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EMS Number: F-A , S-B Special provisions: None  
 Limited Quantities: 0 Marine Pollutant: Yes  
 Shipping Name: CHROMIUM OXYCHLORIDE

### Section 15 - REGULATORY INFORMATION

**chromium oxychloride (CAS: 14977-61-8) is found on the following regulatory lists:**

"Canada - Alberta Occupational Exposure Limits", "Canada - British Columbia Occupational Exposure Limits", "Canada - Nova Scotia Occupational Exposure Limits", "Canada - Prince Edward Island Occupational Exposure Limits", "Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)", "Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits", "Canada Ingredient Disclosure List (SOR/88-64)", "Canada Non-Domestic Substances List (NDSL)", "Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (English)", "International Chemical Secretariat (ChemSec) REACH SIN\* List (\*Substitute It Now!) 1.1", "US - California Occupational Safety and Health Regulations (CAL/OSHA) - Hazardous Substances List", "US - California Permissible Exposure Limits for Chemical Contaminants", "US - Connecticut Hazardous Air Pollutants", "US - Hawaii Air Contaminant Limits", "US - Massachusetts Oil & Hazardous Material List", "US - Minnesota Hazardous Substance List", "US - New Jersey Right to Know Hazardous Substances", "US - Pennsylvania - Hazardous Substance List", "US - Rhode Island Hazardous Substance List", "US - Washington Permissible exposure limits of air contaminants", "US ACGIH Threshold Limit Values (TLV)", "US Department of Homeland Security Chemical Facility Anti-Terrorism Standards - Chemicals of Interest", "US NIOSH Recommended Exposure Limits (RELs)", "US Postal Service (USPS) Hazardous Materials Table: Postal Service Mailability Guide", "US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory"

**Regulations for ingredients**

**hydrogen chloride (CAS: 7647-01-0) is found on the following regulatory lists:**

"Canada - Alberta Ambient Air Quality Objectives", "Canada - Alberta Occupational Exposure Limits", "Canada - British Columbia Occupational Exposure Limits", "Canada - Northwest Territories Occupational Exposure Limits (English)", "Canada - Nova Scotia Occupational Exposure Limits", "Canada - Prince Edward Island Occupational Exposure Limits", "Canada - Prince Edward Island Occupational Exposure Limits - Carcinogens", "Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)", "Canada - Saskatchewan Industrial Hazardous Substances", "Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits", "Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances", "Canada Controlled Drugs and Substances Act Schedule VI", "Canada Domestic Substances List (DSL)", "Canada Ingredient Disclosure List (SOR/88-64)", "Canada National Pollutant Release Inventory (NPRI)", "Canada Prohibited Toxic Substances, Schedule 2, Concentration Limits (English)", "Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (English)", "CODEX General Standard for Food Additives (GSFA) - Additives Permitted for Use in Food in General, Unless Otherwise Specified, in Accordance with GMP", "GESAMP/EHS Composite List - GESAMP Hazard Profiles", "IMO IBC Code Chapter 17: Summary of minimum requirements", "IMO MARPOL 73/78 (Annex II) - List of Noxious Liquid Substances Carried in Bulk", "International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs", "International Council of Chemical Associations (ICCA) - High Production Volume List", "International Maritime Dangerous Goods Requirements (IMDG Code) - Goods Forbidden for Transport", "OECD Representative List of High Production Volume (HPV) Chemicals", "United Nations Convention Against Illicit Traffic in Narcotic Drugs and Psychotropic Substances - Table II", "United Nations List of Precursors and Chemicals Frequently used in the Illicit Manufacture of Narcotic Drugs and Psychotropic Substances Under International Control (Red List) - Table II", "US - Alaska Limits for Air Contaminants", "US - California Air Toxics ""Hot Spots"" List (Assembly Bill 2588) Substances for which emissions must be quantified", "US - California Occupational Safety and Health Regulations (CAL/OSHA) - Hazardous Substances List", "US - California OEHHA/ARB - Acute Reference Exposure Levels and Target Organs (RELS)", "US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELS)", "US - California Permissible Exposure Limits for Chemical Contaminants", "US - California Toxic Air Contaminant List Category II", "US - Connecticut Hazardous Air Pollutants", "US - Florida Essential Chemicals", "US - Hawaii Air Contaminant Limits", "US - Idaho - Limits for Air Contaminants", "US - Massachusetts Oil & Hazardous Material List", "US - Michigan Exposure Limits for Air Contaminants", "US - Minnesota Hazardous Substance List", "US - Minnesota Permissible Exposure Limits (PELs)", "US - New Jersey Right to Know Hazardous Substances", "US - Oregon Hazardous Materials", "US - Oregon Permissible Exposure Limits (Z-1)", "US - Pennsylvania - Hazardous Substance List", "US - Rhode Island Hazardous Substance List", "US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants", "US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants", "US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants", "US - Washington Permissible exposure limits of air contaminants", "US - Wyoming List of Highly Hazardous Chemicals, Toxics and Reactives", "US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants", "US ACGIH Threshold Limit Values (TLV)", "US ACGIH Threshold Limit Values (TLV) - Carcinogens", "US Clean Air Act - Hazardous Air Pollutants", "US CWA (Clean Water Act) - List of Hazardous Substances", "US CWA (Clean Water Act) - Reportable Quantities of Designated Hazardous Substances", "US Department of Homeland Security Chemical Facility Anti-Terrorism Standards - Chemicals of Interest", "US Department of Transportation (DOT) List of Hazardous Substances and Reportable Quantities - Hazardous Substances Other Than Radionuclides", "US DOE Temporary Emergency Exposure Limits (TEELs)", "US Drug Enforcement Administration (DEA) List I and II Regulated Chemicals", "US EPA Acute Exposure Guideline Levels (AEGLs) - Final", "US EPA High Production Volume Chemicals Additional List", "US EPA Master Testing List - Index I Chemicals Listed", "US EPCRA Section 313 Chemical List", "US Food Additive Database", "US List of Lists - Consolidated List of Chemicals Subject to EPCRA, CERCLA and Section 112(r) of the Clean Air Act", "US NFPA 45 Fire Protection for Laboratories Using Chemicals - Flammability Characteristics of Common Compressed and Liquefied Gases", "US NIOSH Recommended Exposure Limits (RELs)", "US OSHA List of Highly Hazardous Chemicals, Toxics and Reactives", "US OSHA Permissible Exposure Levels (PELs) - Table Z1", "US Postal Service (USPS) Hazardous Materials Table: Postal Service Mailability Guide", "US SARA Section 302 Extremely Hazardous Substances", "US Spacecraft Maximum Allowable Concentrations (SMACs) for Airborne Contaminants", "US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory"

**chlorine (CAS: 7782-50-5) is found on the following regulatory lists:**

"Canada - Alberta Ambient Air Quality Objectives", "Canada - Alberta Occupational Exposure Limits", "Canada - British

