 304 (40 CFR Table 302.4) No	ie tals Inc. product may not be onsibilitie s. Inventory. rting requirements of Sections ion Act (SARA – Oct. 2006), as (40 CIR372.65) Yes Yes	302, 304 and 313 of follows: CERCIA Reportable Quantities None listed 5,000 lbs.

No

 SARA THRESHOLD PLANNING QUANTITY:
 Threshold Planning Quantities for Phosphorous 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

Q'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); Phosphorous 1 lb. (0.454 kg); Zinc = 1000 lb. (454 g). he Lead component of this material is known in the State of California to cause cancer, and/or birth defects
g). he Lead component of this material is known in the State of California to cause cancer, and/or birth defects
he Lead component of this material is known in the State of California to cause cancer, and/orbirth defects
•
orotherneproductive ham).
he Nickelcomponent of this material is known in the State of California to cause cancer.
e ad is regulated under 29 CFR 1910.1025.
his MSDS follows the European Union Directive "Restriction on the Use of Certain Hazardous Substances (RoHS)
n Electrical and Electronic Equipment" (2002/95/EC) and the "Waste Electrical and Electronic Equipment
WEEE)" Directive (2002/96/EC).
ead is present in this copperalloy 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.
he hexavalent oxidation state of chromium does not normally exist as part of a metal or alloy.

HAZARD LABEL KA	IING SISIEMS:		
NFPA C C	DE: H=0 F=0 R=0		
HMISCO	DE: H=1* F=0 R=0 PPE See Section 8		
* De no te	s possible chronic hazard if airborne dusts or fum	esare gen	e ra te d .
PREPARED BY:	$\operatorname{RUSSELMETALS}\operatorname{INC}$. AND $\operatorname{ENVIRO}\operatorname{TEST}\operatorname{INC}$.	DATE:	NO VEMBER 2011
TELEPHO NE:	905-819-7295	NOTE	C O NTA C T SUPPLIER FO R A D DITIO NAL PRO DUC TINFO RMATIO N
DISC LA IMER:	THE INFORMATION CONTAINED HEREIN BASED O REGARDING THE ACCURACY OF THESE DATA O		ONSIDERED ACCURATE. HOWEVER, NO WARRANTY IS EXPRESSED OR IMPLIED LTS O BTAINED FROM THE USE THEREOF.

1.1	Product and Company Identification
Product Name CAS # Product use Manufacturer	Thermo-Trap Gel (4371-32) Mixture Heat absorbent gel 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.

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	
рН	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 (H2O)	> 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 Waste from residues / unused products Dispose in accordance with all applicable regulations. 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

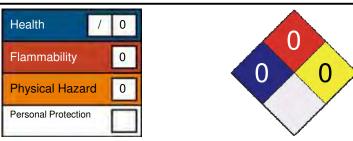
Canadian federal regulations	This product has been classified in accordance with the haza Products Regulations and the MSDS contains all the informa Controlled Products Regulations.	
WHMIS status	Not Controlled	
Occupational Safety and Health Ad	ministration (OSHA)	
29 CFR 1910.1200 hazardous chemical	No	
US Federal regulations	This product is not known to be a "Hazardous Chemical" as defined by the OSHA Hazar Communication Standard, 29 CFR 1910.1200.	
CERCLA (Superfund) reportable qu	antity	
Sodium nitrite: 100.0000		
Superfund Amendments and Reaut	horization 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 chemic	al 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)	
Canada	Non-Domestic Substances List (NDSL) N	
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 "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

LEGEND HMIS/NFPA		
Severe	4	
Serious	3	
Moderate	2	
Slight	1	
Minimal	0	

Disclaimer

16. Other Information



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.

15-Dec-2011
1

Expiry date Prepared by Other information

15-Dec-2014 Nu-Calgon Technical Service (314) 469-7000 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:	uct Name: Slic-Tite® PTFE Thread Tape,			
	PTFE Thread S	eal Ta	pe	
Revision #: 2.4	Date Prepared: June 27, 1990Date Revised: February 19, 2013			
Manufacturer:	Manufacturer: Supplier/Importer:			
LA-CO INDUSTRIES, Inc./Markal Co.			6.	
1201 Pratt Blvd.			Contract of Contract	
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				
CAS No : Not Applicable Derivation: Not Applicable				
CAS No.: Not Applicable. Derivation: Not Applicable. Synonyms: Not Applicable.				
General Use: Pipe Thread Sealant				
	/max			

Section 2 Composition/Information on Ingredients

Ingredient

CAS No.

%

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

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 firefighting 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: 621°F/327°C Boiling Point: Not Determined. Vapor Pressure (mm Hg at 20[°]C): 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 750°F/400°C 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).

<u>E.U.</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

Cl#: 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

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.

lonicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Insoluble in cold water, hot water.

Section 10: Stability and Reactivity Data

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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Titanium Alloy

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 I 100 River Road,	udlum Brackenridge, PA 15014	CAS Number: Mixture	
Phone Number (s): 724-226-5980 (M-F, 9 a.m4:30 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 TiO_2 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 <u>2009 TLVs® and BEIs®</u> 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	$\label{eq:constraint} \begin{tabular}{lllllllllllllllllllllllllllllllllll$	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/m³ (as Ni)
Molybdenum	15 mg/m ³ (as total dust, PNOR) 5.0 mg/m ³ (as respirable fraction, PNOR)	 10 mg/m³ (as Mo insoluble compounds, inhalable fraction) 3.0 mg/m³ (as Mo insoluble compounds, respirable fraction)⁸ 0.5 mg/m³ (as Mo soluble compounds, respirable fraction) 	NE	NE

NE - None Established

Notes:

- 1. 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.
- 2. 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.
- 3. 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.
- 4. 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.
- 5. LFC Lowest Feasible Concentration, Refer to Section 11, Toxicological Information
- 6. 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).
- 7. 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 BELs [®] (Biological Exposure Indices) Appendix D, paragraph A.
- 8. 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 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.

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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	

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 <u>"GLOBALLY HARMONIZED SYSTEM OF CLASSIFICATION AND LABELLING OF CHEMICALS (GHS), Third revised edition ST/SG/AC.10/30/Rev. 3"</u> 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 °	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:

a. 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)
- b. 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
- c. 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.
- d. 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

- e. 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*
- f. **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.
- h. 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.
- i. 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 (semifinished 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.

Shipping Name: Not Applicable (NA)	Packaging Authorizations	Quantity Limitations
Shipping Symbols: NA	a) Exceptions: NA	a) Passenger, Aircraft, or Railcar: NA
Hazard Class: NA	b) Group: NA	b) Cargo Aircraft Only: NA
UN No.: Not applicable	c) Authorization: NA	Vessel Stowage Requirements
Packing Group: NA		a) Vessel Stowage: NA
DOT/ IMO Label: NA		b) Other: NA
Special Provisions (172.102): NA		DOT Reportable Quantities: NA

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.

Shipping Name: Not Applicable (NA)	Packaging	Portable Tanks & Bulk Containers
Classification Code: NA	a) Packing Instructions: NA	a) Instructions: NA
UN No.: Not applicable	b) Special Packing Provisions: NA	b) Special Provisions: NA
Packing Group: NA	c) Mixed Packing Provisions: NA	
ADR Label: NA		
Special Provisions: NA		
Limited Quantities: NA		



Section 14 - Transport Information (continued) IATA – International Air Transport Association (IATA) does not regulate Titanium Alloy (semi-finished steel products) as a hazardous material. **Special Provisions:** Shipping Name: Not Applicable (NA) Passenger & Cargo Aircraft **Cargo Aircraft Only** Class/Division: NA Limited Quantity (EQ) Pkg Inst: NA NA Hazard Label (s): NA Pkg Inst: NA Pkg Inst: NA ERG Code: NA Max Net Qty/Pkg: UN No.: NA Max Net Qty/Pkg: Max Net Qty/Pkg: NA NA NA Packing Group: NA **Excepted Quantities (EQ): NA** Max Net Qty/Pkg - Maximum Net Quantity per Package Pkg Inst - Packing Instructions 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 SWDA, SARA 313 Aluminum Vanadium SARA 313 CAA, CWA, SARA 313, CERCLA, RCRA, SDWA Nickel Molybdenum **SDWA** SARA Potential Hazard Categories: Immediate Acute Health Hazard; Delayed Chronic Health Hazard **Regulations Kev:** CAA Clean Air Act (42 USC Sec. 7412; 40 CFR Part 61 [As of: 8/18/06]) Comprehensive Environmental Response, Compensation and Liability Act (42 USC secs. 9601(14), 9603(a); 40 CFR Sec. 302.4, Table 302.4, and CERCLA 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) Superfund Amendments and Reauthorization Title III Section 302 Extremely Hazardous Substances (42 USC secs. 11023, 13106; 40 CFR Sec. 372.65) and SARA Section 313 Toxic Chemicals (42 USC secs. 11023, 13106; 40 CFR sec. 372.65 [as of 6/30/05]) Toxic Substance Control Act (15 U.S.C. s/s 2601 et seq. [1976]) TSCA 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)

			Section 15 - Regulatory I	morma	tion (continueu)	
WHMIS C	Classification (Ca	nadian) (continued):			
Ingredients			WHMIS Classification			
Titanium			D26			
Vanadium			D3B			
Nickel			D2B			
Molybdenun			B4, D2B			
	t has been classified olled Products Regu		dance with the hazard criteria of the Con-	trolled Produ	cts Regulations and the MSDS contains all the information required	
			Section 16 – Oth	er Infor	mation	
Hazardous	s Material Identif	ication	System (HMIS) Classification	Nationa	l Fire Protection Association (NFPA)	
Health Ha	azard	0				
Fire Haza	nd	0			0	
Physical	Hazard	0			×	
HEALTH =	0, No significant risl	c to heal	th.	HEALTH	I = 0, No hazard beyond that of ordinary combustible materials.	
FIRE= 0, Ma	aterials that will not	burn		FIRE $= 0$, Materials that will not burn	
PHYSICAL	HAZARDS = 0 , Ma	terials tl	nat are normally stable, even under fire	INSTABILITY = 0, Normally stable, even under fire exposure conditions,		
		h water,	polymerize, decompose, condense, or	and are no	ot reactive with water.	
	on-explosives					
ABBREVI	ATIONS/ACRO					
ACGIH			overnmental Industrial Hygienists	NIF	No Information Found	
BEIs	Biological Exposur			NIOSH	National Institute for Occupational Safety and Health	
CAS	Chemical Abstracts			NTP	National Toxicology Program	
CERCLA	Comprehensive En Liability Act	vironme	ntal Response, Compensation, and	ORC	Organization Resources Counselors	
CFR	Code of Federal Re	gulatior	15	OSHA	Occupational Safety and Health Administration	
CNS	Central Nervous Sy	stem		PEL	Permissible Exposure Limit	
GI, GIT	Gastro-Intestinal, C	Bastro-Ir	itestinal Tract	PNOR	Particulate Not Otherwise Regulated	
HMIS	Hazardous Materia	ls Identi	fication System	PNOC	Particulate Not Otherwise Classified	
IARC	International Agene	cy for R	esearch on Cancer	PPE	Personal Protective Equipment	
LC50	Median Lethal Con	centrati	on	ppm	parts per million	
LD50 Median Lethal Dose		RCRA	Resource Conservation and Recovery Act			
LD Lo Lowest Dose to have killed animals or humans		RTECS	Registry of Toxic Effects of Chemical Substances			
LEL Lower Explosive Limit			SARA	Superfund Amendment and Reauthorization Act		
μg/m ³	microgram per cub	ic meter	of air	SCBA	Self-contained Breathing Apparatus	
mg/m ³	milligram per cubic	e meter o	of air	STEL	Short-term Exposure Limit	
mppcf	million particles pe	r cubic i	foot	TLV	Threshold Limit Value	
MSDS	Material Safety Da	ta Sheet		TWA	Time-weighted Average	
MSHA	Mine Safety and H	ealth Ad	Iministration	UEL	Upper Explosive Limit	
NFPA	National Fire Prote	ction As	ssociation			

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 N	MSDS DATED: 12-15-07
WEBSITE: www.alleghenyludlum.com or www.ATIMetals.com	<u>1</u>		
Note: This MSDS supersedes all prior MSDSs issued by ATI Allegheny Ludlum.			





