1 PRODUCT AND COMPANY IDENTIFICATION

Manufacturer

Norlab - A Division of Norco, Inc.
898 W. Gowen Rd.
Boise, ID 83705

Contact: Quality Department
Phone: (208) 336-1643
Web: www.norlab-gas.com

Product Name: Chlorine 0.0002% to 0.002% in Nitrogen
Revision Date: 5/28/2015
Version: 1
SDS Number: 2380
CAS Number: MIXTURE
Chemical Family: Gas Mixture
Chemical Formula: MIXTURE
Synonyms: Chlorine in Nitrogen

Emergency Telephone Number: (800) 424-9300 (CHEMTREC)

2 HAZARDS IDENTIFICATION

Inhalation: Inhalation of Chlorine, a component of this gas mixture, may lead to irritation of the nose and throat. Additionally, overexposures to Chlorine can cause the following health effects: coughing, labored breathing, sore throat, and potentially fatal lung disorders (chemical pneumonitis and pulmonary edema). Repeated Chlorine overexposures by inhalation can result in emphysema and erosion of teeth. The symptoms associated with specific Chlorine concentrations are as follows:

0.06 PPM:	Odor threshold.
3 PPM:	Irritation of the eyes and mucous membranes.
15 PPM:	Immediate irritation of the throat.
50 PPM:	A dangerous health hazard, even for short periods of time. Prolonged exposure may result in death.
1000 PPM:	Potentially fatal after a short exposure.
NOTE:	This gas mixture contains 2 to 200 PPM Chlorine.

Nitrogen is a simple asphyxiate. Oxygen levels should be maintained above 19.5% at normal atmospheric pressure, which is the equivalent to a partial pressure of 135 mm of Hg. Exposure to high concentrations of this gas mixture in a confined area, may exclude an adequate supply of Oxygen.

Effects of Oxygen deficiency resulting from simple asphyxiates may include: rapid breathing, diminished mental alertness, impaired muscular coordination, faulty judgment, depression of all sensations, emotional instability and fatigue. As asphyxiation progresses, nausea, vomiting, prostration, and loss of consciousness may result, eventually leading to convulsions, coma and death.

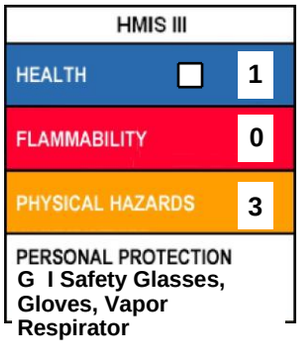
Skin Contact: Over exposures to this product may lead to burns or dermatitis (red, cracked, irritated skin). Contact with rapidly expanding gas near the point of release may cause frostbite with redness, skin color change to

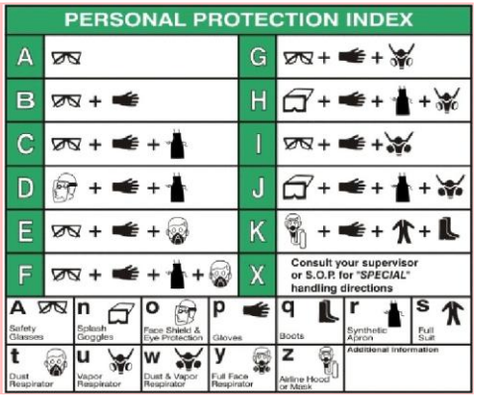
gray or white, and blistering.

Eye Contact: Contact of this product with the eyes can cause pain, redness, and prolonged exposure could cause blindness. Contact with rapidly expanding gas near the point of release may cause frostbite.

Ingestion: None known. Ingestion is unlikely as product is a gas at room temperature.

NFPA: Health = 1, Fire = 0, Reactivity = 0
HMIS III: H1/F0/PH3





GHS Signal Word:
WARNING

GHS Hazard Pictograms:

GHS Classifications:
Physical, Gases Under Pressure, Compressed Gas
Health, Acute toxicity, 5 Inhalation

GHS Phrases:
H280 - Contains gas under pressure; may explode if heated
H333 - May be harmful if inhaled

GHS Precautionary Statements:
P260 - Do not breathe dust/fume/gas/mist/vapors/spray.
P271 - Use only outdoors or in a well-ventilated area.
P280 - Wear protective gloves/protective clothing/eye protection/face protection.
P304+340 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P308+313 - IF exposed or concerned: Get medical advice/attention.
P403+233 - Store in a well ventilated place. Keep container tightly closed.
CGA-PG02 - Protect from sunlight when ambient temperature exceeds 52 °C (125 °F).
CGA-PG05 – Use a back flow preventive device in the piping
CGA-PG06 – Close Valve after each use and when empty.
CGA-PG10 – Use only with equipment rated for cylinder pressure.
CGA-PG20 – Use only equipment of compatible materials of constructions.