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Columbia Occupational Exposure Limits","Canada - Northwest Territories Occupational Exposure Limits (English)","Canada - Nova Scotia Occupational Exposure Limits","Canada - Prince Edward Island Occupational Exposure Limits","Canada - Prince Edward Island Occupational Exposure Limits - Carcinogens","Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)","Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits","Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances","Canada Domestic Substances List (DSL)","Canada Ingredient Disclosure List (SOR/88-64)","Canada National Pollutant Release Inventory (NPRI)","Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (English)","International Council of Chemical Associations (ICCA) - High Production Volume List","OECD Representative List of High Production Volume (HPV) Chemicals","US - Alaska Limits for Air Contaminants","US - California Air Toxics ""Hot Spots"" List (Assembly Bill 2588) Substances for which emissions must be quantified","US - California Occupational Safety and Health Regulations (CAL/OSHA) - Hazardous Substances List","US - California OEHHA/ARB - Acute Reference Exposure Levels and Target Organs (CRELs)","US - California Permissible Exposure Levels for Chemical Contaminants","US - California Toxic Air Contaminant List Category II","US - Connecticut Hazardous Air Pollutants","US - Hawaii Air Contaminant Limits","US - Idaho - Limits for Air Contaminants","US - Massachusetts Oil & Hazardous Material List","US - Michigan Exposure Limits for Air Contaminants","US - Minnesota Hazardous Substance List","US - Minnesota Permissible Exposure Limits (PELs)","US - New Jersey Right to Know Hazardous Substances","US - Oregon Hazardous Materials","US - Oregon Permissible Exposure Limits (Z-1)","US - Pennsylvania - Hazardous Substance List","US - Rhode Island Hazardous Substance List","US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants","US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants","US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants","US - Washington Permissible exposure limits of air contaminants","US - Wyoming List of Highly Hazardous Chemicals, Toxics and Reactives","US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants","US ACGIH Threshold Limit Values (TLV)","US ACGIH Threshold Limit Values (TLV) - Carcinogens","US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)","US CERCLA Priority List of Hazardous Substances","US Clean Air Act - Hazardous Air Pollutants","US CWA (Clean Water Act) - List of Hazardous Substances","US CWA (Clean Water Act) - Reportable Quantities of Designated Hazardous Substances","US Department of Homeland Security Chemical Facility Anti-Terrorism Standards - Chemicals of Interest","US Department of Transportation (DOT) List of Hazardous Substances and Reportable Quantities - Hazardous Substances Other Than Radionuclides","US Department of Transportation (DOT) Marine Pollutants - Appendix B","US DOE Temporary Emergency Exposure Limits (TEELs)","US EPA Acute Exposure Guideline Levels (AEGLs) - Final","US EPA High Production Volume Chemicals Additional List","US EPA Master Testing List - Index I Chemicals Listed","US EPCRA Section 313 Chemical List","US Food Additive Database","US List of Lists - Consolidated List of Chemicals Subject to EPCRA, CERCLA and Section 112(r) of the Clean Air Act","US NFPA 45 Fire Protection for Laboratories Using Chemicals - Flammability Characteristics of Common Compressed and Liquefied Gases","US NIOSH Recommended Exposure Limits (RELs)","US OSHA List of Highly Hazardous Chemicals, Toxics and Reactives","US OSHA Permissible Exposure Levels (PELs) - Table Z1","US SARA Section 302 Extremely Hazardous Substances","US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory","USA: Chemical Facility Anti-Terrorism Standards - List Appendix A - 6CFR 27","WHO Guidelines for Drinking-water Quality - Guideline values for chemicals that are of health significance in drinking-water"

**chromium trioxide (CAS: 1333-82-0) is found on the following regulatory lists:**

"Canada Domestic Substances List (DSL)","Canada Ingredient Disclosure List (SOR/88-64)","Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (English)","International Chemical Secretariat (ChemSec) REACH SIN" List ("Substitute It Now! 1.1","OECD Representative List of High Production Volume (HPV) Chemicals","US - California Air Toxics ""Hot Spots"" List (Assembly Bill 2588) Substances for which emissions must be quantified","US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs)","US - Maine Chemicals of High Concern List","US - Massachusetts Oil & Hazardous Material List","US - New Jersey Right to Know Hazardous Substances","US - Pennsylvania - Hazardous Substance List","US - Rhode Island Hazardous Substance List","US CERCLA Priority List of Hazardous Substances","US CWA (Clean Water Act) - Reportable Quantities of Designated Hazardous Substances","US DOE Temporary Emergency Exposure Limits (TEELs)","US NFPA 1 Annex B Typical Oxydizers","US Postal Service (USPS) Hazardous Materials Table: Postal Service Mailability Guide","US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory","US TSCA Section 12(b) - List of Chemical Substances Subject to Export Notification Requirements"

**chromic chloride (CAS: 10025-73-7,10060-12-5) is found on the following regulatory lists:**

"Canada Ingredient Disclosure List (SOR/88-64)","Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (English)","US - Massachusetts Oil & Hazardous Material List","US - New Jersey Right to Know Hazardous Substances","US - Pennsylvania - Hazardous Substance List","US DOE Temporary Emergency Exposure Limits (TEELs)","US List of Lists - Consolidated List of Chemicals Subject to EPCRA, CERCLA and Section 112(r) of the Clean Air Act","US SARA Section 302 Extremely Hazardous Substances","US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory"

### Section 16 - OTHER INFORMATION

**LIMITED EVIDENCE**

- Contact with air may produce sufficient heat to ignite combustible materials.\*
- Skin contact may produce health damage\*.
- Cumulative effects may result following exposure\*.
- Possible respiratory sensitisier\*.

\* (limited evidence).

**Ingredients with multiple CAS Nos**

Ingredient Name CAS chromic chloride 10025-73-7, 10060-12-5

*Reasonable care has been taken in the preparation of this information, but the author makes no*

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*warranty of merchantability or any other warranty, expressed or implied, with respect to this information. The author makes no representations and assumes no liability for any direct, incidental or consequential damages resulting from its use. For additional technical information please call our toxicology department on +800 CHEMCALL.*

- Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.  
A list of reference resources used to assist the committee may be found at:  
[www.chemwatch.net/references](http://www.chemwatch.net/references).
- The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

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Issue Date: Aug-11-2008

Print Date: Jun-10-2011

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- **Freon-11**



MATHESON

TRI•GAS

ask...The Gas Professionals™

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## MATERIAL SAFETY DATA SHEET

### 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

MATHESON TRI-GAS, INC.

150 Allen Road Suite 302

Basking Ridge, New Jersey 07920

Information: 1-800-416-2505

Emergency Contact:

CHEMTREC 1-800-424-9300

Calls Originating Outside the US:

703-527-3887 (Collect Calls Accepted)

### SUBSTANCE: FLUOROTRICHLOROMETHANE

#### TRADE NAMES/SYNONYMS:

MTG MSDS 36; FREON 11; F 11; FC 11; R 11; CFC 11; TRICHLOROMONOFUOROMETHANE; FREON MF; REFRIGERANT 11; MONOFLUOROTRICHLOROMETHANE; HALON 11; TRICHLOROFLUOROCARBON; FLUOROCARBON-11; FLUOROCHLOROFORM; RCRA U121; CCl<sub>3</sub>F; MAT09990; RTECS PB6125000

**CHEMICAL FAMILY:** halogenated hydrocarbons

**CREATION DATE:** Jan 24 1989

**REVISION DATE:** Dec 11 2008

### 2. COMPOSITION, INFORMATION ON INGREDIENTS

**COMPONENT:** FLUOROTRICHLOROMETHANE

**CAS NUMBER:** 75-69-4

**PERCENTAGE:** 100

### 3. HAZARDS IDENTIFICATION

**NFPA RATINGS (SCALE 0-4):** HEALTH=1 FIRE=0 REACTIVITY=0

**EMERGENCY OVERVIEW:**

**COLOR:** colorless

**PHYSICAL FORM:** gas

**ODOR:** faint odor, sweet odor

**MAJOR HEALTH HAZARDS:** central nervous system depression

**PHYSICAL HAZARDS:** Containers may rupture or explode if exposed to heat.



**POTENTIAL HEALTH EFFECTS:**

**INHALATION:**

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**SHORT TERM EXPOSURE:** irritation, ringing in the ears, nausea, vomiting, difficulty breathing, irregular heartbeat, headache, drowsiness, dizziness, tremors, loss of coordination, unconsciousness

**LONG TERM EXPOSURE:** no information on significant adverse effects

**SKIN CONTACT:**

**SHORT TERM EXPOSURE:** irritation

**LONG TERM EXPOSURE:** irritation

**EYE CONTACT:**

**SHORT TERM EXPOSURE:** irritation

**LONG TERM EXPOSURE:** no information on significant adverse effects

**INGESTION:**

**SHORT TERM EXPOSURE:** ingestion of a gas is unlikely

**LONG TERM EXPOSURE:** ingestion of a gas is unlikely

## 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 CONTACT:** Wash skin with soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention, if needed. Thoroughly clean and dry contaminated clothing and shoes before reuse.