Health	2
Fire	3
Reactivity	0
Personal Protection	Н

Material Safety Data Sheet Turpentine MSDS

Section 1: Chemical Product and Company Identification				
Product Name: Turpentine	Contact Information:			
Catalog Codes: SLT2377, SLT3670	Sciencelab.com, Inc. 14025 Smith Rd.			
CAS#: 8006-64-2	Houston, Texas 77396			
RTECS: YO8400000	US Sales: 1-800-901-7247 International Sales: 1-281-441-4400			
TSCA: TSCA 8(b) inventory: Turpentine	Order Online: ScienceLab.com			
CI#: Not available.	CHEMTREC (24HR Emergency Telephone), call:			
Synonym:	1-800-424-9300			
Chemical Name: Not available.	International CHEMTREC, call: 1-703-527-3887			
Chemical Formula: C10H16	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].

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.

lonicity (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

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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

1	Ingredients	Percentage	LD50s and LC50s Route & Species:
		(W/W)	

LA0093 UCARTHERM(TM) HTF 50-C Page 1 of 7

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

LA0093 UCARTHERM(TM) HTF 50-C Page 2 of 7

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/m³ 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

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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

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.

Ecotoxicological Information:

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 (Ibs): 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



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	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



MATERIAL SAFETY DATA SHEET

1. Product and Company Identification

1. Product and Company I	dentification
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 Emergency Telephone Numbers	513-754-2000 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 feedingstuffs.

8. Exposure Controls / Personal Protection

Occupational exposure limits

US. ACGIH Threshold Limit Values

Components	Туре	Value	Form
Iron oxide (CAS 1309-37-1)	TWA	5 mg/m3	Respirable fraction.
Manganese (CAS	TWA	0.1 mg/m3	Inhalable fraction.
7439-96-5)		0.02 mg/m2	Doopirable fraction
US. OSHA Table Z-1 Limits for Air	Contaminants (20 CEB 1010 -	0.02 mg/m3	Respirable fraction.
	-	-	Form
Components Iron oxide (CAS 1309-37-1)	Type PEL	Value 10 mg/m3	Fume.
Manganese (CAS	Ceiling	5 mg/m3	Fume.
7439-96-5)	Cenng	5 mg/m3	rume.
Canada. Alberta OELs (Occupatio	nal Health & Safety Code, Sch	nedule 1, Table 2)	
Components	Туре	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	s for Chemical Substances. O	ccupational Health and
Safety Regulation 296/97, as amen		······································	•
Components	Туре	Value	Form
Iron oxide (CAS 1309-37-1)	STEL	10 mg/m3	Fume.
	TWA	5 mg/m3	Fume.
		5 mg/m3	Dust.
		3 mg/m3	Respirable fraction.
		10 mg/m3	Total dust.
		i o mg/mo	
Manganese (CAS	TWA	0.2 mg/m3	
Manganese (CAS 7439-96-5)	TWA	0.2 mg/m3	
		· ·	
7439-96-5)		· ·	Form
7439-96-5) Canada. Manitoba OELs (Reg. 217) Components	/2006, The Workplace Safety /	And Health Act)	
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Mexico. Occupational Exposure Limit Values

Components	Туре	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.
рН	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 stabilityMaterial is stable under normal conditions.Conditions to avoidContact with incompatible materials.Incompatible materialsStrong oxidizing agents. Strong acids. Strong bases. Acetylene. Ammonia. Hydrogen peroxide
(H2O2). 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	Orrection	To de De culto	
Components	Species	Test Results	
Iron (CAS 7439-89-6)			
Acute			
<i>Oral</i> LD50	Bat	30 g/kg	
		30 g/kg	
Manganese (CAS 7439-96-5)		
Acute Oral			
LD50	Rat	9000 ma/kg	
		0 0	
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 mecher the eye, mucous membranes a	nanical action may form dust and fumes which may be irritating to and respiratory tract.	
Chronic effects	pneumoconiosis (siderosis). O nervous system, resulting in po	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	This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.	
ACGIH Carcinogens	·		
Manganese (CAS 7	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 chro	No other specific acute or chronic health impact noted.	

12. Ecological Information

Ecotoxicological data Components		Species	Test Results
ron (CAS 7439-89-6)		opecies	rest nesults
Aquatic			
Fish	LC50	Channel catfish (Ictalurus punctatus)	> 500 mg/l, 96 hours
toxicity	Alloys in r	nassive forms present a limited hazard for the	e environment.
onmental effects	Significan	t environmental persistence and bioaccumula	ation can be expected.
istence and degradability	The produ	uct is not biodegradable.	
baccumulation / cumulation	The produ	uct contains potentially bioaccumulating subs	tances.

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

·••• ·•• genere ; ···••	-
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.	
8	112 Hazardous Air Pollutants (HAPs) List
Manganese (CAS 7439-9	96-5)
US EPCRA (SARA Title III) S	Section 313 - Toxic Chemical: De minimis concentration
Manganese (CAS 7439-9	
US EPCRA (SARA Title III) S	Section 313 - Toxic Chemical: Listed substance
Manganese (CAS 7439-9	06-5) Listed.
CERCLA (Superfund) reportable	e quantity (Ibs) (40 CFR 302.4)
None	
Superfund Amendments and Re	authorization Act of 1986 (SARA)
Hazard categories	Immediate Hazard - Yes Delayed Hazard - Yes Fire Hazard - No Pressure Hazard - No Reactivity Hazard - No
SARA 302 Extremely hazard	dous 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	
\bigcirc	



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
	nplies with the inventory requirements administered by the governing count components of the product are not listed or exempt from listing on the inver	
State regulations	This product does not contain a chemical known to the State of Ca defects or other reproductive harm.	alifornia to cause cancer, birth
US - California Hazardous Su	ubstances (Director's): Listed substance	
Iron (CAS 7439-89-6)	Listed.	
Manganese (CAS 7439-96-5) Listed.		
•	5 - Carcinogens & Reproductive Toxicity (CRT): Listed substant	nce
Not listed.		
US. Massachusetts RTK - Su	bstance List	
Manganese (CAS 7439-96	,	
US. New Jersey Worker and	Community Right-to-Know Act	
Manganese (CAS 7439-96	S-5)	
US. Pennsylvania Worker an	d Community Right-to-Know Law	
Manganese (CAS 7439-96	δ-5)	
Mexico regulations	This safety data sheet was prepared in accordance with the Officia (NOM-018-STPS-2000).	al Mexican Standard

16. Other Information

Further information HMIS® ratings HMIS® is a registered trade and service mark of the NPCA. Health: 2^*

NFPA Ratings



Flammability: 0 Physical hazard: 0

Disclaimer

The information in the sheet was written based on the best knowledge and experience currently available.







MATERIAL SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

MANUFACTURER/SUPPLIER:	Canadian Office:
US Office:	WD-40 Products [Canada] Ltd.
WD-40 Company	P.O. Box 220
1061 Cudahy Place	Toronto, Ontario M9C 4V3
San Diego, ČA 92110	,
	Information Phone #: (416) 622-9881
Information Phone #: (619) 275-1400	Emergency Phone # 24 hr:
Emergency Phone # 24 hr:	Canutec: (613) 996-6666 –
Chemtrec: (800) 424-9300 –	Designated for use only in the event of chemical
Designated for use only in the event of chemical	emergencies involving a spill, leak, fire exposure or
emergencies involving a spill, leak, fire exposure or	accident involving chemicals
accident involving chemicals.	

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.

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 3 COMPOSITION INFORMATION ON INGREDIENTS

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/m3 TWA Manufacturer Recommended
Petroleum Base Oil	5 mg/m3 TWA ACGIH TLV
	10 mg/m3 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	Not Determined	Kinematic	2.79-2.96cSt @ 100°F
Distribution:		Viscosity:	
Flash Point:	122°F (49°C) Tag Open Cup	Flammable Limits:	LEL: 0.6% UEL: 8.0%
	(concentrate)	(Solvent Portion)	
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







MATERIAL SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION MANUFACTURER/SUPPLIER: **US Office:** WD-40 Products [Canada] Ltd. WD-40 Company P.O. Box 220 **1061 Cudahy Place** Toronto, Ontario M9C 4V3 San Diego, CA 92110 Information Phone #: (416) 622-9881 Information Phone #: (619) 275-1400 **Emergency Phone # 24 hr: Emergency Phone # 24 hr:** Canutec: (613) 996-6666 Chemtrec: (800) 424-9300 Designated for use only in the event of chemical Designated for use only in the event of chemical emergencies involving a spill, leak, fire exposure or emergencies involving a spill, leak, fire exposure or accident involving chemicals accident involving chemicals.

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.

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 3 COMPOSITION INFORMATION ON INGREDIENTS

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 Distil	lates 1200 mg/m3 TWA Manufacturer Recommended
Petroleum Base Oil	5 mg/m3 TWA ACGIH TLV
	10 mg/m3 STEL ACGIH TLV
Non-Hazardous Ingredien	s 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

	ON.		GU2 2		DATA SH	EEI			Date Revised	: DEC 2011
		WELD-O	N® 705™ I	Low VOC	Cements for	PVC Pla	stic Pipe		Supersedes:	
ECTION I - PRODU	JCT AND (COMPAN		CATION						
RODUCT NAME:	WELD-ON®	705™ Low \	OC Cements	for PVC Pla	stic Pipe					
RODUCT USE:	Low VOC So	lvent Cemen	t for PVC Plas	stic Pipe						
SUPPLIER:				MANUF		S Corporati				
							Main Street, Ca			
						.О. вох 379 el. 1-310-89	, Gardena, CA	90247-03	579	
MERGENCY: Transportat	ion: CHEMTE	I Tel 800 25	5-3924 813-2	248-0585 (Inte				760 602 8	3703 3E Com	pany (International)
SECTION 2 - HAZA				- 10 0000 (inte		cultur. Ten.		100.002.		party (international)
CLASSIFICATION:										
Hea	alth			Enviro	onmental			P	hysical	
Acute Toxicity:	Category 4		Acute Toxicit		None Known		Flammable Liq	uid		Category 2
Skin Irritation:	Category 3		Chronic Toxi	icity:	None Known					
Skin Sensitization:	NO Category 2B									
	Category 2B				Cianal Mard			CATION		
GHS LABEL:		OR	344		Signal Word: Danger		WHMIS CLASSIF	ICATION:	CLASS B, I	JIVISION 2
	$\mathbf{\nabla}$		U		Danger					
•	Hazard S	tatements					Precautionary	Statemer	nts	
1225: Highly flammable liquid an	nd vapor				P210: Keep away	from heat/spa	arks/open flames/h	ot surfaces	– No smoking	
1319: Causes serious eye irritat	ion				P261: Avoid breat					
H332: Harmful if inhaled					P280: Wear prote		-	• •		
H335: May cause respiratory irrit H336: May cause drowsiness or					P304+P340: IF IN P403+P233: Store					sition comfortable for breathing
EUH019: May form explosive pe					P501: Dispose of					
SECTION 3 - COMF		INFORM4		INGREDIF						
			CAS#	EINECS #	REAC			CENTRAT		
Fetue les selve frances (7115)			100.00.0	000 700 -	Pre-registration		9	by Weigh	<u>t</u>	
Tetrahydrofuran (THF) Methyl Ethyl Ketone (MEK)			109-99-9 78-93-3	203-726-8	05-2116297728			25 - 50 5 - 36		
Cyclohexanone			108-93-3		05-211629772			5 - 36 15 - 30		
All of the constituents of this	s adhesive pro	duct are liste					and by the LIS			and the station of the state of
# indicates that this chemica	al is found on	Proposition 6		Section 313 of	the Emergency F	Planning and	d Community R	ight-to-Kn	ow Act of 198	
# indicates that this chemica SECTION 4 - FIRST	al is found on	Proposition 6	5's List of che	Section 313 of micals known	the Emergency I to the State of C	Planning and alifornia to c	d Community R cause cancer of	ight-to-Kn	ow Act of 198	
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WELD-ON® 705[™] Low VOC Cements for PVC Plastic Pipe