Additional Hazard Statements (EU):
EUH066 - Repeated exposure may cause skin dryness or cracking.
Additional Hazard Statements (USA):
Simple Asphyxiate - May displace oxygen and cause rapid suffocation.

This clear, pungent-smelling gas mixture is severely irritating. Persons who respond to releases of this product must protect themselves from inhalation of chlorine, the corrosive component of this gas mixture, especially in areas that are downwind of the release. Another significant health hazard associated with this gas mixture is the potential for exposure to oxygen deficient atmospheres. Extreme caution must be used when responding to spills.

3 COMPOSITION/INFORMATION ON INGREDIENTS

Ingredients:

CAS #	Percentage	Chemical Name
7727-37-9	99.998-99.9998%	Nitrogen
7782-50-5	0.0002-0.0020%	Chlorine

4 FIRST AID MEASURES

Inhalation: PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE. RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS. Victims should be assisted to an uncontaminated area and inhale fresh air. Quick removal from the contaminated area is most important. Unconscious persons should be moved to an uncontaminated area, and if breathing has stopped, administer artificial resuscitation and supplemental oxygen. Further treatment should be symptomatic and supportive.

Skin Contact: For skin exposure, immediately begin decontamination with running water. Minimum flushing time is 15 minutes. Remove exposed or contaminated clothing, taking care not to contaminate eyes. Victim must seek immediate medical attention. For frostbite, immerse skin in lukewarm water. DO NOT USE HOT WATER. Obtain medical attention.

Eye Contact: If irritation of the eye develops after exposure to this mixture, 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. Seek medical assistance immediately, preferably an ophthalmologist. If frostbite is suspected, flush with cool water for 15 minutes and obtain immediate medical attention.

Ingestion: None required.

Most important symptoms and effects, both acute and delayed:
The most important known symptoms and effects are described in the labeling (see Section 2) and/or Section 11.

Indication of any immediate medical attention and special treatment needed:
No data available.

5 FIRE FIGHTING MEASURES

Flammability:	Not flammable
Flash Point:	NA
Flash Point Method:	NA
Burning Rate:	Not determined
Autoignition Temp:	Not determined
LEL:	NA
UEL:	NA

Extinguishing Media:
Use as appropriate for surrounding material.

Special Hazards Arising From the Substance or Mixture:
Chlorine gas
Nitrogen gas

Advice for Firefighters:
If possible, stop the flow of gas supply. Use water spray to cool adjacent cylinders and areas. Firefighters should wear a full-face piece NIOSH/MSHA approved self-contained breathing apparatus (SCBA) operated in positive pressure mode and full turnout gear.

Further Information:
If incinerated, may release toxic fumes.
Use water spray to cool unopened containers.
Chlorine, a minor component of this mixture, can produce severe irritation and health effects at low concentrations; therefore, this gas mixture presents significant health hazards to firefighters. This gas mixture is nonflammable; however, containers when involved in fire may rupture or burst in the heat of the fire.
See Section 7 for more information on safe handling.
See Section 8 for more information on personal protection equipment.
See Section 13 for disposal information.

6 ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures:
Use personal protective equipment. Keep from contacting skin or eyes. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. If leak is in user's equipment, be certain to purge piping with inert gas prior to attempting repairs. If leak is in container or valve, contact the appropriate emergency telephone number listed in Section 1 or call your closest Norco/Norlab location.

Environmental Precautions:
Prevent further release (leakage/spillage) if safe to do so.

Methods and Materials for Containments and Cleaning Up:
Contact the appropriate emergency telephone number listed in Section 1 or call your closest Norco/Noriab location.
Ensure adequate ventilation.

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 information on proper disposal.

7 HANDLING AND STORAGE

Handling Precautions:

Use only in well-ventilated areas. Valve protection caps must remain in place unless the cylinder 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 regulator when connecting cylinder to lower pressure (< 3000 PSIG) piping or systems. Do not heat cylinder by any means to increase the discharge rate of product from the cylinder. Use a check valve or trap in the discharge line to prevent hazardous back flow into the cylinder.

Never carry a compressed gas cylinder or a container of a gas in cryogenic liquid from in an enclosed space such as a car trunk, van or station wagon. A leak can result in a fire, explosion, asphyxiation or a toxic exposure.

Most metals corrode rapidly with wet Chlorine. Systems must be kept dry. iead, Gold, Tantalum and Hastelloy are most resistant to wet Chlorine.

Storage Requirements:

Post "NO SMOKING OR OPEN FLAMES" signs in use and storage areas. Use only in well-ventilated areas.