**EYE CONTACT:** 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.

## 5. FIRE FIGHTING MEASURES

**FIRE AND EXPLOSION HAZARDS:** Negligible fire hazard. 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:** 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. 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). Use extinguishing agents appropriate for surrounding fire. Cool containers with water spray until well after the fire is out. Apply water from a protected location or from a safe distance. Do not get water directly on material. Reduce vapors with water spray. Avoid inhalation of material or combustion by-products. Stay upwind and keep out of low areas. Consider

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downwind evacuation if material is leaking.

**FLASH POINT:** not flammable

### **HAZARDOUS COMBUSTION PRODUCTS:**

Thermal decomposition or combustion products: acid halides, phosgene, halogenated compounds, fluorocarbons, hydrogen chloride, hydrogen fluoride, chlorine, carbonyl fluoride

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## 6. ACCIDENTAL RELEASE MEASURES

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### **OCCUPATIONAL RELEASE:**

Stop leak if possible without personal risk. Keep unnecessary people away, isolate hazard area and deny entry. Stay upwind and keep out of low areas. Notify Local Emergency Planning Committee and State Emergency Response Commission for release greater than or equal to RQ (U.S. SARA Section 304). If release occurs in the U.S. and is reportable under CERCLA Section 103, notify the National Response Center at (800)424-8802 (USA) or (202)426-2675 (USA).

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## 7. HANDLING AND STORAGE

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**STORAGE:** Store and handle in accordance with all current regulations and standards. Subject to storage regulations: U.S. OSHA 29 CFR 1910.101. Keep separated from incompatible substances.

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## 8. EXPOSURE CONTROLS, PERSONAL PROTECTION

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### **EXPOSURE LIMITS:**

#### **FLUOROTRICHLOROMETHANE:**

1000 ppm (5600 mg/m<sup>3</sup>) OSHA TWA

1000 ppm (5620 mg/m<sup>3</sup>) OSHA ceiling (vacated by 58 FR 35338, June 30, 1993)

1000 ppm ACGIH ceiling

1000 ppm (5600 mg/m<sup>3</sup>) NIOSH recommended ceiling

**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 insulated gloves.

**PROTECTIVE MATERIAL TYPES:** rubber, neoprene

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**RESPIRATOR:** The following respirators and maximum use concentrations are drawn from NIOSH and/or OSHA.

### 2000 ppm

Any supplied-air respirator.

Any self-contained breathing apparatus 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 organic vapor canister.

Any appropriate escape-type, self-contained breathing apparatus.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

**PHYSICAL STATE:** gas

**COLOR:** colorless

**ODOR:** faint odor, sweet odor

**MOLECULAR WEIGHT:** 137.37

**MOLECULAR FORMULA:** C-Cl<sub>3</sub>-F

**BOILING POINT:** 74.7 F (23.7 C) @ 706 mmHg

**FREEZING POINT:** -168 F (-111 C)

**VAPOR PRESSURE:** 690 mmHg @ 20 C

**VAPOR DENSITY (air=1):** 5.04 @ 25 C

**SPECIFIC GRAVITY (water=1):** 1.494 @ 17.2 C (liquid)

**WATER SOLUBILITY:** 0.11%

**PH:** Not applicable

**VOLATILITY:** Not applicable

**ODOR THRESHOLD:** 28.0 mg/m<sup>3</sup>

**EVAPORATION RATE:** 63 (butyl acetate=1)

**VISCOOSITY:** 0.43 mPa.s @ 20 C (liquid)

**COEFFICIENT OF WATER/OIL DISTRIBUTION:** Not applicable

**SOLVENT SOLUBILITY:**

**Soluble:** alcohol, ether, organic solvents

## 10. STABILITY AND REACTIVITY

**REACTIVITY:** Stable at normal temperatures and pressure.

**CONDITIONS TO AVOID:** Protect from physical damage and heat. Containers may rupture or explode if exposed to heat.

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**INCOMPATIBILITIES:** metals, combustible materials, acids

**HAZARDOUS DECOMPOSITION:**

Thermal decomposition or combustion products: acid halides, phosgene, halogenated compounds, fluorocarbons, hydrogen chloride, hydrogen fluoride, chlorine, carbonyl fluoride

Thermal decomposition products: acid halides, phosgene, halogenated compounds

**POLYMERIZATION:** Will not polymerize.

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## 11. TOXICOLOGICAL INFORMATION

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**FLUOROTRICHLOROMETHANE:**

**TOXICITY DATA:** 13 pph/15 minute(s) inhalation-rat LC50

**CARCINOGEN STATUS:** ACGIH: A4 -Not Classifiable as a Human Carcinogen

**ACUTE TOXICITY LEVEL:**

Relatively Non-toxic: inhalation

**TARGET ORGANS:** central nervous system

**MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:** heart or cardiovascular disorders

**ADDITIONAL DATA:** Stimulants such as epinephrine may induce ventricular fibrillation. May cross react with similar compounds.

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## 12. ECOLOGICAL INFORMATION

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**FATE AND TRANSPORT:**

**KOW:** 0.403 ( $\log = -0.396$ )

**KOC:** 97 ( $\log = 1.99$ ) estimated

**HENRY'S LAW CONSTANT:** 9.7 E -2

**BIOCONCENTRATION:** 0.29 (estimated from Kow)

**ENVIRONMENTAL SUMMARY:** Leaches through the soil or the sediment at a rapid rate. Accumulates very little in the bodies of living organisms. Highly volatile from water.

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## 13. DISPOSAL CONSIDERATIONS

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Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): U121.

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### 14. TRANSPORT INFORMATION

#### U.S. DOT 49 CFR 172.101:

**PROPER SHIPPING NAME:** Compressed gas, n.o.s. (FLUOROTRICHLOROMETHANE)

**ID NUMBER:** UN1956

**HAZARD CLASS OR DIVISION:** 2.2

**LABELING REQUIREMENTS:** 2.2



#### CANADIAN TRANSPORTATION OF DANGEROUS GOODS:

**SHIPPING NAME:** Compressed gas, n.o.s. (FLUOROTRICHLOROMETHANE)

**UN NUMBER:** UN1956

**CLASS:** 2.2

### 15. REGULATORY INFORMATION

#### U.S. REGULATIONS:

##### CERCLA SECTIONS 102a/103 HAZARDOUS SUBSTANCES (40 CFR 302.4):

FLUOROTRICHLOROMETHANE: 5000 LBS RQ

SARA TITLE III SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355 Subpart B): Not regulated.

SARA TITLE III SECTION 304 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355 Subpart C): Not regulated.

SARA TITLE III SARA SECTIONS 311/312 HAZARDOUS CATEGORIES (40 CFR 370 Subparts B and C):

ACUTE: Yes

CHRONIC: No

FIRE: No

REACTIVE: No

SUDDEN RELEASE: Yes

#### SARA TITLE III SECTION 313 (40 CFR 372.65):

FLUOROTRICHLOROMETHANE

OSHA PROCESS SAFETY (29 CFR 1910.119): Not regulated.

#### STATE REGULATIONS:

California Proposition 65: Not regulated.

#### CANADIAN REGULATIONS:

WHMIS CLASSIFICATION: A.

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### **NATIONAL INVENTORY STATUS:**

**U.S. INVENTORY (TSCA):** Listed on inventory.

**TSCA 12(b) EXPORT NOTIFICATION:** Not listed.

**CANADA INVENTORY (DSL/NDSL):** All components of this product are listed on the DSL.

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## 16. OTHER INFORMATION

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- **Freon-12**



### Material Safety Data Sheet

#### R-12

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##### 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

**PRODUCT NAME:** R-12  
**DISTRIBUTOR:** National Refrigerants, Inc.  
 661 Kenyon Avenue  
 Bridgeton, New Jersey 08302

**FOR MORE INFORMATION CALL:**  
 (Monday-Friday, 8:00am-5:00pm)  
 1-800-262-0012

**IN CASE OF EMERGENCY CALL:**  
 CHEMTREC: 1-800-424-9300

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##### 2. COMPOSITION / INFORMATION ON INGREDIENTS

<b>INGREDIENT NAME</b>	<b>CAS NUMBER</b>	<b>WEIGHT %</b>
Dichlorodifluoromethane	75-71-8	100

Trace impurities and additional material names not listed above may also appear in Section 15 toward the end of the MSDS. These materials may be listed for local "Right-To-Know" compliance and for other reasons.