Date Revised: DEC 2011 Supersedes: FEB 2010

SECTION 9 - PHYS					
Appearance:		y, medium syrupy liquid			
Odor:	Ketone	y, mealani syrapy liquid		Odor Threshold:	0.88 ppm (Cyclohexanone)
pH:	Not Applical	ble			
Melting/Freezing Poi		63.3 °F) Based on first mel	ting component: THF	Boiling Range:	66 ℃ (151 ℉) to 156 ℃ (313 ℉)
Boiling Point:		F) Based on first boiling con		Evaporation Rate:	> 1.0 (BUAC = 1)
Flash Point:	-20 °C (-4 °F)	TCC based on THF		Flammability:	Category 2
Specific Gravity:	0.9611 @23	3℃ (73°F)		Flammability Limits:	LEL: 1.1% based on Cyclohexanone
Solubility:		ion soluble in water. Resin	portion separates out.		UEL: 11.8% based on THF
Partition Coefficient		Not Available		Vapor Pressure:	129 mm Hg @ 20 ℃ (68 °F)based on THF
Auto-ignition Tempe		°F) based on THF		Vapor Density:	>2 (Air = 1)
Decomposition Tem				Other Data: Viscosity:	Medium bodied
VOC Content:			ID Rule 1168, Test Method 3	316A,VOC content is: < 510) g/l.
SECTION 10 - STA	BILITY AND REACT	IVITY			
Stability:		Stable			
Hazardous decompo	sition products:	None in normal use. Whe	en forced to burn, this produ	ct gives off oxides of carbo	n, hydrogen chloride and smoke.
Conditions to avoid:		Keep away from heat, spa	arks, open flame and other i	gnition sources.	
Incompatible Materia	lls:	Oxidizers, strong acids ar	nd bases, amines, ammonia		
SECTION 11 - TOX	ICOLOGICAL INFOR	RMATION			
Likely Routes of Exposur		Eye and Skin Contact			
Acute symptoms and effe		Lyo and onin contact			
Inhalation:		v result in nausea, dizzines	s, headache. Can cause dr	owsiness irritation of eves	and nasal nassages
Eye Contact:					lammation on contact with the liquid.
Skin Contact:			in skin irritation. Dermatitis	,	•
Ingestion:		ing, diarrhea and mental sli			
Chronic (long-term) effec		n to humans	-33.5		
Toxicity:	LD50		LC ₅₀		
Tetrahydrofuran (THF)	Oral: 2842 r	ng/kg (rat)	Inhalation 3	hrs. 21,000 mg/m ³ (rat)	
Methyl Ethyl Ketone (MEk		ng/kg (rat), Dermal: 6480 m		hrs. 23,500 mg/m ³ (rat)	
Cyclohexanone	·	ng/kg (rat), Dermal: 948 mg		hrs. 8,000 PPM (rat)	
	1	5 5 ()			
Reproductive Effects	Teratogenicity Not Established	Mutagenicity	Embryotoxicity	Sensitization to Produc	
Not Established		Not Established	Not Established	Not Established	Not Established
SECTION 12 - ECC		ATION			
Ecotoxicity:	None Known				
Mobility:	In normal use, emission o	f volatile organic compound	ds (VOC's) to the air takes p	lace, typically at a rate of \leq	510 g/l.
Mobility: Degradability:	In normal use, emission o Biodegradable	f volatile organic compound	ds (VOC's) to the air takes p	lace, typically at a rate of \leq	510 g/l.
Mobility:	In normal use, emission o	f volatile organic compound	ds (VOC's) to the air takes p	lace, typically at a rate of \leq	510 g/l.
Mobility: Degradability:	In normal use, emission o Biodegradable Minimal to none.		ds (VOC's) to the air takes p	lace, typically at a rate of \leq	510 g/l.
Mobility: Degradability: Bioaccumulation: SECTION 13 - WAS	In normal use, emission o Biodegradable Minimal to none.	SIDERATIONS	ds (VOC's) to the air takes p	lace, typically at a rate of \leq	510 g/l.
Mobility: Degradability: Bioaccumulation: SECTION 13 - WAS Follow local and national re	In normal use, emission o Biodegradable Minimal to none. STE DISPOSAL CON gulations. Consult disposa	ISIDERATIONS	ds (VOC's) to the air takes p	lace, typically at a rate of \leq	510 g/l.
Mobility: Degradability: Bioaccumulation: SECTION 13 - WAS Follow local and national re SECTION 14 - TRA	In normal use, emission o Biodegradable Minimal to none. STE DISPOSAL CON gulations. Consult disposa NSPORT INFORMAT	ISIDERATIONS	ds (VOC's) to the air takes p	lace, typically at a rate of \leq	510 g/l.
Mobility: Degradability: Bioaccumulation: SECTION 13 - WAS Follow local and national re SECTION 14 - TRAI Proper Shipping Name:	In normal use, emission o Biodegradable Minimal to none. STE DISPOSAL CON egulations. Consult disposa NSPORT INFORMAT Adhesives	ISIDERATIONS			-
Mobility: Degradability: Bioaccumulation: SECTION 13 - WAS Follow local and national re SECTION 14 - TRAI Proper Shipping Name: Hazard Class:	In normal use, emission o Biodegradable Minimal to none. STE DISPOSAL CON egulations. Consult disposa NSPORT INFORMAT Adhesives 3	ISIDERATIONS I expert. TON	EXCEPT	ION for Ground Shipping	•
Mobility: Degradability: Bioaccumulation: SECTION 13 - WAS Follow local and national re SECTION 14 - TRAI Proper Shipping Name: Hazard Class: Secondary Risk:	In normal use, emission o Biodegradable Minimal to none. STE DISPOSAL CON rgulations. Consult disposa NSPORT INFORMAT Adhesives 3 None	ISIDERATIONS	EXCEPT	ION for Ground Shipping ner packaging, 30 kg gross	weight per package.
Mobility: Degradability: Bioaccumulation: SECTION 13 - WAS Follow local and national re SECTION 14 - TRAI Proper Shipping Name: Hazard Class: Secondary Risk: Identification Number:	In normal use, emission o Biodegradable Minimal to none. STE DISPOSAL CON gulations. Consult disposa NSPORT INFORMAT Adhesives 3 None UN 1133	ISIDERATIONS	EXCEPT	ION for Ground Shipping ner packaging, 30 kg gross	•
Mobility: Degradability: Bioaccumulation: SECTION 13 - WAS Follow local and national re SECTION 14 - TRAI Proper Shipping Name: Hazard Class: Secondary Risk: Identification Number: Packing Group:	In normal use, emission o Biodegradable Minimal to none. STE DISPOSAL CON gulations. Consult disposa NSPORT INFORMAT Adhesives 3 None UN 1133 PG II	ISIDERATIONS I expert. TON DOT Limite Consumer	EXCEPT Ed Quantity: Up to 5L per in Commodity: Depending on	ION for Ground Shipping ner packaging, 30 kg gross	weight per package.
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Mobility: Degradability: Bioaccumulation: SECTION 13 - WAS Follow local and national re SECTION 14 - TRAI Proper Shipping Name: Hazard Class: Secondary Risk: Identification Number: Packing Group: Label Required: Marine Pollutant:	In normal use, emission o Biodegradable Minimal to none. STE DISPOSAL CON egulations. Consult disposa NSPORT INFORMAT Adhesives 3 None UN 1133 PG II Class 3 Flar NO	ISIDERATIONS I expert. TON DOT Limite Consumer	EXCEPT d Quantity: Up to 5L per in Commodity: Depending on TDG CLASS: SHIPPING NAME:	ION for Ground Shipping her packaging, 30 kg gross packaging, these quantitie IG INFORMATION FLAMMABL ADHESIVE	weight per package. s may qualify under DOT as "ORM-D" . E LIQUID 3
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Mobility: Degradability: Bioaccumulation: SECTION 13 - WAS Follow local and national re SECTION 14 - TRAI Proper Shipping Name: Hazard Class: Secondary Risk: Identification Number: Packing Group: Label Required: Marine Pollutant: SECTION 15 - REC Precautionary Label Symbols: Risk Phrases: Safety Phrases: Safety Phrases:	In normal use, emission o Biodegradable Minimal to none. STE DISPOSAL CON gulations. Consult disposa NORE UNFORMAT Adhesives 3 None UN 1133 PG II Class 3 Flar NO SULATORY INFORM Information: Highly Flam F, Xi R11: Highly flammable. R20: Harmful by inhalation. R36/37: Irritating to eyes and S9: Keep container in a well S16: Keep away from source. S25: Avoid contact with eyes IER INFORMATION ation:	ISIDERATIONS I expert. TON DOT Limite Consumer nmable Liquid ATION mable, Irritant d respiratory systemventilated place. es of ignition - No smoking. s. IPS, Safety Health & Env	EXCEPT ed Quantity: Up to 5L per inn Commodity: Depending on TE TDG CLASS: SHIPPING NAME: UN NUMBER/PACKING Ingredient Listings: USA AICS, K R66: Repeat R67: Vapors S26: In case of contact with S33: Take precautionary me S46: If swallowed, seek me	ION for Ground Shipping ner packaging, 30 kg gross packaging, these quantitie IG INFORMATION FLAMMABL ADHESIVE GROUP: UN 1133, P TSCA, Europe EINECS, Ca orea ECL/TCCL, Japan MI ed exposure may cause skin of may cause drowsiness and d eyes, rinse immediately with pasures against static dischar dical advise immediately and All ingredients are complia	weight per package. s may qualify under DOT as "ORM-D" . E LIQUID 3 S G II anada DSL, Australia TI (ENCS) dryness or cracking izziness plenty of water and seek medical advice. ges. show this container or label.
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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.



Date Revised: DEC 2011 Supersedes: NOV 2010

WELD-ON® 714[™] Low VOC Cement for CPVC Plastic Pipe

				ATION							
SECTION I - PROD	UCT AND C		IDENTIFIC	ATION							
PRODUCT NAME:	WELD-ON®	714™ Low VC	OC Cement for	CPVC Plasti	c Pipe						
PRODUCT USE:	Low VOC Sol	vent Cement f	for CPVC Plast	tic Pipe							
SUPPLIER:				MANUFA	ACTURER:	IPS Corpora	tion				
							Main Street, Car 9, Gardena, CA 9 98-3300				
EMERGENCY: Transporta	tion: CHEMTE	Tel. 800.255	-3924, 813-24	8-0585 (Intern	ational)		. 800.451.8346, 7	760.602.87	'03 3E Comp	any (International)
SECTION 2 - HAZA						incurcult rol		00.002.07			/
GHS CLASSIFICATION:			11								
He	alth			Environ	nmental			PI	nysical		
Acute Toxicity:	Category 4		Acute Toxicity:		None Knowr		Flammable Liqu	id		Category 2	
Skin Irritation: Skin Sensitization:	Category 3 NO		Chronic Toxici	ty:	None Knowr	1					
Eye:	Category 2B										
GHS LABEL:	^		.4		Signal Word	1:	WHMIS CLASSIFIC	CATION:	CLASS B.	DIVISION 2	
		OR		X	Danger				,		
					-			0			
H225: Highly flammable liquid a	-	statements			P210: Keen and	vav from hoot/co	Precautionary arks/open flames/ho		-		
H225: Highly hammable liquid a H319: Causes serious eye irrita							ne/gas/mist/vapors/s		NO SHOKING		
H332: Harmful if inhaled						-	protective clothing/e		/face protection		
H335: May cause respiratory irr						et medical advic					
H336: May cause drowsiness o							ntilated place. Keep				
EUH019: May form explosive p		NEODIA				or contents/con	tainer in accordance	with local re	guialion		
SECTION 3 - COM	-05ITION/		CAS#	EINECS #		ACH	CON	ICENTRATI	ON		
					Pre-registration	on Number		by Weight	_		
Tetrahydrofuran (THF)			109-99-9	203-726-8	05-2116297			30 - 60			
Methyl Ethyl Ketone (MEK) Cyclohexanone			78-93-3 108-94-1	201-159-0 203-631-1	05-2116297			5 - 25 5 - 20			
All of the constituents of thi	s adhesive pro	duct are listed					ned by the US FF		exempt from t	hat listing.	
	subject to the i									40CFR372).	
* Indicates this chemical is # indicates that this chemic SECTION 4 - FIRS	subject to the al is found on	Proposition 65								10CFR3/2).	
# indicates that this chemic SECTION 4 - FIRS	subject to the r al is found on I FAID MEA S	Proposition 65	i's List of chem	icals known to	the State of C	California to ca	ause cancer or re			40CFR372).	
# indicates that this chemic SECTION 4 - FIRS Contact with eyes: Skin contact:	subject to the al is found on FAID MEAS Flush eyes im Remove cont	Proposition 65 SURES mediately with aminated cloth	i's List of chem n plenty of wate ning and shoes	icals known to er for 15 minut 5. Wash skin t	es and seek n horoughly with	California to ca nedical advice n soap and wa	ause cancer or re immediately. ater. If irritation de	evelops, se	toxicity. eek medical a	dvice.	
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WELD-ON® 714[™] Low VOC Cement for CPVC Plastic Pipe