Protect cylinders from physical damage. Store in a cool, dry, well ventilated area of non-combustible construction away from heavy traffic 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 from being stored for excessive periods of time.

For additional recommendations, consult Compressed Gas Association Pamphlets P-1, P-9, and Safety Bulletin SB-2.

8 EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls:

All ventilation should be designed in accordance with OSHA standard (29 CFR 1910.94). Use local exhaust at filling zones and where leakage is probable. Use mechanical (general) ventilation for storage areas. Use appropriate ventilation as required to keep Exposure iimits in Air below TLV & PEL limits. Maintain atmospheric Oxygen content at or above 19.5%

Personal Protective Equip:

Eye/face protection:
When using material use safety glasses, gloves, and vapor respirator according to HMIS PP, G. All safety equipment should be tested and approved under appropriate government standards such as NIOSH (US) or EN 166 (EU).

Skin protection:
Handle with gloves suitable for the job. Gloves must be inspected prior to use. Dispose of contaminated gloves according to applicable laws and workplace practices.

Body Protection:
Chemically resistant gloves and safety glasses are recommended. Type of protective equipment should be selected based on concentration amount and conditions of use of this material. Use safety shoes.

Respiratory protection:
A vapor respirator may be required as backup to engineering controls when proper engineering controls are not in place to keep TLV and PEL limits below defined thresholds. For emergency release use a positive pressure NIOSH approved air-supplying respirator system (SCBA or airline/escape bottle) using at a minimum Grade D air.

Control of environmental exposure:
Prevent leakage or spillage if safe to do so.

Components with workplace control parameters:

Component(s): Nitrogen; Chlorine
CAS No(s): 7727-37-9; 7782-50-5
USA NIOSH (STEL/REL): 0.5 ppm, 1.45 mg/m^3
USA ACGIH (TWA/TLV): Simple asphyxiate
(Nitrogen) USA ACGIH (TWA/TLV): 0.5 ppm
USA ACGIH (STEL/TLV): 1.0 ppm
USA OSHA Occupational Exposure limits Table Z-1 limits for Air Contaminant (C): 1.0 ppm, 3.0 mg/m^3

Biological occupational exposure limits:

Contains no substances with biological occupational exposure limit values.

9 PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Clear, greenish-yellow gas		
Physical State:	Gas	**Odor:**	Pungent, irritating
Odor Threshold:	0.06 ppm	**Molecular Formula:**	MIXTURE
Particle Size:	No data available	**Solubility:**	Very soluble (Chlorine)
Spec Grav./Density:	Not determined	**Softening Point:**	Not determined
Viscosity:	Not determined	**Percent Volatile:**	100%
Sat. Vap. Conc.:	Not determined	**Heat Value:**	Not determined
Boiling Point:	Not determined	**Freezing/Melting Pt.:**	Not determined
Flammability:	(solid, gas): Not flammable	**Flash Point:**	NA
Partition Coefficient:	Not determined	**Octanol:**	Not determined
Vapor Pressure:	Not determined	**Vapor Density:**	(air = 1): 0.906
pH:	Not determined	**VOC:**	NA
Evap. Rate:	Not determined	**Bulk Density:**	NA
Molecular weight:	MIXTURE	**Auto·Ignition Temp:**	Not determined
Decomp Temp:	Not determined	**UFL/LFL:**	NA

10 STABILITY AND REACTIVITY

Stability:	Product is stable under normal conditions.
Conditions to Avoid:	Incompatibilities, flames, ignition sources.
Materials to Avoid:	Most metals corrode rapidly with wet Chlorine. Systems must be kept dry. Lead, Gold, Tantalum and Hastelloy are most resistant to wet Chlorine.
Hazardous Decomposition:	No further information available.
Hazardous Polymerization:	Will not occur.

11 TOXICOLOGICAL INFORMATION

Component(s): Nitrogen; Chlorine
CAS No(s): 7727-37-9; 7782-50-5

Acute Toxicity:
LC50 Inhalation - Rat: 293 ppm (1 h)

Skin Corrosion/Irritation: No data available.

Serious Eye Damage/Eye Irritation: No data available.

Respiratory or Skin Sensitation: No data available.

Germ Cell Mutagenicity: No data available.

Carcinogenicity: This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP or OSHA classification (Chlorine).

Carcinogenicity Oral - Rat: Tumorigenic (ieukemia) - Equivocal tumorigenic agents by RTECS criteria.
Carginogenicity Inhalation - Monkey: Tumorigenic (lung, thorax or respiratory tract tumors) - Neoplastic by RTECS criteria.

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

Reproductive Toxicity:
Reproductive Toxicity Oral - Rat: Effects on newborn - Biochemical and metabolic.

Specific Target Organ Toxicity · Single Exposure: Respiratory system - May cause respiratory irritation.