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##### 3. HAZARDS IDENTIFICATION

**EMERGENCY OVERVIEW:** Colorless, volatile liquid with ethereal and faint sweetish odor. Non-flammable material. Overexposure may cause dizziness and loss of concentration. At higher levels, CNS depression and cardiac arrhythmia may result from exposure. Vapors displace air and can cause asphyxiation in confined spaces. At higher temperatures, (>250°C), decomposition products may include Hydrochloric Acid (HCl), Hydrofluoric Acid (HF) and carbonyl halides.

##### POTENTIAL HEALTH HAZARDS

**SKIN:** Irritation would result from a defatting action on tissue. Liquid contact could cause frostbite.

**EYES:** Liquid contact can cause severe irritation and frostbite. Mist may irritate.

**INHALATION:** R-12 is low in acute toxicity in animals even at concentrations of 5% (50,000 ppm). However, when oxygen levels in air are reduced to 12-14% by displacement, symptoms of asphyxiation, loss of coordination, increased pulse rate and deeper respiration will occur. At high levels, cardiac arrhythmia may occur.

**INGESTION:** Ingestion is unlikely because of the low boiling point of the material. Should it occur, discomfort in the gastrointestinal tract from rapid evaporation of the material and consequent evolution of gas would result. Some effects of inhalation and skin exposure would be expected.

**DELAYED EFFECTS:** None Known

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**R-12**

Ingredients found on one of the OSHA designated carcinogen lists are listed below.

<u>INGREDIENT NAME</u>	<u>NTP STATUS</u>	<u>IARC STATUS</u>	<u>OSHA LIST</u>
No ingredients listed in this section			

### 4. FIRST AID MEASURES

**SKIN:** Promptly flush skin with water until all chemical is removed. If there is evidence of frostbite, bathe (do not rub) with lukewarm (not hot) water. If water is not available, cover with a clean, soft cloth or similar covering. Get medical attention if symptoms persist.

**EYES:** Immediately flush eyes with large amounts of water for at least 15 minutes (in case of frostbite, water should be lukewarm, not hot) lifting eyelids occasionally to facilitate irrigation. Get medical attention if symptoms persist.

**INHALATION:** Immediately remove patient to fresh air. If breathing has stopped, give artificial respiration. Use oxygen as required, provided a qualified operator is available. Get medical attention immediately. DO NOT give epinephrine (adrenaline).

**INGESTION:** Ingestion is unlikely because of the physical properties and is not expected to be hazardous. DO NOT induce vomiting unless instructed to do so by a physician.

**ADVICE TO PHYSICIAN:** Because of the possible disturbances of cardiac rhythm, catecholamine drugs, such as epinephrine, should be used with special caution and only in situations of emergency life support. Treatment of overexposure should be directed at the control of symptoms and the clinical conditions.

### 5. FIRE FIGHTING MEASURES

#### FLAMMABLE PROPERTIES

<b>FLASH POINT:</b>	Gas, not applicable per DOT regulations
<b>FLASH POINT METHOD:</b>	Not applicable
<b>AUTOIGNITION TEMPERATURE:</b>	Unknown
<b>UPPER FLAME LIMIT (volume % in air):</b>	None*
<b>LOWER FLAME LIMIT (volume % in air):</b>	None*
	*Based on ASHRAE Standard 34 with match ignition
<b>FLAME PROPAGATION RATE (solids):</b>	Not applicable
<b>OSHA FLAMMABILITY CLASS:</b>	Not applicable

#### EXTINGUISHING MEDIA:

Use any standard agent – choose the one most appropriate for type of surrounding fire (material itself is not flammable)

#### UNUSUAL FIRE AND EXPLOSION HAZARDS:

Contact with certain reactive metals may result in formation of explosive or exothermic reactions under specific conditions (e.g. very high temperatures and/or appropriate pressures).

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### SPECIAL FIRE FIGHTING PRECAUTIONS/INSTRUCTIONS:

Firefighters should wear self-contained, NIOSH-approved breathing apparatus for protection against possible toxic decomposition products. Proper eye and skin protection should be provided. Use water spray to keep fire-exposed containers cool.

### 6. ACCIDENTAL RELEASE MEASURES

**IN CASE OF SPILL OR OTHER RELEASE:** (Always wear recommended personal protective equipment.) Evacuate unprotected personnel. Protected personnel should remove ignition sources and shut off leak, if without risk, and provide ventilation. Unprotected personnel should not return until air has been tested and determined safe, including low-lying areas.

Spills and releases may have to be reported to Federal and/or local authorities. See Section 15 regarding reporting requirements.

### 7. HANDLING AND STORAGE

**NORMAL HANDLING:** (Always wear recommended personal protective equipment.) Avoid breathing vapors and liquid contact with eyes, skin or clothing. Do not puncture or drop cylinders, expose them to open flame or excessive heat. Use authorized cylinders only. Follow standard safety precautions for handling and use of compressed gas cylinders.

### STORAGE RECOMMENDATIONS:

Store in a cool, well-ventilated area of low fire risk and out of direct sunlight. Protect cylinder and its fittings from physical damage. Storage in subsurface locations should be avoided. Close valve tightly after use and when empty.

### 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

#### ENGINEERING CONTROLS:

Provide local ventilation at filling zones and areas where leakage is probable. Mechanical (general) ventilation may be adequate for other operating and storage areas.

#### PERSONAL PROTECTIVE EQUIPMENT

##### SKIN PROTECTION:

Skin contact with refrigerant may cause frostbite. General work clothing and gloves (leather) should provide adequate protection. If prolonged contact with liquid or gas is anticipated, insulated gloves constructed of PVA, neoprene or butyl rubber should be used. Any contaminated clothing should be promptly removed and washed before reuse.

##### EYE PROTECTION:

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

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### RESPIRATORY PROTECTION:

None generally required for adequately ventilated work situations. For accidental release or non-ventilated situations, or release into confined space, where the concentration may be above the PEL of 1,000 ppm, use a self-contained, NIOSH approved breathing apparatus or supplied air respirator. For escape: use the former or a NIOSH approved gas mask with organic vapor canister.

### ADDITIONAL RECOMMENDATIONS:

Where contact with liquid is likely, such as in a spill or leak, impervious boots and clothing should be worn. High dose-level warning signs are recommended for areas of principle exposure. Provide eyewash stations and quick-drench shower facilities at convenient locations. For tank cleaning operations, see OSHA regulations, 29 CFR 1910.132 and 29 CFR 1910.133.

### EXPOSURE GUIDELINES

INGREDIENT NAME	ACGIH TLV	OSHA PEL	OTHER LIMIT
Dichlorodifluoromethane	None	1000 ppm (8hr)	None

### OTHER EXPOSURE LIMITS FOR POTENTIAL DECOMPOSITION PRODUCTS:

Hydrogen Fluoride: ACGIH TLV = 3 ppm ceiling

### 9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE:	Clear, colorless liquid and vapor
PHYSICAL STATE:	Gas at ambient temperatures
MOLECULAR WEIGHT:	120.9
CHEMICAL FORMULA:	CCl <sub>2</sub> F <sub>2</sub>
ODOR:	Faint ethereal odor
SPECIFIC GRAVITY (water = 1.0):	1.34 @ 30°C (86°F)
SOLUBILITY IN WATER (weight %):	Unknown
pH:	Neutral
BOILING POINT:	-29.8°C (-21.6°F)
FREEZING POINT:	-157.7°C (-252°F)
VAPOR PRESSURE:	94.9 psia @ 70°F 195.6 psia @ 130°F
VAPOR DENSITY (air = 1.0):	4.2
EVAPORATION RATE:	>1
% VOLATILES:	100
FLASH POINT:	Not applicable

(Flash point method and additional flammability data are found in Section 5.)