Date Revised: DEC 2011 Supersedes: NOV 2010

SECTION 9 - PHYS	SICAL AND								
Appearance:		Orange or gra	ay, heavy syru	ipy liquid			Odor Throphold	0.99 ppm (Cyclobayanara)	
Odor: pH:		Ketone Not Applicable	۵				Odor Threshold:	0.88 ppm (Cyclohexanone)	
Melting/Freezing Po	int:			on first melting	component: TH	IF	Boiling Range:	66℃ (151 ℉) to 156℃ (313 ℉	-)
Boiling Point:				t boiling compo			Evaporation Rate:	> 1.0 (BUAC = 1)	/
Flash Point:		-20 °C (-4 °F) 1	FCC based on				Flammability:	Category 2	
Specific Gravity:		0.995 @23℃					Flammability Limits:	LEL: 1.1% based on Cyclohe	exanone
Solubility:					rtion separates	out.	N	UEL: 11.8% based on THF	
Partition Coefficient Auto-ignition Tempe		ater: 321 ℃ (610 °F	Not Available				Vapor Pressure: Vapor Density:	129 mm Hg @ 20℃ (68°F)ba >2 (Air = 1)	sed on THF
Decomposition Tempe		Not Applicable	,				Other Data: Viscosity:	Heavy bodied	
VOC Content:	peruture.			per SCAQMD F	Rule 1168, Test	Method 316	SA,VOC content is: \leq 490 g/l.		
SECTION 10 - STA					,				
Stability:			Stable						
Hazardous decomp	osition produ	cts:		nal use. When	forced to burn,	this product	gives off oxides of carbon, h	ydrogen chloride and smoke.	
Conditions to avoid	:				s, open flame a		-		
Incompatible Materi	als:		Oxidizers, str	ong acids and	bases, amines,	ammonia			
SECTION 11 - TO	KICOLOGIO	CAL INFOR	MATION						
Likely Routes of Exposu		Inhalation, Ey		ontact					
Acute symptoms and eff									
Inhalation:							siness, irritation of eyes and i		
Eye Contact:								nation on contact with the liquid	
Skin Contact:						ermatitis ma	y occur with prolonged conta	ict.	
Ingestion:	,	nausea, vomitin	0,	nd mental slugg	jishness.				
Chronic (long-term) effect	cts:	None known t LD50	to humans			LC ₅₀			
Toxicity: Tetrahydrofuran (THF)		LD50 Oral: 2842 mg	n/ka (rat)				hrs. 21,000 mg/m ³ (rat)		
Methyl Ethyl Ketone (ME	K)			mal: 6480 mg/ł			hrs. 23,500 mg/m ³ (rat)		
Cyclohexanone				mal: 948 mg/kg			hrs. 8,000 PPM (rat)		
-	T							Suparriatia Draduata	
Reproductive Effects Not Established		ogenicity stablished		genicity tablished	<u>Embryot</u> Not Esta		Sensitization to Product Not Established	Synergistic Products Not Established	
SECTION 12 - ECO									
Ecotoxicity:	None Knowr								
Mobility:			volatile organi	c compounds (VOC's) to the a	r takes plac	e, typically at a rate of < 490	g/l.	
Degradability:	Biodegradab		- 3		,			~	
Bioaccumulation:	Minimal to no								
SECTION 13 - WA	STE DISPO	OSAL CONS	SIDERATIC	ONS					
Follow local and national re									
SECTION 14 - TRA	•								
Proper Shipping Name		Adhesives							
Hazard Class:		3				EXCEPT	ION for Ground Shipping		
Secondary Risk:		None					er packaging, 30 kg gross we		
Identification Number:		UN 1133		Consumer Co	ommodity: Dep	ending on p	ackaging, these quantities m	ay qualify under DOT as "ORM	-D" .
Packing Group:		PG II Class 3 Flam	mable Liquid			т	DG INFORMATION		
Label Required: Marine Pollutant:		Class 3 Flam NO	паріе сіциій		TDG CLASS:	11	FLAMMABLE		
marino i vilutunt.					SHIPPING NA	ME:	ADHESIVES		
					UN NUMBER			II	
SECTION 15 - REC	GULATORY	Y INFORMA	TION						
Precautionary Label					Ingredient List	ings: USA	TSCA, Europe EINECS, Can	ada DSL, Australia	
Symbols:		F, Xi			•	AICS, Ko	orea ECL/TCCL, Japan MITI	(ENCS)	
Risk Phrases:	R11: Highly fla						ay cause skin dryness or cracki	ng	
		ting to eyes and r		em.	R67: Vapors m	ay cause dro	wsiness and dizziness		
Safety Phrases:		of the reach of c			S25: Avoid con				
		ntainer in a well-v						enty of water and seek medical adv	vice.
		vay from sources	or ignition - No	о smoking.	533: Take prec	autionary me	asures against static discharge	s.	
SECTION 16 - OTH		IMATION							
Specification Inform Department issuing			IPS Safety L	lealth & Enviro	nmental Affairs		All ingrediente are complian	t with the requirements of the E	uronean
E-mail address:			<ehsinfo@ip< td=""><td></td><td>mientai Analis</td><td></td><td>•</td><td>ion of Hazardous Substances).</td><td></td></ehsinfo@ip<>		mientai Analis		•	ion of Hazardous Substances).	
Training necessary:					d procedures or	ntained in r	roduct literature.		
Reissue date / reaso		*:	-		Standard Form		ייטעטטו ווופומנטופ.		
Intended Use of Pro				ent for CPVC F					
					- -				
This product is intended for	r use by skiller	d individuals at	their own risk	. The informatio	on contained he	rein is base	d on data considered accurat	e based on current state of	

	ON.	GHS SAF							d: DEC 2011
	WELD-ON®	P-75 Wet 'R D	ry™ Low	VOC Prin	ner for PV	C Plastic Pi		Supersedes:	
SECTION I - PROD	UCT AND COMPAN	IY IDENTIFICA	TION						
RODUCT NAME:	WELD-ON® P-75 Wet 'I	R Dry™ Low VOC I	Primer for F	VC Plastic F	ipe				
RODUCT USE:	Low VOC Primer for PV	C Plastic Pipe							
UPPLIER:			MANUFA	ACTURER:		n Main Street, Ca 9, Gardena, CA			
MERGENCY: Transporta	ation: CHEMTEL Tel. 800.2	255-3924, 813-248-	0585 (Intern	national)	Medical: Tel	. 800.451.8346	, 760.602.87	703 3E Com	pany (International)
	ARDS IDENTIFICAT	ION							
HS CLASSIFICATION:	ealth		Environ	mental			Ph	ysical	
acute Toxicity: Skin Irritation: Skin Sensitization:	Category 4 Category 3 NO	Acute Toxicity: Chronic Toxicity		None Knowr None Knowr		Flammable Liq		,	Category 2
	Category 2B	*	X	Signal Word Danger	:	WHMIS CLASSIF	ICATION:	CLASS B,	DIVISION 2
1225: Highly flammable liquid a 1319: Causes serious eye irrita 1332: Harmful if inhaled 1335: May cause respiratory irr 1336: May cause drowsiness o	ation ritation or dizziness		<u> </u>	P261: Avoid br P280: Wear pr P304+P340: IF P403+P233: S	eathing dust/fun otective gloves/ INHALED: Ren ore in a well ver	ntilated place. Kee	not surfaces – //spray /eye protectior n air and keep p container tig	No smoking n/face protecti at rest in a po htly closed	on ssition comfortable for breathir
UH019: May form explosive p					of contents/con	tainer in accordan	ce with local re	egulation	
etrahydrofuran (THF)	POSITION/INFORM	CAS# E	EINECS #				NCENTRATIC 6 by Weight 40 - 50	DN	
lethyl Ethyl Ketone (MEK) cetone		67-64-1	200-662-2	05-2116297 05-2116297	713-35-0000		15 - 40 35 - 40		
	is autresive product are is					inod by the LIC	EDA or oro	ovompt fro	m that licting
	subject to the reporting re cal is found on Proposition	equirements of Secti	ion 313 of th	e Emergency	Planning and	d Community Ri	ght-to-Know	/ Act of 198	m that listing. 6 (40CFR372).
Findicates that this chemic SECTION 4 - FIRS	cal is found on Proposition T AID MEASURES	equirements of Secti 65's List of chemica	ion 313 of th als known to	the Emergency the State of	Planning and California to c	d Community Ri ause cancer or	ght-to-Know	/ Act of 198	
indicates that this chemic SECTION 4 - FIRS Contact with eyes:	cal is found on Proposition T AID MEASURES Flush eyes immediately	equirements of Secti 65's List of chemica with plenty of water	ion 313 of th als known to for 15 minut	the Emergency the State of tes and seek	Planning and California to c medical advic	d Community Ri cause cancer or re immediately.	ght-to-Know reproductiv	v Act of 1980 e toxicity.	6 (40CFR372).
indicates that this chemic SECTION 4 - FIRS Contact with eyes: Skin contact: Inhalation:	cal is found on Proposition T AID MEASURES Flush eyes immediately Remove contaminated of Remove to fresh air. If b	equirements of Secti 65's List of chemica with plenty of water clothing and shoes. oreathing is stopped	ion 313 of th als known to for 15 minut Wash skin t , give artifici	the State of the State of tes and seek thoroughly wi al respiration	Planning and California to c medical advic h soap and w If breathing	d Community Ri cause cancer or re immediately. vater. If irritation is difficult, give o	ght-to-Know reproductive develops, s oxygen. See	v Act of 1986 e toxicity. seek medica ek medical a	6 (40CFR372). al advice. advice.
indicates that this chemic SECTION 4 - FIRS Contact with eyes: Skin contact: Inhalation: Ingestion:	cal is found on Proposition T AID MEASURES Flush eyes immediately Remove contaminated of Remove to fresh air. If b Rinse mouth with water.	equirements of Secti 65's List of chemics with plenty of water dothing and shoes. oreathing is stopped Give 1 or 2 glasses	ion 313 of th als known to for 15 minut Wash skin t , give artifici	the State of the State of tes and seek thoroughly wi al respiration	Planning and California to c medical advic h soap and w If breathing	d Community Ri cause cancer or re immediately. vater. If irritation is difficult, give o	ght-to-Know reproductive develops, s oxygen. See	v Act of 1986 e toxicity. seek medica ek medical a	6 (40CFR372). al advice. advice.
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indicates that this chemic ECTION 4 - FIRS Contact with eyes: Skin contact: Inhalation: Ingestion: ECTION 5 - FIRE Suitable Extinguishing	cal is found on Proposition T AID MEASURES Flush eyes immediately Remove contaminated of Remove to fresh air. If b Rinse mouth with water. FIGHTING MEASUF Media: Dry chemi	equirements of Secti 65's List of chemics with plenty of water dothing and shoes. oreathing is stopped Give 1 or 2 glasses	ion 313 of th als known to for 15 minut Wash skin t , give artifici s of water or	tes and seek thoroughly wi al respiration r milk to dilute	r Planning and California to c medical advic h soap and w If breathing . Do not indu	d Community Ri cause cancer or re immediately. vater. If irritation is difficult, give o	ght-to-Know reproductive develops, s oxygen. See	v Act of 1986 e toxicity. seek medica ek medical a	6 (40CFR372). al advice. advice.
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indicates that this chemic SECTION 4 - FIRS Contact with eyes: Skin contact: Inhalation: Ingestion: SECTION 5 - FIRE Suitable Extinguishin Exposure Hazards: Combustion Products: Protection for Firefight SECTION 6 - ACCI Personal precautions: Environmental Precauti Methods for Cleaning u Materials not to be used SECTION 7 - HANI Handling: Avoid breathin Keep away fr Do not eat, d Storage: Store in venti Keep away fr Follow all pre	cal is found on Proposition T AID MEASURES Flush eyes immediately Remove contaminated c Remove to fresh air. If th Rinse mouth with water. FIGHTING MEASUF Media: Dry chemin ng Media: Dry chemin ng Media: Water spra Inhalation Oxides of th	aquirements of Secti 65's List of chemica with plenty of water clothing and shoes. oreathing is stopped Give 1 or 2 glasses RES cal powder, carbon ay or stream. and dermal contact carbon and smoke ined breathing appa MEASURES y from heat, sparks ifficient ventilation, u intact with skin or ey oduct or liquids con- vith sand or other inin Aluminum or pla GE t with eyes, skin and only electrically grou ng. w 44 °C (110 °F) and compatible materia container label, proof TROL EXPOSI ACGIH TLV / S00 ppm 500 ppm eded. airborne concentral wear splash-proof of ate for the exposure skin as much as po gloves or solvent-re	ion 313 of th als known to for 15 minut Wash skin i s of vater or dioxide gas, dioxide gas, and open fla use explosio yes (see sec taminated w ert absorber astic contain d clothing. nded handli away from of ls: caustics, duct bulletin URE / PE ACGIH STEL 100 ppm 300 ppm 750 ppm tions below of chemical go ssible. Buty	e Emergency o the State of tes and seek thoroughly wi al respiration r milk to dilute face positive ame. n-proof exhan- tion 8). <i>i</i> th product fin th material. T ers direct sunligh ammonia, in s and solvent RSONAL 0SHA PEL 200 ppm 200 ppm 1000 ppm 1000 ppm	Planning and California to c medical advice h soap and w If breathing . Do not indu water fog. pressure airlin ast ventilation or entering s ransfer to a c can d ensure a proganic acids, cementing lit PROTECT OSHA STEL:	d Community Ri ause cancer or re immediately. vater. If irritations is difficult, give of ce vomiting. Se Health Flammability Reactivity PPE ne masks. equipment or w ewers, drains, s losable steel ver adequate ventila chlorinated cor erature. TON	ght-to-Know reproductiv develops, s pxygen. See bek medical HMIS 2 3 0 B ear suitable oil or open w ssel. ation/fume e npounds, st	Act of 1986 e toxicity. seek medical advice imm NFPA 2 3 0 respiratory vater course xhaust hood rong oxidize	6 (40CFR372).