Specific Target Organ Toxicity · Repeated Exposure: No data available.

Aspiration Hazard: No data available.

Additional Information:
Component: Nitrogen; RTECS: QW9700000
Component: Chlorine; RTECS: FO2100000

12 ECOLOGICAL INFORMATION

Component(s): Nitrogen; Chlorine
CAS No(s): 7727-37-9; 7782-50-5

Toxicity:

Toxicity to fish:
LC50 - Oncorhynchus mykiss (Rainbow Trout): 0.014 mg/l mg/l (96 h)

Toxicity to daphnia and other aquatic invertebrates:
LC50 - Daphnia magna (Water Flea): 0.019 mg/l (24 h)

Persistence and Degradability:
No data available.

Bioaccumulative potential:
log K_{OW} = Not applicable
Not expected to bioaccumulate due to the log K_{OW} (log K_{OW} < 4).

Mobility in Soil:
No data available.

Results of PBT and vPvB assessment:
Not required/conducted.

Other Adverse Effects:
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal. Very toxic to aquatic life. Product does not contain Class I or Class II ozone depleting substances.

13 DISPOSAL CONSIDERATIONS

Product and Contaminated Packaging: Do not attempt to dispose of residual waste or unused quantities in returnable containers. Return in shipping container, properly labeled, with any valve outlet plugs or caps secured and valve protection cap in place to Norlab for proper disposal. Non-refillable containers should be vented in a well-ventilated area then disposed of in accordance with local regulations, or returned to Norlab.

14 TRANSPORT INFORMATION

DOT Class: Non-Flammable Gas (2.2) #2.2
UN #: UN 1956, Class: 2, Proper Shipping Name: Compressed gas, n.o.s. (Chlorine in Nitrogen)

DOT (US)
UN Number: 1956
Class: 2.2
ERG #: 126
Proper Shipping Name: Compressed gas, n.o.s. (Chlorine in Nitrogen)

IMDG
UN Number: 1956
Class: 2 - Gases
EMS-No: F-C, S-V

Proper Shipping Name: Compressed gas, n.o.s. (Chlorine in Nitrogen)

IATA
UN Number: 1956
Class: 2
Proper Shipping Name: Compressed gas, n.o.s. (Chlorine in Nitrogen)

Canada TDG
UN Number: 1956
Class: 2.2
Proper Shipping Name: Compressed gas, n.o.s. (Chlorine in Nitrogen)

15 REGULATORY INFORMATION

COMPONENT / (CAS/PERC) / CODES

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*Nitrogen (7727379 99.998-99.9998%) MASS, NJHS, PA, TSCA

*Chlorine (7782505 0.0002-0.002%) CERCLA, CSWHS, EHS302, EPCRAWPC, HAP, MASS, NJEHS, NJHS, OSHAPSM, OSHAWAC, PA, SARA311/312, SARA313, TSCA, TXAIR

The presence of chlorine in quantities in excess of the threshold planning quantity (TPQ) of 100 pounds requires certain emergency planning activities to be conducted.

Releases of chlorine in quantities equal to or greater than the reportable quantity (RQ) of 10 pounds are subject to reporting to the National Response Center under CERCLA, Section 304 SARA Title III.

REGULATORY KEY DESCRIPTIONS

CERCLA = Superfund clean up substance
CSWHS = Clean Water Act Hazardous substances
EHS302 = Extremely Hazardous Substance
EPCRAWPC = EPCRA Water Priority Chemicals
HAP = Hazardous Air Pollutants
MASS = MA Massachusetts Hazardous Substances List
NJEHS = NJ Extraordinarily Hazardous Substances
NJHS = NJ Right-to-Know Hazardous Substances
OSHAPSM = OSHA Chemicals Requiring process safety management
OSHAWAC = OSHA Workplace Air Contaminants
PA = PA Right-To-Know List of Hazardous Substances
SARA311/312 = SARA 311/312 Toxic Chemicals
SARA313 = SARA 313 Title III Toxic Chemicals
TOXICRCRA = RCRA Toxic Hazardous Wastes (U-List)
TSCA = Toxic Substances Control Act
TXAIR = TX Air Contaminants with Health Effects Screening Level
TXHWL = TX Hazardous Waste List

16 OTHER INFORMATION

Disclaimer:

The data in this Safety Data Sheet relates only to the specific material designated herein and does not relate to use in combination with any other material in any process. The information set forth herein is furnished free of charge and is based on technical data that Norlab believes to be reliable. It is intended for use by persons having technical skill and at their own discretion and risk. Since conditions of use are outside of Norlab's control, Norlab makes no warranties, expressed or implied, and assumes no liability in connection with any use of this information. Nothing herein is to be taken as a license to operate under, or a recommendation to infringe upon, any patents.