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**R-12**

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### 10. STABILITY AND REACTIVITY

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**NORMALLY STABLE? (CONDITIONS TO AVOID):**

The product is stable.

Do not mix with oxygen or air above atmospheric pressure. Any source of high temperatures, such as lighted cigarettes, flames, hot spots or welding may yield toxic and/or corrosive decomposition products.

**INCOMPATIBILITIES:**

(Under specific conditions: e.g. very high temperatures and/or appropriate pressures) – Freshly abraded aluminum surfaces (may cause strong exothermic reaction). Chemically reactive metals: potassium, calcium, powdered aluminum, magnesium, and zinc.

**HAZARDOUS DECOMPOSITION PRODUCTS:**

Halogens, halogen acids and possibly carbonyl halides.

**HAZARDOUS POLYMERIZATION:**

Will not occur.

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### 11. TOXICOLOGICAL INFORMATION

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**IMMEDIATE (ACUTE) EFFECTS:**

LC<sub>50</sub> : 4 hr. (rat) - > 760,000 ppm / Cardiac Sensitization threshold (dog) – 50,000 ppm  
10 min EC<sub>50</sub> – 254,000 ppm

**DELAYED (SUBCHRONIC AND CHRONIC) EFFECTS:**

Subchronic: NOEL – 10,000 ppm

**OTHER DATA:**

Teratology: Not a teratogen

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### 12. ECOLOGICAL INFORMATION

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**Degradability (BOD):** R-12 is a gas at room temperature; therefore, it is unlikely to remain in water.

**Octanol Water Partition Coefficient:** Unknown

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### 13. DISPOSAL CONSIDERATIONS

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**RCRA**

<b>Is the unused product a RCRA hazardous waste if discarded?</b>	Not a hazardous waste
<b>If yes, the RCRA ID number is:</b>	Not applicable

**OTHER DISPOSAL CONSIDERATIONS:**

Disposal must comply with federal, state, and local disposal or discharge laws. R-12 is subject to U.S. Environmental Protection Agency Clean Air Act Regulations Section 608 in 40 CFR Part 82 regarding refrigerant recycling.

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# NATIONAL REFRIGERANTS™

**R-12**

The information offered here is for the product as shipped. Use and/or alterations to the product such as mixing with other materials may significantly change the characteristics of the material and alter the RCRA classification and the proper disposal method.

### 14. TRANSPORT INFORMATION

**US DOT HAZARD CLASS:** US DOT PROPER SHIPPING NAME: Dichlorodifluoromethane  
 US DOT HAZARD CLASS: 2.2  
 US DOT PACKING GROUP: Not applicable  
**US DOT ID NUMBER:** UN1028

For additional information on shipping regulations affecting this material, contact the information number found in Section 1.

### 15. REGULATORY INFORMATION

#### TOXIC SUBSTANCES CONTROL ACT (TSCA)

**TSCA INVENTORY STATUS:** Listed on the TSCA inventory  
**OTHER TSCA ISSUES:** None

#### SARA TITLE III / CERCLA

“Reportable Quantities” (RQs) and/or “Threshold Planning Quantities” (TPQs) exist for the following ingredients.

<u>INGREDIENT NAME</u>	<u>SARA / CERCLA RQ (lb.)</u>	<u>SARA EHS TPQ (lb.)</u>
Dichlorodifluoromethane	5000	None

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

**SECTION 311 HAZARD CLASS:** IMMEDIATE  
 PRESSURE

#### SARA 313 TOXIC CHEMICALS:

The following ingredients are SARA 313 “Toxic Chemicals”. CAS numbers and weight percents are found in Section 2.

<u>INGREDIENT NAME</u>	<u>COMMENT</u>
Dichlorodifluoromethane	None

#### STATE RIGHT-TO-KNOW

In addition to the ingredients found in Section 2, the following are listed for state right-to-know purposes.

<u>INGREDIENT NAME</u>	<u>WEIGHT %</u>	<u>COMMENT</u>
No ingredients listed in this section		

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**R-12**

### ADDITIONAL REGULATORY INFORMATION:

R-12 is subject to U.S. Environmental Protection Agency Clean Air Act Regulations at 40 CFR Part 82.

**WARNING: DO NOT vent** to the atmosphere. To comply with provisions of the U.S. Clean Air Act, any residual must be recovered. Contains **Dichlorodifluoromethane (CFC-12)**, a substance which harms public health and environment by destroying ozone in the upper atmosphere. Destruction of the ozone layer can lead to increased ultraviolet radiation which, with excess exposure to sunlight, can lead to an increase in skin cancer and eye cataracts.

### WHMIS CLASSIFICATION (CANADA):

This product has been evaluated in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

### FOREIGN INVENTORY STATUS:

Canada – Listed on DSL  
EU - EINECS # 2206926

### 16. OTHER INFORMATION

**CURRENT ISSUE DATE:** December, 2008

**PREVIOUS ISSUE DATE:** August, 2007

**OTHER INFORMATION:** HMIS Classification: Health – 1, Flammability – 0, Reactivity – 0  
NFPA Classification: Health – 2, Flammability – 0, Reactivity – 0  
ANSI/ASHRAE 34 Safety Group – A1

#### Regulatory Standards:

1. OSHA regulations for compressed gases: 29 CFR 1910.101
2. DOT classification per 49 CFR 172.101
3. Clean Air Act Class I Substance

#### General

- a) CGA pamphlet P-1, *Safe Handling of Compressed Gases in Containers*, 1984, Compressed Gas Association (1980 Printing)
- b) Bretherick, L., *Handbook of Reactive Chemical Hazards*, 4<sup>th</sup> ed., 1992, Butterworths, Boston, MA

### 17. 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.

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### ○ Freon-13



The MSDS format adheres to the standards and regulatory requirements of the United States and may not meet regulatory requirements in other countries.

DuPont  
Material Safety Data Sheet

Page 1

2003FR "FREON" 13 Refrigerant  
Revised 9-MAY-1995

#### CHEMICAL PRODUCT/COMPANY IDENTIFICATION

##### Material Identification

"Freon" is a registered trademark of DuPont.

Corporate MSDS Number : DU001069  
Formula : CC1F3  
Grade : REFRIGERANT

##### Tradenames and Synonyms

CHLOROTRIFLUOROMETHANE  
REFRIGERANT 13

##### Company Identification

MANUFACTURER/DISTRIBUTOR  
DuPont Fluoroproducts  
1007 Market Street  
Wilmington, DE 19898

##### PHONE NUMBERS

Product Information : 1-800-441-7515 (outside the U.S.  
302-774-1000)  
Transport Emergency : CHEMTREC 1-800-424-9300 (outside U.S.  
703-527-3887)  
Medical Emergency : 1-800-441-3637 (outside the U.S.  
302-774-1000)

#### COMPOSITION/INFORMATION ON INGREDIENTS

##### Components

Material	CAS Number	%
*METHANE, CHLOROTRIFLUORO- ("FREON" 13 REFRIGERANT)	75-72-9	100

\* Disclosure as a toxic chemical is required under Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR part 372.

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**HAZARDS IDENTIFICATION**

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**Potential Health Effects**

High concentrations may cause fatal heart irregularities. Vapors of FC-13 are heavier than air posing a hazard of asphyxia if trapped in enclosed or low places. At flame temperatures, this fluorocarbon may decompose to hydrogen fluoride which can be lethal at low concentrations. Frostbite may occur on skin or eye contact.

Skin or eye contact may include frostbite. There are no reports of human sensitization.

Inhalation may include temporary nervous system depression with anaesthetic effects such as dizziness, headache, confusion, incoordination, and loss of consciousness; or possibly with gross overexposure(> 20%), temporary alteration of the heart's electrical activity with irregular pulse, palpitations, or inadequate circulation.

Individuals with preexisting diseases of the cardiovascular system may have increased susceptibility to the toxicity of excessive exposures.