WELD-ON® P-75 Wet 'R Dry™ Low VOC Primer for PVC Plastic Pipe

Date Revised: DEC 2011 Supersedes: OCT 2010

SECTION 9 - PHYS	ICAL AND			n HEG					
Appearance: Odor:		Aqua Blue, thi Ethereal	n liquid				Odor Threshold:	2-50 ppm (THF)	
pH:		Not Applicable				, c	Juor Threshold:	2-50 ppm (THP)	
Melting/Freezing Poin	nt•			on first melti	ing component: THF	F	Boiling Range:	56℃ (133℉) to 156℃ (313	°F)
Boiling Point:					ponent: Acetone		Evaporation Rate:	> 1.0 (BUAC = 1)	•)
Flash Point:		-20 ℃ (-4 °F) T					lammability:	Category 2	
Specific Gravity:		0.834 @23 ℃					lammability Limits:	LEL: 1.1% based on Cyclol	hexanon
Solubility:				ater. Resin	portion separates out.		· · · · · ·	UEL: 12.8% based on Acet	
Partition Coefficient n	n-octanol/wa		Not Available				/apor Pressure:	190 mm Hg @ 20 ℃ (68 °F)	
Auto-ignition Tempera	ature:	321 ℃ (610 °F) based on Tl	ΗF		V	/apor Density:	>2.0 (Air = 1)	
Decomposition Temp	erature:	Not Applicable)			C	Other Data: Viscosity:	Water-thin	
VOC Content:		When applied	as directed,	per SCAQMI	D Rule 1168, Test Met	thod 316/	A,VOC content is: < 550 g	g/l.	
SECTION 10 - STAE	BILITY AN		/ITY						
Stability:			Stable						
Hazardous decompos	sition produc	cts:	None in norm	nal use. Whe	en forced to burn, this	product of	gives off oxides of carbon	and smoke.	
Conditions to avoid:					arks, open flame and c		-		
Incompatible Material	ls:				nd bases, amines, amr	-			
SECTION 11 - TOXI			-	J					
ikely Routes of Exposure		Inhalation, Eye		ontact					
Acute symptoms and effect		initialation, Ey		Jindot					
• •		exposure may r	esult in naus	ea dizziness	headache Can cau	se drows	iness, irritation of eyes ar	nd nasal passages	
								immation on contact with the	liquid
•							occur with prolonged co		iquiu.
	•	ausea, vomiting		•		annay	v occur with proionged co	inact.	
Chronic (long-term) effects		None known t		io mental siu	993111033.				
Foxicity:	.5.	LD50	0 Humans		17	C50			
•							01 000		
Tetrahydrofuran (THF)		Oral: 2842 mg					rs. 21,000 mg/m ³ (rat)		
Methyl Ethyl Ketone (MEK))	Oral: 2737 mg		mal: 6480 m			rs. 23,500 mg/m ³ (rat)		
Acetone		Oral: 5800 mg	ı/kg (rat)		Inhal	lation 50,	100 mg/m ³ (rat)		
Reproductive Effects	Terato	genicity	Mutad	enicity	Embryotoxici	itv S	Sensitization to Product	Synergistic Products	
neproductive Ellects	TCTULO		matay	oniony					
Not Established SECTION 12 - ECO Ecotoxicity: Mobility:	Not Es LOGICAL None Known	tablished INFORMAT e, emission of v	Not Es	tablished	Not Establishe	ed	Not Established , typically at a rate of ≤ 5	Not Established	
Not Established SECTION 12 - ECOI Ecotoxicity: Mobility: Degradability: Bioaccumulation:	Not Es LOGICAL None Known In normal use Biodegradab Minimal to no	tablished INFORMAT e, emission of v le one.	Not Es FION rolatile organi	tablished	Not Establishe	ed	Not Established	Not Established	
Not Established SECTION 12 - ECOI Ecotoxicity: Mobility: Degradability: Bioaccumulation: SECTION 13 - WAS	Not Es LOGICAL None Known In normal use Biodegradab Minimal to no STE DISPC	tablished INFORMAT e, emission of v le one. DSAL CONS	Not Es TION rolatile organi	tablished	Not Establishe	ed	Not Established	Not Established	
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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.

WELD×	ON	°								d: DEC 2011	
	WE	LD-ON® P	-70™ Low	VOC Prim	er for PVC	and CPV	C Plastic Pi	ipe		OCT 2010	
SECTION I - PRODU	JCT AND	COMPANY	IDENTIFIC	ATION							
PRODUCT NAME:			OC Primer for		PVC Plastic P	ipe					
PRODUCT USE:	Low VOC Pri	imer for PVC a	and CPVC Plas								
SUPPLIER:				MANUF	ACTURER:		n Main Street, C 9, Gardena, CA				
EMERGENCY: Transportat	ion [.] CHEMTE	-I Tel 800 255	5-3924 813-24	8-0585 (Inter	national)		90-3300 l. 800.451.8346	760 602	8703 3E Con	noany (Interna	tional)
SECTION 2 - HAZA				0 0000 (inter	nationaly	mealean. re		, 700.002.	0700 02 001		
GHS CLASSIFICATION:											
	alth				nmental				Physical		
Acute Toxicity: Skin Irritation:	Category 4 Category 3		Acute Toxicity Chronic Toxic		None Knowr None Knowr		Flammable Lic	dniq		Category 2	
Skin Sensitization:	NO					•					
Eye:	Category 2B										
GHS LABEL:	$\langle \rangle$	OR	*	×	Signal Word Danger	1:	WHMIS CLASSI	FICATION:	CLASS B,	DIVISION 2	
	Hazard S	Statements					Precautionar	y Statemer	<u>nts</u>		
H225: Highly flammable liquid ar						•	arks/open flames/		– No smoking		
H319: Causes serious eye irritat H332: Harmful if inhaled	ion						ne/gas/mist/vapors protective clothing		ion/face protoct	ion	
H332: Harmful If Innaled H335: May cause respiratory irri	tation						protective clothing nove victim to fres				ole for breathin
H336: May cause drowsiness or	dizziness				P403+P233: S	tore in a well ve	ntilated place. Kee	p container t	tightly closed		
EUH019: May form explosive pe						of contents/con	tainer in accordan	ice with local	l regulation		_
SECTION 3 - COMP	OSITION	INFORMA	TION ON IN CAS#	IGREDIEN EINECS #		АСН	00	NCENTRAT	ION		
					Pre-registration	on Number		% by Weigh			
Tetrahydrofuran (THF) Methyl Ethyl Ketone (MEK)			109-99-9 78-93-3	203-726-8 201-159-0	05-2116297			45 - 59 19 - 29			
Cyclohexanone			108-94-1	203-631-1				5 - 15			
Acetone			100-94-1								
All of the constituents of this Indicates this chemical is a # indicates that this chemica SECTION 4 - FIRST Contact with eyes:	subject to the al is found on AID MEA	reporting request Proposition 65	67-64-1 d on the TSCA lirements of Se 5's List of chem	200-662-2 inventory of o ection 313 of t nicals known t	he Emergency o the State of	713-35-0000 tances mainta y Planning an California to o	d Community R	5 - 20 EPA, or a light-to-Kno	ow Act of 198).
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WELD-ON® P-70[™] Low VOC Primer for PVC and CPVC Plastic Pipe