**Carcinogenicity Information**

None of the components present in this material at concentrations equal to or greater than 0.1% are listed by IARC, NTP, OSHA or ACGIH as a carcinogen.

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**FIRST AID MEASURES**

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**First Aid****INHALATION**

Immediately remove to fresh air. Keep persons calm. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

**SKIN CONTACT**

Flush with plenty of water. Treat for frostbite if necessary.

**EYE CONTACT**

Immediately flush eyes with plenty of water. Call a physician.

**INGESTION**

Ingestion is not considered a potential route of exposure.

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(FIRST AID MEASURES - Continued)

### Notes to Physicians

Because of possible disturbances of cardiac rhythm, catecholamine drugs, such as epinephrine, should be used with special caution only in situations of emergency life support.

### FIRE FIGHTING MEASURES

#### Flammable Properties

Flash Point	: Will not burn
Flammable limits in Air, % by Volume	
LEL	: Not applicable
UEL	: Not applicable
Autoignition	: Not determined
Autodecomposition	: >800 C (>1472 F)

#### Fire and Explosion Hazards:

Use water spray or fog to cool containers. Although cylinders are equipped with pressure and temperature relief devices, they may still rupture under fire conditions. Decomposition may occur.

#### Extinguishing Media

Non-flammable. As appropriate for combustibles in area.

#### Fire Fighting Instructions

Self-contained breathing apparatus (SCBA) is required if cylinders rupture or discharge under fire conditions.

### ACCIDENTAL RELEASE MEASURES

#### Safeguards (Personnel)

NOTE: Review FIRE FIGHTING MEASURES and HANDLING (PERSONNEL) sections before proceeding with clean-up. Use appropriate PERSONAL PROTECTIVE EQUIPMENT during clean-up.

#### Accidental Release Measures

Ventilate area-especially low places where heavy vapors might collect. Remove open flames. Use self-contained breathing apparatus (SCBA) for large spills.

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**HANDLING AND STORAGE**


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**Handling (Personnel)**

Avoid breathing vapors and liquid contact with the skin and eyes. Use with sufficient ventilation to keep employee exposure below recommended limits.

**Storage**

Clean, dry area. Do not heat above 125 deg F.

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**EXPOSURE CONTROLS/PERSONAL PROTECTION**


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**Engineering Controls**

Normal ventilation for standard procedures is generally adequate. Local exhaust should be used when large amounts are released. Mechanical ventilation should be used in low places.

**Personal Protective Equipment**

Lined neoprene gloves and chemical splash goggles should be used when handling liquid. Under normal manufacturing conditions, no respiratory protection is required when using this product. Self-contained breathing apparatus (SCBA) is required if a spill occurs.

**Exposure Guidelines**
**Exposure Limits**

"FREON" 13 Refrigerant	
PEL (OSHA)	: None Established
TLV (ACGIH)	: None Established

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**PHYSICAL AND CHEMICAL PROPERTIES**


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**Physical Data**

Boiling Point	: -81.4 C (-114.5 F)
Vapor Pressure	: 485 psia @ 25 deg C (77 deg F)
Vapor Density	: 3.6 at 25 deg C (77 deg F) (Air = 1)
% Volatiles	: 100 WT%
Evaporation Rate	: >1 (CCl <sub>4</sub> = 1)
Solubility in Water	: 0.009 WT% @ 25 C (77 F)
pH	: Neutral
Odor	: Slight ethereal
Form	: Gas
Color	: Clear, colorless

Liquid Density : 1.3 g/cc at -30 degC (-22 degF)

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**STABILITY AND REACTIVITY**

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**Chemical Stability**

Material is stable. However, avoid open flames and high temperatures.

**Polymerization**

Polymerization will not occur.

**Other Hazards**

**Incompatibility** : Alkali or alkaline earth metals - powdered Al, Zn, Be, etc.

**Decomposition** : "Freon" 13 can be decomposed by high temperatures (open flames, glowing metal surfaces, etc.) forming hydrochloric and hydrofluoric acids, and possible carbonyl halides.

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**TOXICOLOGICAL INFORMATION**

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**Animal Data**

Inhalation 2 hour LC50: > 600,000 ppm in rats

The compound is untested for skin or eye irritancy, and animal sensitization.

In Guinea pigs there was a slight narcotic effect as determined by loss of righting reflex during a 60 minute exposure to various concentrations by inhalation. Cardiac sensitization was observed in beagle dogs exposed to 800,000 ppm for 5 minutes and challenged with adrenalin for 10 seconds. Repeated exposures to concentrations as high as 200,000 ppm produced no adverse effects.

No animal test reports are available to define carcinogenic, developmental, or reproductive hazards. The compound does not produce genetic damage in bacterial cell cultures.

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**DISPOSAL CONSIDERATIONS**

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**Waste Disposal**

Reclaim by distillation or remove to permitted waste disposal facility. Comply with Federal, State and Local regulations.

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TRANSPORTATION INFORMATION  
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## # Shipping Information

DOT/IMO  
Proper Shipping Name : CHLOROTRIFLUOROMETHANE  
Hazard Class : 2.2  
UN No. : 1022  
Special Information : IMO/ICAO LABEL

NONFLAMMABLE GAS

Shipping Containers

Cylinders

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REGULATORY INFORMATION  
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## U.S. Federal Regulations

TSCA Inventory Status : Reported/Included.

TITLE III HAZARD CLASSIFICATIONS SECTIONS 311, 312

Acute : Yes  
Chronic : No  
Fire : No  
Reactivity : No  
Pressure : Yes

## LISTS:

Extremely Hazardous Substance - No  
CERCLA Hazardous Substance - No  
Toxic Chemicals - No

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OTHER INFORMATION  
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## NFPA, NPMA-HMIS

NPMA-HMIS Rating  
Health : 1  
Flammability : 0  
Reactivity : 1

Personal Protection rating to be supplied by user depending on use conditions.

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(Continued)

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The data in 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.

Responsibility for MSDS : MSDS Coordinator  
> : DuPont Fluoroproducts  
Address : Wilmington, DE 19898  
Telephone : (800) 441-7515

# Indicates updated section.

This information is based upon technical information believed to be reliable. It is subject to revision as additional knowledge and experience is gained.

End of MSDS

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- Nitrogen



### MATERIAL SAFETY DATA SHEET

#### SECTION 1. PRODUCT IDENTIFICATION

**PRODUCT NAME:** Nitrogen, compressed  
**CHEMICAL NAME:** Nitrogen  
**FORMULA:** N<sub>2</sub>  
**SYNONYMS:** Nitrogen gas, Gaseous Nitrogen, GAN  
**MANUFACTURER:** Air Products and Chemicals, Inc.  
 7201 Hamilton Boulevard  
 Allentown, PA 18195 - 1501  
**PRODUCT INFORMATION:** 1-800-752-1597  
**MSDS NUMBER:** 1011 **REVISION:** 5  
**REVISION DATE:** March 1994 **REVIEW DATE:**

August 1997

#### SECTION 2. COMPOSITION/INFORMATION ON INGREDIENTS

Nitrogen is sold as pure product > 99%.

**CAS NUMBER:** 7727-37-9

**EXPOSURE LIMITS:**

**OSHA:** Not established

**ACGIH:** Simple asphyxiant

**NIOSH:** Not established

#### SECTION 3. HAZARDS IDENTIFICATION

##### EMERGENCY OVERVIEW

Nitrogen is a nontoxic, odorless, colorless, nonflammable compressed gas stored in cylinders at high pressure. It can cause rapid suffocation when concentrations are sufficient to reduce oxygen levels below 19.5%. Self Contained Breathing Apparatus (SCBA) may be required.

##### EMERGENCY TELEPHONE NUMBERS

800-523-9374 Continental U.S., Canada and Puerto Rico  
 610-481-7711 other locations

##### POTENTIAL HEALTH EFFECTS INFORMATION:

**INHALATION:** Simple asphyxiant. Nitrogen is nontoxic, but may cause suffocation by displacing the oxygen in air. Lack of sufficient oxygen can cause serious injury or death.