Date Revised: DEC 2011 Supersedes: OCT 2010

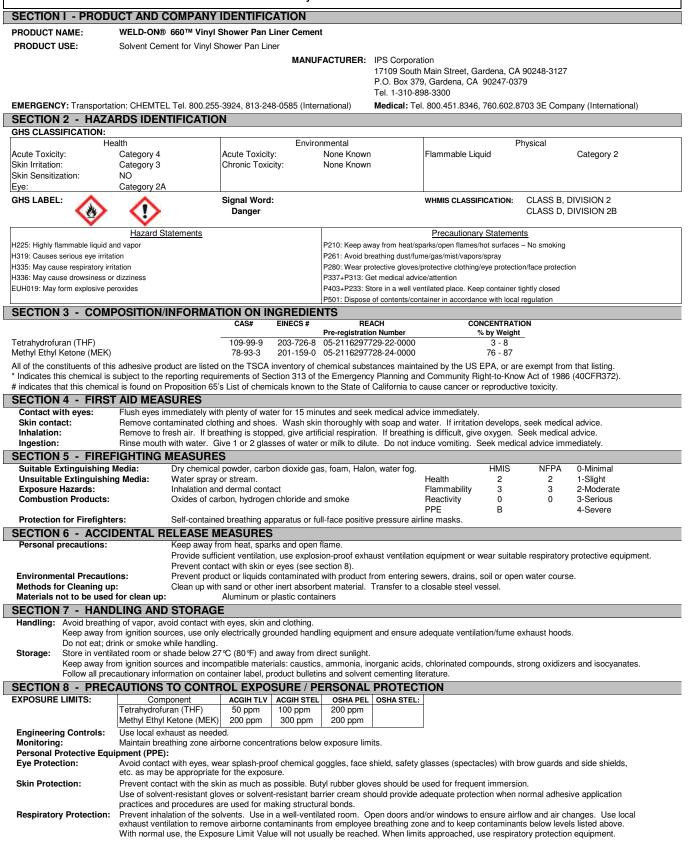
SECTION 9 - PHYS						
Appearance:		Clear or purple, t	hin liquid		Odar Three balds	0.89 ppm (Cyclobergerere)
Odor: pH:		thereal Iot Applicable			Odor Threshold:	0.88 ppm (Cyclohexanone)
Melting/Freezing Poi			℃F) Based on first melting	a component: THE	Boiling Range:	56℃ (133℉) to 156℃ (313℉)
Boiling Point:			sed on first boiling comp		Evaporation Rate:	> 1.0 (BUAC = 1)
Flash Point:		· · · ·	C based on Acetone		Flammability:	Category 2
Specific Gravity:		.858 @23℃ (7			Flammability Limits:	LEL: 1.1% based on Cyclohexanor
Solubility:			oluble in water. Resin po	ortion separates out.	· ······, -·····	UEL: 12.8% based on Acetone
Partition Coefficient			ot Available		Vapor Pressure:	190 mm Hg @ 20 ℃ (68 °F) Acetone
Auto-ignition Temper	rature: 3	21℃ (610°F) b	ased on THF		Vapor Density:	>2.0 (Air = 1)
Decomposition Temp	perature: N	lot Applicable			Other Data: Viscosity:	Water-thin
VOC Content:	v	Vhen applied as	directed, per SCAQMD	Rule 1168, Test Method 3	16A,VOC content is: < 550	g/l.
SECTION 10 - STA	BILITY AND	REACTIVI	ГҮ			
Stability:			able			
Hazardous decompo	sition products	s: No	one in normal use. When	n forced to burn, this produ	uct gives off oxides of carbo	n and smoke.
Conditions to avoid:	•			rks, open flame and other		
Incompatible Materia	als:			bases, amines, ammonia	-	
SECTION 11 - TOX			•		•	
ikely Routes of Exposur			nd Skin Contact			
cute symptoms and effe		, ,				
Inhalation:		posure mav res	ult in nausea, dizziness	headache. Can cause dro	owsiness, irritation of eyes a	nd nasal passages.
Eye Contact:						ammation on contact with the liquid.
Skin Contact:					may occur with prolonged co	
Ingestion:			diarrhea and mental slug			
Chronic (long-term) effect		lone known to h		-		
Toxicity:		LD50		LC50		
Tetrahydrofuran (THF)	C) Dral: 2842 mg/kg	g (rat)	Inhalation	3 hrs. 21,000 mg/m ³ (rat)	
Methyl Ethyl Ketone (MEK			g (rat), Dermal: 6480 mg/		8 hrs. 23,500 mg/m ³ (rat)	
Cyclohexanone	,		g (rat), Dermal: 948 mg/k	0 ()	4 hrs. 8,000 PPM (rat)	
Acetone		Dral: 5800 mg/kg			50,100 mg/m ³ (rat)	
Reproductive Effects	Teratoge	5.	- · · · ·		, ,	
		enicity	Mutagenicity	Embryotoxicity	Sensitization to Produce	t Syneraistic Products
Not Established	Not Estat		Mutagenicity Not Established	Embryotoxicity Not Established	Sensitization to Product Not Established	t Synergistic Products Not Established
Not Established	Not Estab	blished	Not Established			
Not Established	Not Estab	blished	Not Established			
Not Established SECTION 12 - ECO	Not Estat	NFORMATIC	Not Established	Not Established		Not Established
Not Established SECTION 12 - ECO Ecotoxicity:	Not Estat	NFORMATIC	Not Established	Not Established	Not Established	Not Established
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Not Established SECTION 12 - ECO Ecotoxicity: Mobility: Degradability: Bioaccumulation:	Not Estat DLOGICAL II None Known In normal use, Biodegradable Minimal to none	Dished NFORMATIC emission of vola e.	Not Established	Not Established	Not Established	Not Established
Not Established SECTION 12 - ECO Ecotoxicity: Mobility: Degradability: Bioaccumulation: SECTION 13 - WAS	Not Estat DLOGICAL IN None Known In normal use, Biodegradable Minimal to none STE DISPOS	Dished NFORMATIC emission of vola e. SAL CONSIE	Not Established DN atile organic compounds DERATIONS	Not Established	Not Established	Not Established
Not Established SECTION 12 - ECO Ecotoxicity: Mobility: Degradability: Bioaccumulation: SECTION 13 - WAS Follow local and national re	Not Estat DLOGICAL II None Known In normal use, Biodegradable Minimal to none STE DISPOS egulations. Cons	Dished NFORMATIC emission of vola e. SAL CONSIE sult disposal exp	Not Established DN atile organic compounds DERATIONS pert.	Not Established	Not Established	Not Established
Not Established SECTION 12 - ECO Ecotoxicity: Mobility: Degradability: Bioaccumulation: SECTION 13 - WAS Follow local and national re SECTION 14 - TRAN	Not Estat DLOGICAL II None Known In normal use, Biodegradable Minimal to none STE DISPOS egulations. Cons NSPORT INF	Dished NFORMATIC emission of vola e. SAL CONSIE sult disposal exp FORMATION	Not Established DN atile organic compounds DERATIONS pert. N	VOC's) to the air takes pl	Not Established	Not Established
Not Established SECTION 12 - ECO Ecotoxicity: Mobility: Degradability: Bioaccumulation: SECTION 13 - WAS Follow local and national re SECTION 14 - TRAI Proper Shipping Name:	Not Estat DLOGICAL II None Known In normal use, Biodegradable Minimal to none STE DISPOS egulations. Cons NSPORT INI F	Dished NFORMATIC emission of vola e. SAL CONSIE Sult disposal exp FORMATION Tammable Liqui	Not Established DN atile organic compounds DERATIONS pert.	VOC's) to the air takes pl	Not Established	Not Established
Not Established SECTION 12 - ECO Ecotoxicity: Mobility: Degradability: Bioaccumulation: SECTION 13 - WAS Follow local and national re SECTION 14 - TRAN Proper Shipping Name: Hazard Class:	Not Estat DLOGICAL II None Known In normal use, Biodegradable Minimal to none STE DISPOS egulations. Cons NSPORT INI 5 3	Dished NFORMATIC emission of vola e. SAL CONSIE sult disposal exp FORMATIOI flammable Liqui	Not Established DN atile organic compounds DERATIONS pert. N	VOC's) to the air takes pl	Not Established ace, typically at a rate of \leq 5	Not Established
Not Established SECTION 12 - ECO Ecotoxicity: Mobility: Degradability: Bioaccumulation: SECTION 13 - WAS Follow local and national re SECTION 14 - TRAN Proper Shipping Name: Hazard Class: Secondary Risk:	Not Estat DLOGICAL II None Known In normal use, Biodegradable Minimal to none STE DISPOS gulations. Cons NSPORT INI 5 3 3 N	olished NFORMATIC emission of vola e. SAL CONSIE sult disposal exp FORMATION Flammable Liqui Jone	Not Established DN atile organic compounds DERATIONS Dert. N d, n.o.s. (Acetone, Tetral	VOC's) to the air takes pl	Not Established ace, typically at a rate of <u><</u> 5 CEPTION for Ground Shi	Not Established
Not Established SECTION 12 - ECO Ecotoxicity: Mobility: Degradability: Bioaccumulation: SECTION 13 - WAS Follow local and national re SECTION 14 - TRAN Proper Shipping Name: Hazard Class:	Not Estat PLOGICAL II None Known In normal use, Biodegradable Minimal to none STE DISPOS gulations. Cons NSPORT INI F 3 N U	Dished NFORMATIC emission of vola e. SAL CONSIE sult disposal exp FORMATIOI flammable Liqui	Not Established DN atile organic compounds DERATIONS pert. N d, n.o.s. (Acetone, Tetral DOT Limited	Not Established (VOC's) to the air takes pl hydrofuran) E3	Not Established ace, typically at a rate of ≤ 5 CEPTION for Ground Shi ner packaging, 30 kg gross	Not Established
Not Established SECTION 12 - ECO Ecotoxicity: Mobility: Degradability: Bioaccumulation: SECTION 13 - WAS Follow local and national re SECTION 14 - TRAN Proper Shipping Name: Hazard Class: Secondary Risk: Identification Number:	Not Estat DLOGICAL II None Known In normal use, Biodegradable Minimal to none STE DISPOS gulations. Cons NSPORT INI S N N U P	Dished NFORMATIC emission of vola e. SAL CONSIE sult disposal exp FORMATION ilammable Liqui ione IN 1993	Not Established DN atile organic compounds DERATIONS pert. N d, n.o.s. (Acetone, Tetral DOT Limited Consumer C	Not Established (VOC's) to the air takes pl hydrofuran) E3	Not Established ace, typically at a rate of ≤ 5 CEPTION for Ground Shi ner packaging, 30 kg gross	Not Established
Not Established SECTION 12 - ECO Ecotoxicity: Mobility: Degradability: Bioaccumulation: SECTION 13 - WAS collow local and national re SECTION 14 - TRAI Proper Shipping Name: Hazard Class: Secondary Risk: Identification Number: Packing Group:	Not Estat DLOGICAL II None Known In normal use, Biodegradable Minimal to none STE DISPOS sigulations. Cons NSPORT INI S N N C C	Dished NFORMATIC emission of vola e. SAL CONSIE Sult disposal exp FORMATION Clammable Liqui Jone JN 1993 2G II	Not Established DN atile organic compounds DERATIONS pert. N d, n.o.s. (Acetone, Tetral DOT Limited Consumer C	Not Established (VOC's) to the air takes pl hydrofuran) E3	Not Established ace, typically at a rate of ≤ 5 CEPTION for Ground Shi ner packaging, 30 kg gross	Not Established
Not Established SECTION 12 - ECO Ecotoxicity: Mobility: Degradability: Bioaccumulation: SECTION 13 - WAS Follow local and national re SECTION 14 - TRAI Proper Shipping Name: Hazard Class: Secondary Risk: Identification Number: Packing Group: Label Required:	Not Estat DLOGICAL II None Known In normal use, Biodegradable Minimal to none STE DISPOS sigulations. Cons NSPORT INI S N N C C	Dished NFORMATIC emission of vola e. SAL CONSIE Sult disposal exp FORMATION Tammable Liqui Jone Jone JN 1993 'G II Class 3 Flammal	Not Established DN atile organic compounds DERATIONS pert. N d, n.o.s. (Acetone, Tetral DOT Limited Consumer C	Not Established (VOC's) to the air takes pl hydrofuran) E3	Not Established ace, typically at a rate of ≤ 5 CCEPTION for Ground Shi ner packaging, 30 kg gross n packaging, these quantitie	Not Established
Not Established SECTION 12 - ECO Ecotoxicity: Mobility: Degradability: Bioaccumulation: SECTION 13 - WAS Follow local and national re SECTION 14 - TRAI Proper Shipping Name: Hazard Class: Secondary Risk: Identification Number: Packing Group: Label Required:	Not Estat DLOGICAL II None Known In normal use, Biodegradable Minimal to none STE DISPOS egulations. Cons NSPORT INI ST ST ST ST ST ST ST ST ST ST	Dished NFORMATIC emission of vola e. SAL CONSIE Sult disposal exp FORMATION Tammable Liqui Jone Jone JN 1993 'G II Class 3 Flammal	Not Established DN atile organic compounds DERATIONS pert. N d, n.o.s. (Acetone, Tetral DOT Limited Consumer C	Not Established (VOC's) to the air takes pl hydrofuran) E: Quantity: Up to 1L per in commodity: Depending or	Not Established ace, typically at a rate of ≤ 5 CCEPTION for Ground Shi ner packaging, 30 kg gross n packaging, these quantitie	Not Established
Not Established SECTION 12 - ECO Ecotoxicity: Mobility: Degradability: Bioaccumulation: SECTION 13 - WAS Collow local and national re SECTION 14 - TRAI Proper Shipping Name: Hazard Class: Secondary Risk: Identification Number: Packing Group: Label Required:	Not Estat PLOGICAL II None Known In normal use, Biodegradable Minimal to none STE DISPOS gulations. Cons NSPORT INI SPORT INI C N N T S S S S S S S S S S S S S	Dished NFORMATIC emission of vola e. SAL CONSIL SAL CONSIL SAL CONSIL SAL CONSIL SAL CONSIL SAL CONSIL SAL CONSIL SAL CONSIL STATUTOR CONSTRUCTION CONSTRUCT	Not Established DN atile organic compounds DERATIONS Dert. N d, n.o.s. (Acetone, Tetral DOT Limited Consumer C ble Liquid E:	Not Established (VOC's) to the air takes pl (VOC's) to the air takes pl hydrofuran) E3 Quantity: Up to 1L per in commodity: Depending or TDG INFORM. FLAMMABLE LIQUID 3 Flammable Liquid, n.o.s.	Not Established ace, typically at a rate of ≤ 5 CCEPTION for Ground Shi ner packaging, 30 kg gross n packaging, these quantitie	Not Established
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Not Established SECTION 12 - ECO Ecotoxicity: Mobility: Degradability: Bioaccumulation: SECTION 13 - WAS Follow local and national re SECTION 14 - TRAN Proper Shipping Name: Hazard Class: Secondary Risk: Identification Number: Packing Group: Label Required: Marine Pollutant: SECTION 15 - REG Precautionary Label I Symbols:	Not Estat DLOGICAL II None Known In normal use, Biodegradable Minimal to none STE DISPOS SUBJORT INF SUBJORT INF	Dished NFORMATIC emission of vola e. SAL CONSIE Sult disposal exp FORMATION Tammable Liqui Jone JN 1993 'G II Class 3 Flammable Class 3 Flammable DG CLASS: SHIPPING NAM IN NUMBER/PA INFORMATI tighly Flammable , Xi	Not Established DN atile organic compounds DERATIONS Dert. N d, n.o.s. (Acetone, Tetral DOT Limited Consumer C ble Liquid E: ACKING GROUP: ON	Not Established (VOC's) to the air takes pl (VOC's) to the air takes pl hydrofuran) Commodity: Up to 1L per in commodity: Depending or TDG INFORM, FLAMMABLE LIQUID 3 Flammable Liquid, n.o.s. UN 1993, PG II Ingredient Listings: USA	Not Established ace, typically at a rate of ≤ 5 (CEPTION for Ground Shi ner packaging, 30 kg gross a packaging, these quantitie ATION (Acetone, Tetrahydrofuran)	Not Established
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Not Established SECTION 12 - ECO Ecotoxicity: Mobility: Degradability: Bioaccumulation: SECTION 13 - WAS Follow local and national re SECTION 14 - TRAN Proper Shipping Name: Hazard Class: Secondary Risk: Identification Number: Packing Group: Label Required: Marine Pollutant: SECTION 15 - REG Precautionary Label I Symbols: Risk Phrases: Safety Phrases: SECTION 16 - OTH Specification Informa Department issuing of	Not Estat PLOGICAL II None Known In normal use, Biodegradable Minimal to nore STE DISPOS gulations. Cons NSPORT INI F SULATORY I Information: H F R11: Highly flam R20: Harmful by R36/37: Irritating S9: Keep contair S16: Keep away S25: Avoid contair S16: Keep away S17: Keep away	A solution of the second secon	Not Established DN atile organic compounds atile organic compounds DERATIONS pert. N d, n.o.s. (Acetone, Tetral DOT Limited Consumer C ble Liquid E: ACKING GROUP: ON le, Irritant biratory system. ilated place. ignition - No smoking. S, Safety Health & Enviro: HSinfo@ipscorp.com>	Not Established (VOC'S) to the air takes pl hydrofuran) EXAMPAGE FLAMMABLE LIQUID 3 FLAMMABLE LIQUID 3 FLAMMABLE LIQUID 3 Flammable Liquid, n.o.s. UN 1993, PG II Ingredient Listings: USA AICS, F R66: Repea R67: Vapors S26: In case of contact witt S33: Take precautionary m S46: If swallowed, seek me	Not Established ace, typically at a rate of ≤ 5 Acception for Ground Shi ner packaging, 30 kg gross a packaging, these quantitie ATION (Acetone, Tetrahydrofuran) TSCA, Europe EINECS, C. Korea ECL/TCCL, Japan Mi ted exposure may cause skin - s may cause drowsiness and c n eyes, rinse immediately with teasures against static dischar dical advise immediately and All ingredients are compli Directive on RoHS (Restr	Not Established
Not Established SECTION 12 - ECO Ecotoxicity: Mobility: Degradability: Bioaccumulation: SECTION 13 - WAS Follow local and national re SECTION 14 - TRAN Proper Shipping Name: Hazard Class: Secondary Risk: Identification Number: Packing Group: Label Required: Marine Pollutant: SECTION 15 - REG Precautionary Label I Symbols: Risk Phrases: Safety Phrases: Secont 16 - OTH Specification Informa Department issuing of E-mail address:	Not Estat PLOGICAL II None Known In normal use, Biodegradable Minimal to none STE DISPOS gulations. Cons NSPORT INI SPORT I	Dished NFORMATIC emission of vola e. AL CONSIL sult disposal exp FORMATIOI Tammable Liqui fone IN 1993 CG II DG CLASS: CHIPPING NAM IN NUMBER/PA IN NUMBER/PA IN NUMBER/PA IN NUMBER/PA IN NUMBER/PA Inhalation. I to eyes and resp ner in a well-vent from sources of act with eyes. IATION IP <e< td=""><td>Not Established DN atile organic compounds atile organic compounds DERATIONS pert. N d, n.o.s. (Acetone, Tetral DOT Limited Consumer C ble Liquid E: ACKING GROUP: ON le, Irritant biratory system. ilated place. ignition - No smoking. S, Safety Health & Enviro: HSinfo@ipscorp.com></td><td>Not Established (VOC's) to the air takes pl (VOC's) to the air takes pl hydrofuran) COUNT (Instanting) C</td><td>Not Established ace, typically at a rate of ≤ 5 Acception for Ground Shi ner packaging, 30 kg gross a packaging, these quantitie ATION (Acetone, Tetrahydrofuran) TSCA, Europe EINECS, C. Korea ECL/TCCL, Japan Mi ted exposure may cause skin - s may cause drowsiness and c n eyes, rinse immediately with teasures against static dischar dical advise immediately and All ingredients are compli Directive on RoHS (Restr</td><td>Not Established</td></e<>	Not Established DN atile organic compounds atile organic compounds DERATIONS pert. N d, n.o.s. (Acetone, Tetral DOT Limited Consumer C ble Liquid E: ACKING GROUP: ON le, Irritant biratory system. ilated place. ignition - No smoking. S, Safety Health & Enviro: HSinfo@ipscorp.com>	Not Established (VOC's) to the air takes pl (VOC's) to the air takes pl hydrofuran) COUNT (Instanting) C	Not Established ace, typically at a rate of ≤ 5 Acception for Ground Shi ner packaging, 30 kg gross a packaging, these quantitie ATION (Acetone, Tetrahydrofuran) TSCA, Europe EINECS, C. Korea ECL/TCCL, Japan Mi ted exposure may cause skin - s may cause drowsiness and c n eyes, rinse immediately with teasures against static dischar dical advise immediately and All ingredients are compli Directive on RoHS (Restr	Not Established

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.



WELD-ON® 660[™] Vinyl Shower Pan Liner Cement

Date Revised: JUL 2012 Supersedes: DEC 2011





WELD-ON® 660[™] Vinyl Shower Pan Liner Cement

Date Revised: JUL 2012 Supersedes: DEC 2011

SECTION 9 - PHYS	Clear	medium syrupy liquio	d						
Appearance: Odor:	Keton		u			Odor Threshold:	1 ppm (MEK)		
pH:	Not A	pplicable					,		
Melting/Freezing Poi		-108 °C (-162 °F) Based on first melting component: THF			Boiling Range:	66 ℃ (151 °F) to 80 ℃ (176 °F)			
Boiling Point:		66 ℃ (151 ℉) Based on first boiling component: THF -20 ℃ (4 ℉) TCC based on THF 0.848 @23 ℃ (73 ℉)				Evaporation Rate:	> 1.0 (BUAC = 1)		
Flash Point: Specific Gravity:						Flammability: Flammability Limits:	Category 2 LEL: 2.0 base	od on THE	
Solubility:		mt portion soluble in w	vater Resin	nortion senarates	out	Flammability Limits:	UEL: 2.0 bas		
Partition Coefficient		Not Available		portion separates	out.	Vapor Pressure:		⊉ 20 ℃ (68 °F) TH	F
Auto-ignition Temper		(609.8 °F) based on			Vapor Density:	>2.0 (Air = 1)			
Decomposition Temp	perature: Not A	pplicable				Other Data: Viscosity:	Medium bodie	ed	
VOC Content:			per SCAQMI	D Rule 1168, Test	Method 3	16A,VOC Max. is: ≤ 600	g/l.		
SECTION 10 - STAI	BILITY AND REA	ACTIVITY							
Stability:		Stable							
Hazardous decompo						t gives off oxides of carb	on, hydrogen chlo	oride and smoke.	
Conditions to avoid:				irks, open flame a		inition sources.			
Incompatible Materia			rong acids an	d bases, amines,	ammonia				
ECTION 11 - TOX									
kely Routes of Exposure		tion, Eye and Skin Co	ontact						
cute symptoms and effe Inhalation:			aa dizzinaaa	hoadacha Car	cause dra	veinces irritation of aver	and nasal passa	0.05	
Eye Contact:						vsiness, irritation of eyes corneal or conjunctival in			uid
Skin Contact:						nay occur with prolonged		smact with the liqu	
Ingestion:		vomiting, diarrhea an	0		-ormatitio I	nay occur with proforiged	contact.		
Chronic (long-term) effect		known to humans	io mentai siuț	99:3111:033.					
Foxicity:		D ₅₀			LC ₅₀				
Tetrahydrofuran (THF)		2842 mg/kg (rat)		In		hrs. 21,000 mg/m ³ (rat)			
Methyl Ethyl Ketone (MEK		2737 mg/kg (rat), Dei	rmal: 6480 m			hrs. 23,500 mg/m ³ (rat)			
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Reproductive Effects	Teratogenicit	v Mutao	enicity	Embryoto	xicity	Sensitization to Produ	ct Synergiet	ic Products	
Reproductive Effects Not Established	Teratogenicit Not Establishe		<u>enicity</u> ablished	Embryotox Not Establi		Sensitization to Produ Not Established		ic Products tablished	
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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.

Date Revised: JUN 2013 Supersedes: JAN 2012

XIRTEC 7 CLR Low VOC Primer for PVC and CPVC Plastic Pipe

RODUCT NAM	E:	XIRTEC 7 CLR	Low VOC F	Primer for PVC	C and CPVC P	lastic Pipe						
RODUCT USE:		Low VOC Prime	er for PVC a	nd CPVC Plast	tic Pipe							
UPPLIER:		IPEX Inc.			MANUF	ACTURER:	IPS Corporat	tion				
-		807 Pharmacy	Avenue					Main Street, Ga	rdena, CA	90248-3127		
		Scarborough, C		3K2, CAN				9, Gardena, CA				
		-					Tel. 1-310-89	98-3300				
MERGENCY: T	ransportat	ion: CHEMTEL	Tel. 800.255	-3924, 813-248	3-0585 (Interna	tional)	Medical: CH	EMTEL Tel. 800	.255-3924,	813-248-058	5 (International)	
SECTION 2	- HAZA	RDS IDENT	IFICATIO	N								
HS CLASSIFIC	-			1				I				
eute Tevicitu	He	alth		Acuto Tovicit		nmental None Knowr		Floremobile Lieu		hysical	Catagory	
cute Toxicity: kin Irritation:		Category 4 Category 3		Acute Toxicit Chronic Toxic	•	None Knowr		Flammable Liqu	JIU		Category 2	
kin Sensitization	ı.	NO		Official Toxic	ony.	None Known						
ye:		Category 2B										
HS LABEL:	$\mathbf{\wedge}$	~		.		Signal Word	:	WHMIS CLASSIF	ICATION:	CLASS B. [DIVISION 2	
			OR		X	Danger				,		
	$\mathbf{\nabla}$	V										
		Hazard Sta	atements					Precautionary				
225: Highly flamma								arks/open flames/h		- No smoking		
319: Causes seriou 332: Harmful if inh	-	ion					-	ne/gas/mist/vapors/ protective clothing/e		/face protection	-	
335: May cause re		tation						nove victim to fresh				or breathing
336: May cause dr								ntilated place. Keep				g
UH019: May form of						P501: Dispose	of contents/cont	ainer in accordance	e with local re	egulation		
ECTION 3	- COMF	POSITION/IN	FORMA									
				CAS#	EINECS #	RE Pre-registration	ACH on Number		CENTRATI			
etrahydrofuran (THF)			109-99-9	203-726-8	05-21162977		/	45 - 59	_		
lethyl Ethyl Keto				78-93-3	201-159-0	05-21162977	28-24-0000		19 - 29			
cetone				67-64-1		05-21162977			5 - 20			
Syclohexanone				108-94-1		05-21162977			5 - 15			
								ed by the US EP				
								ommunity Right- se cancer or rep			CFR372).	
			sposition 65	S LIST OF CHEITIN	Cals KIIUWII LU							
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IPEX