**EYE CONTACT:** No adverse effect.

**SKIN CONTACT:** No adverse effect.

##### EXPOSURE INFORMATION:

**ROUTE OF ENTRY:** Inhalation

**TARGET ORGANS:** None

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**EFFECT:** Asphyxiation (suffocation)

**SYMPTOMS:** Exposure to an oxygen deficient atmosphere (<19.5%) may cause dizziness, drowsiness, nausea, vomiting, excess salivation, diminished mental alertness, loss of consciousness and death. Exposure to atmospheres containing 8-10% or less oxygen will bring about unconsciousness without warning and so quickly that the individuals cannot help themselves.

**MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE:** None

**CARCINOGENIC POTENTIAL:** Nitrogen is not listed as a carcinogen or potential carcinogen by NTP, IARC, or OSHA.

### SECTION 4. FIRST AID

**INHALATION:** Persons suffering from lack of oxygen should be moved to fresh air. If victim is not breathing, administer artificial respiration. If breathing is difficult, administer oxygen. Obtain prompt medical attention.

**EYE CONTACT:** Not applicable.

**SKIN CONTACT:** Not applicable.

### SECTION 5. FIRE AND EXPLOSION

**FLASH POINT:**

Not applicable

**AUTOIGNITION:**

Nonflammable

**FLAMMABLE LIMITS:**

Nonflammable

**EXTINGUISHING MEDIA:** Nitrogen is nonflammable and does not support combustion. Use extinguishing media appropriate for the surrounding fire.

**HAZARDOUS COMBUSTION PRODUCTS:** None

**SPECIAL FIRE FIGHTING INSTRUCTIONS:** Nitrogen is a simple asphyxiant. If possible, remove nitrogen cylinders from fire area or cool with water. SCBA may be required by rescue workers.

**UNUSUAL FIRE AND EXPLOSION HAZARDS:** Upon exposure to intense heat or flame cylinder may vent rapidly and/or rupture violently. Most cylinders are designed to vent contents when exposed to elevated temperatures. Pressure in a container can build up due to heat and it may rupture if pressure relief devices should fail to function.

### SECTION 6. ACCIDENTAL RELEASE MEASURES

Evacuate all personnel from affected area. Increase ventilation to release area and monitor oxygen level. Use appropriate protective equipment (SCBA). If leak is from container or its valve, call the Air Products emergency telephone number. If leak is in user's system close cylinder valve and vent pressure before attempting repairs.

### SECTION 7. HANDLING AND STORAGE

**STORAGE:** Cylinders should be stored upright in a well-ventilated, secure area, protected from the weather. Storage area temperatures should not exceed 125 °F (52 °C) and area should be free of combustible materials. Storage should be away from heavily traveled areas and emergency exits. Avoid areas where salt or other corrosive materials are present. Valve protection caps and valve outlet seals should remain on cylinders not connected for use. Separate full from empty cylinders. Avoid excessive inventory and storage time. Use a first-in first-out system. Keep good inventory records.

**HANDLING:** Do not drag, roll, or slide cylinder. Use a suitable handtruck designed for cylinder movement. Never attempt to lift a cylinder by its cap. Secure cylinders at all times while in use. Use a pressure reducing regulator or separate control valve to safely discharge gas from cylinder. Use a check valve to prevent reverse flow into cylinder. Do not overheat cylinder to increase pressure or discharge rate. If user experiences any difficulty operating cylinder valve, discontinue use and contact supplier. Never insert an object (e.g., wrench, screwdriver, pry bar, etc.) into valve cap openings. Doing so may

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damage valve causing a leak to occur. Use a special cap wrench or adjustable strap-wrench to remove over-tight or rusted caps.

Nitrogen is compatible with all common materials of construction. Pressure requirements should be considered when selecting materials and designing systems.

**SPECIAL REQUIREMENTS:** Always store and handle compressed gases in accordance with Compressed Gas Association, Inc. (ph. 703-412-0900) pamphlet CGA P-1, *Safe Handling of Compressed Gases in Containers*. Local regulations may require specific equipment for storage or use.

**CAUTION:** Users of nitrogen must be aware of the hazards caused by the accumulation of high concentrations, especially in confined spaces. Compliance with OSHA regulations, especially 29 CFR 1910.146 (confined space entry), is essential

### SECTION 8. PERSONAL PROTECTION / EXPOSURE CONTROL

**ENGINEERING CONTROLS:** Provide good ventilation and/or local exhaust to prevent accumulation of high concentrations of gas. Oxygen levels in work area should be monitored to ensure they do not fall below 19.5%.

**RESPIRATORY PROTECTION:**

GENERAL USE: None required.

EMERGENCY: Use SCBA or positive pressure air line with mask and escape pack in areas where oxygen concentration is less than 19.5%. Air purifying respirators will not provide protection.

**OTHER PROTECTIVE EQUIPMENT:** Safety glasses. Safety shoes and leather work gloves are recommended when handling cylinders.

### SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

**APPEARANCE:** Colorless gas

**ODOR:** Odorless

**MOLECULAR WEIGHT:** 28.01

**BOILING POINT (1 Atm):** -320.4 °F (-195.8 °C)

**SPECIFIC GRAVITY (Air =1):** 0.967

**SPECIFIC VOLUME (at 70 °F (21.1 °C) and 1 atm):** 13.81 ft<sup>3</sup>/lb (0.867m<sup>3</sup>/kg)

**FREEZING POINT/MELTING POINT:** -345.8 °F (-209.9 °C)

**VAPOR PRESSURE:** Not applicable at 70 °F

**GAS DENSITY (at 70 °F (21.1 °C) and 1 atm):** 0.072 lb/ft<sup>3</sup> (1.153 kg/m<sup>3</sup>)

**SOLUBILITY IN WATER (Vol./Vol. at 32°F (0°C)):** 0.023

### SECTION 10. STABILITY AND REACTIVITY

**CHEMICAL STABILITY:** Stable

**CONDITIONS TO AVOID:** None

**INCOMPATIBILITY:** None

**HAZARDOUS DECOMPOSITION PRODUCTS:** None

**HAZARDOUS POLYMERIZATION:** Will not occur.

### SECTION 11. TOXICOLOGICAL INFORMATION

Nitrogen is a simple asphyxiant.

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### SECTION 12. ECOLOGICAL INFORMATION

The atmosphere contains approximately 78% nitrogen. No adverse ecological effects are expected. Nitrogen does not contain any Class I or Class II ozone depleting chemicals. Nitrogen is not listed as a marine pollutant by DOT (49 CFR 171).

### SECTION 13. DISPOSAL

**UNUSED PRODUCT / EMPTY CONTAINER:** Return cylinder and unused product to supplier. Do not attempt to dispose of residual or unused quantities.

**DISPOSAL:** For emergency disposal, secure the cylinder and slowly discharge gas to the atmosphere in a well ventilated area or outdoors.

### SECTION 14. TRANSPORT INFORMATION

**DOT HAZARD CLASS:** 2.2

**DOT SHIPPING LABEL:** Nonflammable Gas

**DOT SHIPPING NAME:** Nitrogen, Compressed

**IDENTIFICATION NUMBER:** UN1066

**REPORTABLE QUANTITY (RQ):** None

**SPECIAL SHIPPING INFORMATION:** Cylinders should be transported in a secure upright position in a well ventilated truck. Never transport in passenger compartment of a vehicle.

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.

### SECTION 15. REGULATORY INFORMATION

#### U.S. FEDERAL REGULATIONS:

#### ENVIRONMENTAL PROTECTION AGENCY (EPA):

**CERCLA:** Comprehensive Environmental Response, Compensation, and Liability Act of 1980 requires notification to the National Response Center of a release of quantities of hazardous substances equal to or greater than their reportable quantities (RQ's) in 40 CFR 302.4.

CERCLA Reportable Quantity: None.

**SARA TITLE III:** Superfund Amendment and Reauthorization Act of 1986

**SECTION 302/304:** Requires emergency planning on threshold planning quantities (TPQ) and release reporting based on reportable quantities (RQ) of EPA's extremely hazardous substances (40 CFR 355).