GHS SAFETY DATA SHEET

XIRTEC 7 CLR Low VOC Primer for PVC and CPVC Plastic Pipe

Date Revised: JUN 2013 Supersedes: JAN 2012

SECTION 9 - PHYS					
Appearance:	Clear, thin				
Odor:	Ethereal	indraw		Odor Threshold:	0.88 ppm (Cyclohexanone)
pH:	Not Applica	able			
Melting/Freezing Poir		163.3°F) Based on first melting	component: THF	Boiling Range:	56°C (133°F) to 156°C (313°F)
Boiling Point:		F) Based on first boiling compo		Evaporation Rate:	> 1.0 (BUAC = 1)
Flash Point:) TCC based on Acetone		Flammability:	Category 2
Specific Gravity:	0.858 @23			Flammability Limits:	LEL: 1.1% based on Cyclohexanone
Solubility:		tion soluble in water. Resin po	ortion separates out.	2	UEL: 12.8% based on Acetone
Partition Coefficient		Not Available		Vapor Pressure:	190 mm Hg @ 20°C (68°F) Acetone
Auto-ignition Temper	rature: 321°C (610	°F) based on THF		Vapor Density:	>2.0 (Air = 1)
Decomposition Temp	perature: Not Applica	able		Other Data: Viscosity:	Water-thin
VOC Content:		ied as directed, per SCAQMD	Rule 1168, Test Method 316	A,VOC content is: ≤ 550 g/l.	
SECTION 10 - STA	BILITY AND REACT				
Stability:		Stable			
Hazardous decompos	sition products:		forced to burn this product	gives off oxides of carbon ar	nd smoke
Conditions to avoid:			ks, open flame and other igr		
Incompatible Materia	le ·	Oxidizers, strong acids and			
			bases, amines, aminonia		
	ICOLOGICAL INFO				
ikely Routes of Exposure		Eye and Skin Contact			
cute symptoms and effe			andanha Car	incon instation -f	
Inhalation:		y result in nausea, dizziness, h			
Eye Contact:					nation on contact with the liquid.
Skin Contact:		e natural skin oils resulting in s		occur with prolonged conta	ст.
Ingestion:	•	ting, diarrhea and mental slugg	lisnness.		
Chronic (long-term) effect		n to humans			
Toxicity:	LD ₅₀		LC ₅₀		
Tetrahydrofuran (THF)	Oral: 2842			hrs. 21,000 mg/m ³ (rat)	
Methyl Ethyl Ketone (MEK		mg/kg (rat), Dermal: 6480 mg/l		hrs. 23,500 mg/m ³ (rat)	
Cyclohexanone		mg/kg (rat), Dermal: 948 mg/kg		hrs. 8,000 PPM (rat)	
Acetone	Oral: 5800	ma (ka (kat)	Inhalation F	0,100 mg/m ³ (rat)	
Acetone	Orai. 5600	mg/kg (rat)	Innaiation 5	o, roo mg/m (rat)	
Reproductive Effects	Teratogenicity	Mutagenicity	Embryotoxicity	Sensitization to Product	Synergistic Products
					Synergistic Products Not Established
Reproductive Effects Not Established	Teratogenicity Not Established	Mutagenicity Not Established	Embryotoxicity	Sensitization to Product	
Reproductive Effects Not Established SECTION 12 - ECO	Teratogenicity Not Established	Mutagenicity Not Established	Embryotoxicity	Sensitization to Product	
Reproductive Effects Not Established SECTION 12 - ECO Ecotoxicity:	Teratogenicity Not Established	Mutagenicity Not Established	Embryotoxicity Not Established	Sensitization to Product Not Established	Not Established
Reproductive Effects Not Established SECTION 12 - ECO Ecotoxicity: Mobility:	Teratogenicity Not Established DLOGICAL INFORM None Known In normal use, emission c	Mutagenicity Not Established	Embryotoxicity Not Established	Sensitization to Product Not Established	Not Established
Reproductive Effects Not Established SECTION 12 - ECO Ecotoxicity: Mobility: Degradability:	Teratogenicity Not Established DEOGICAL INFORM, None Known In normal use, emission o Biodegradable	Mutagenicity Not Established	Embryotoxicity Not Established	Sensitization to Product Not Established	Not Established
Reproductive Effects Not Established SECTION 12 - ECO Ecotoxicity: Mobility: Degradability: Bioaccumulation:	Teratogenicity Not Established DLOGICAL INFORM None Known In normal use, emission of Biodegradable Minimal to none.	Mutagenicity Not Established ATION If volatile organic compounds (Embryotoxicity Not Established	Sensitization to Product Not Established	Not Established
Reproductive Effects Not Established SECTION 12 - ECO Ecotoxicity: Mobility: Degradability: Bioaccumulation: SECTION 13 - WAS	Teratogenicity Not Established DLOGICAL INFORM None Known In normal use, emission of Biodegradable Minimal to none. TE DISPOSAL CON	Mutagenicity Not Established ATION If volatile organic compounds (NSIDERATIONS	Embryotoxicity Not Established	Sensitization to Product Not Established	Not Established
Reproductive Effects Not Established SECTION 12 - ECO Ecotoxicity: Mobility: Degradability: Bioaccumulation: SECTION 13 - WAS Follow local and national rep	Teratogenicity Not Established DLOGICAL INFORM None Known In normal use, emission of Biodegradable Minimal to none. STE DISPOSAL COM gulations. Consult disposa	Mutagenicity Not Established ATION of volatile organic compounds (NSIDERATIONS al expert.	Embryotoxicity Not Established	Sensitization to Product Not Established	Not Established
Reproductive Effects Not Established SECTION 12 - ECO Ecotoxicity: Mobility: Degradability: Bioaccumulation: SECTION 13 - WAS follow local and national res SECTION 14 - TRAI	Teratogenicity Not Established DLOGICAL INFORM None Known In normal use, emission of Biodegradable Minimal to none. STE DISPOSAL COM gulations. Consult disposa NSPORT INFORMA	Mutagenicity Not Established ATION of volatile organic compounds (NSIDERATIONS al expert. TION	Embryotoxicity Not Established	Sensitization to Product Not Established	Not Established
Reproductive Effects Not Established SECTION 12 - ECO Ecotoxicity: Mobility: Degradability: Bioaccumulation: SECTION 13 - WAS Follow local and national re- SECTION 14 - TRAI Proper Shipping Name:	Teratogenicity Not Established DLOGICAL INFORMA None Known In normal use, emission of Biodegradable Minimal to none. STE DISPOSAL CON gulations. Consult disposa NSPORT INFORMA Flammable	Mutagenicity Not Established ATION of volatile organic compounds (NSIDERATIONS al expert.	Embryotoxicity Not Established	Sensitization to Product Not Established	Not Established
Reproductive Effects Not Established SECTION 12 - ECO Ecotoxicity: Mobility: Degradability: Bioaccumulation: SECTION 13 - WAS follow local and national rest SECTION 14 - TRAI Proper Shipping Name: Hazard Class:	Teratogenicity Not Established DLOGICAL INFORMA None Known In normal use, emission of Biodegradable Minimal to none. STE DISPOSAL COM gulations. Consult disposa NSPORT INFORMAT Flammable 3	Mutagenicity Not Established ATION of volatile organic compounds (NSIDERATIONS al expert. TION	Embryotoxicity Not Established	Sensitization to Product Not Established	J/I.
Reproductive Effects Not Established SECTION 12 - ECO Ecotoxicity: Mobility: Degradability: Bioaccumulation: SECTION 13 - WAS Follow local and national res SECTION 14 - TRAI Proper Shipping Name: Hazard Class: Secondary Risk:	Teratogenicity Not Established DLOGICAL INFORM. None Known In normal use, emission of Biodegradable Minimal to none. STE DISPOSAL COD gulations. Consult disposa NSPORT INFORMAT Flammable 3 None	Mutagenicity Not Established ATION of volatile organic compounds (NSIDERATIONS Il expert. TION Liquid, n.o.s. (Acetone, Tetrah	Embryotoxicity Not Established	Sensitization to Product Not Established	ping
Reproductive Effects Not Established SECTION 12 - ECO Ecotoxicity: Mobility: Degradability: Bioaccumulation: SECTION 13 - WAS follow local and national re SECTION 14 - TRAI Proper Shipping Name: Hazard Class: Secondary Risk: Identification Number:	Teratogenicity Not Established DLOGICAL INFORM None Known In normal use, emission of Biodegradable Minimal to none. STE DISPOSAL COM gulations. Consult dispose NSPORT INFORMA Flammable 3 None UN 1993	Mutagenicity Not Established ATION of volatile organic compounds (NSIDERATIONS Il expert. TION Liquid, n.o.s. (Acetone, Tetrah DOT Limited	Embryotoxicity Not Established VOC's) to the air takes place nydrofuran) E2 d Quantity: Up to 1L per inno	Sensitization to Product Not Established , typically at a rate of ≤ 550 g CEPTION for Ground Ship er packaging, 30 kg gross we	ping pilt per package.
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Reproductive Effects Not Established	Teratogenicity Not Established	Mutagenicity Not Established ATION of volatile organic compounds (SIDERATIONS il expert. TION Liquid, n.o.s. (Acetone, Tetral DOT Limitec Consumer C DOT Limitec Consumer C DOT Limitec Consumer C NAME: ER/PACKING GROUP: IATION Inmable, Irritant	Embryotoxicity Not Established VOC's) to the air takes place hydrofuran) EX I Quantity: Up to 1L per inne commodity: Depending on p TDG INFORMA FLAMMABLE LIQUID 3 Flammable Liquid, n.o.s. (UN 1993, PG II Ingredient Listings: USA 1 AICS, Ke R66: Repeat R67: Vapors S26: In case of contact with S33: Take precautionary me	Sensitization to Product Not Established A typically at a rate of ≤ 550 g CCEPTION for Ground Ship per packaging, 30 kg gross we ackaging, these quantities m TION Acetone, Tetrahydrofuran) SCA, Europe EINECS, Can orea ECL/TCCL, Japan MITI ed exposure may cause skin c may cause drowsiness and di	ping ight per package. ight per package. iay qualify under DOT as "ORM-D" . ada DSL, Australia (ENCS) Iryness or cracking zziness lenty of water and seek medical advice. jes.
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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	1-866-	232-9563			
Telephone						
Transportation Emerge	ncy Phone Number	1-866-	232-9563			
Product Technical Infor	mation	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.

FIRST AID MEASURES

INHALATION

SECTION 4

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

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

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-proplyene-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/Sta	andard		Note	Source
ETHYL BENZENE		TWA	20 ppm			ACGIH
Mixed Xylenes	Vapour.	RCP - TWA	434 mg/m3	100 ppm	Total Hydrocarbon s	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 explosionproof 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

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



Product Name: XYLENE Revision Date: 26 Feb 2013 Page 6 of 11

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

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

ACUTE TOXICITY

Route of Exposure	Conclusion / Remarks	
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.	
Еуе		
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	3 = IARC 2B	5 = ACGIH A1
2 = IARC 2A	4 = ACGIH ALL	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

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

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

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

Transport Document Name: UN1993, FLAMMABLE LIQUIDS, N.O.S. (Xylenes, Ethylbenzene), 3, PG III

SECTION 15

REGULATORY INFORMATION

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 SEARCH	ED
1 = TSCA 4	3 = TSCA 5e	5 = TSCA 12b
2 = TSCA 5a2	4 = TSCA 6	6 = NPRI

SECTIO	N 16
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OTHER INFORMATION



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 ^oC(^oF) 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		al Exposure Limits OELs)	LD ₅₀ / LC ₅₀ Species and Route
Zinc	99+%	7440-66-6	OSHA PEL ACGIH TLV NIOSH REL	None established None established 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 flulike 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, finelydivided 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, 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 affects, or chronic affects 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 .	
U.S. DOT AND TRANSPORT CANADA PID	Not applicable
MARINE POLLUTANT	No
IMO CLASSIFICATION	Not regulated

SECTION 15. REGULATORY INFORMATION

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 CATEGORIESNo Hazard Categories Apply

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. Urben, 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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