Nitrogen is not listed as an extremely hazardous substance.

Threshold Planning Quantity (TPQ): None

**SECTIONS 311/312:** Require submission of material safety data sheets (MSDSs) and chemical inventory reporting with identification of EPA defined hazard classes. The hazard classes for this product are:

**IMMEDIATE HEALTH:** No

**PRESSURE:** Yes

**DELAYED HEALTH:** No

**REACTIVITY:** No

**FIRE:** No

**SECTION 313:** Requires submission of annual reports of release of toxic chemicals that appear in 40 CFR 372.

Nitrogen does not require reporting under Section 313.

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**40 CFR Part 68 - Risk Management for Chemical Accident Release Prevention:** Requires the development and implementation of risk management programs at facilities that manufacture, use, store, or otherwise handle regulated substances in quantities that exceed specified thresholds.

Nitrogen is not listed as a regulated substance.

**TSCA - TOXIC SUBSTANCES CONTROL ACT:** Nitrogen is listed on the TSCA inventory.

**OSHA - OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION:**

**29 CFR 1910.119 - Process Safety Management of Highly Hazardous Chemicals:** Requires facilities to develop a process safety management program based on Threshold Quantities (TQ) of highly hazardous chemicals.

Nitrogen is not listed in Appendix A as a highly hazardous chemical.

### STATE REGULATIONS

#### CALIFORNIA:

Proposition 65: This product does NOT contain any listed substances which the State of California requires warning under this statute.

SCAQMD Rule: VOC = Not applicable

### SECTION 16. OTHER INFORMATION

#### NFPA RATINGS:

HEALTH:	0
FLAMMABILITY:	0
REACTIVITY:	0
SPECIAL:	SA*

#### HMIS RATINGS:

HEALTH:	0
FLAMMABILITY:	0
REACTIVITY:	0

\*Compressed Gas Association recommendation to designate simple asphyxiant.

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*\*\* Documents with Review Dates August 1997 and Revision Date March 1994 are identical in content and either may be used.*

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### ○ Propilè



### Propylene

#### Safety Data Sheet P-4648

according to U.S. Code of Federal Regulations 29 CFR 1910.1200, Hazard Communication.

Date of issue: 01/01/1983 Revision date: 04/08/2015 Supersedes: 01/13/2015

#### SECTION: 1. Product and company identification

##### 1.1. Product identifier

Product form	:	Substance
Name	:	Propylene
CAS No	:	115-07-1
Formula	:	C <sub>3</sub> H <sub>6</sub>

##### 1.2. Relevant identified uses of the substance or mixture and uses advised against

Use of the substance/mixture	:	Industrial use. Use as directed.
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##### 1.3. Details of the supplier of the safety data sheet

Praxair, Inc.  
39 Old Ridgebury Road  
Danbury, CT 06810-5113 - USA  
T 1-800-772-9247 (1-800-PRAXAIR) - F 1-716-879-2146  
[www.praxair.com](http://www.praxair.com)

##### 1.4. Emergency telephone number

Emergency number	:	Onsite Emergency: 1-800-645-4633
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CHEMTREC, 24hr/day 7days/week — Within USA: 1-800-424-9300, Outside USA: 001-703-527-3887 (collect calls accepted, Contract 17729)

#### SECTION 2: Hazards identification

##### 2.1. Classification of the substance or mixture

###### Classification (GHS-US)

Flam. Gas 1 H220  
Liquefied gas H280

##### 2.2. Label elements

###### GHS-US labeling

Hazard pictograms (GHS-US)



Signal word (GHS-US)

:

DANGER

Hazard statements (GHS-US)

:

H220 - EXTREMELY FLAMMABLE GAS  
H280 - CONTAINS GAS UNDER PRESSURE; MAY EXPLODE IF HEATED  
OSHA-H01 - MAY DISPLACE OXYGEN AND CAUSE RAPID SUFFOCATION.  
CGA-HG04 - MAY FORM EXPLOSIVE MIXTURES WITH AIR  
CGA-HG01 - MAY CAUSE FROSTBITE.

Precautionary statements (GHS-US)

:

P202 - Do not handle until all safety precautions have been read and understood  
P210 - Keep away from Heat, Open flames, Sparks, Hot surfaces. - No smoking  
P271+P403 - Use and store only outdoors or in a well-ventilated place.  
P377 - Leaking gas fire: Do not extinguish, unless leak can be stopped safely  
P381 - Eliminate all ignition sources if safe to do so  
CGA-PG05 - Use a back flow preventive device in the piping.  
CGA-PG12 - Do not open valve until connected to equipment prepared for use.  
CGA-PG06 - Close valve after each use and when empty.  
CGA-PG11 - Never put cylinders into unventilated areas of passenger vehicles.  
CGA-PG02 - Protect from sunlight when ambient temperature exceeds 52°C (125°F).

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### Propylene

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Date of issue: 01/01/1983      Revision date: 04/08/2015      Supersedes: 01/13/2015

#### 2.3. Other hazards

Other hazards not contributing to the classification : Contact with liquid may cause cold burns/frostbite.

#### 2.4. Unknown acute toxicity (GHS US)

No data available

### SECTION 3: Composition/information on ingredients

#### 3.1. Substance

Name	Product identifier	%
Propylene (Main constituent)	(CAS No) 115-07-1	100

#### 3.2. Mixture

Not applicable

### SECTION 4: First aid measures

#### 4.1. Description of first aid measures

First-aid measures after inhalation : Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.

First-aid measures after skin contact : The liquid may cause frostbite. For exposure to liquid, immediately warm frostbite area with warm water not to exceed 105°F (41°C). Water temperature should be tolerable to normal skin. Maintain skin warming for at least 15 minutes or until normal coloring and sensation have returned to the affected area. In case of massive exposure, remove clothing while showering with warm water. Seek medical evaluation and treatment as soon as possible.

First-aid measures after eye contact : . Adverse effects not expected from this product.  
: Immediately flush eyes thoroughly with water for at least 15 minutes. Hold the eyelids open and away from the eyeballs to ensure that all surfaces are flushed thoroughly. Contact an ophthalmologist immediately. Get immediate medical attention.

First-aid measures after ingestion : Ingestion is not considered a potential route of exposure.

#### 4.2. Most important symptoms and effects, both acute and delayed

No additional information available

#### 4.3. Indication of any immediate medical attention and special treatment needed

None.

### SECTION 5: Firefighting measures

#### 5.1. Extinguishing media

Suitable extinguishing media : Carbon dioxide, Dry chemical, Water spray or fog.

#### 5.2. Special hazards arising from the substance or mixture

Fire hazard : EXTREMELY FLAMMABLE GAS. If venting or leaking gas catches fire, do not extinguish flames. Flammable vapors may spread from leak, creating an explosive reignition hazard. Vapors can be ignited by pilot lights, other flames, smoking, sparks, heaters, electrical equipment, static discharge, or other ignition sources at locations distant from product handling point. Explosive atmospheres may linger. Before entering an area, especially a confined area, check the atmosphere with an appropriate device.

Explosion hazard : EXTREMELY FLAMMABLE GAS. Forms explosive mixtures with air and oxidizing agents.

Reactivity : No reactivity hazard other than the effects described in sub-sections below.

#### 5.3. Advice for firefighters

Firefighting instructions : Evacuate all personnel from the danger area. Use self-contained breathing apparatus (SCBA) and protective clothing. Immediately cool containers with water from maximum distance. Stop flow of gas if safe to do so, while continuing cooling water spray. Remove ignition sources if safe to do so. Remove containers from area of fire if safe to do so. On-site fire brigades must comply with OSHA 29 CFR 1910.156 and applicable standards under 29 CFR 1910 Subpart L—Fire Protection.

Protection during firefighting : Compressed gas: asphyxiant. Suffocation hazard by lack of oxygen.

Special protective equipment for fire fighters : Standard protective clothing and equipment (Self Contained Breathing Apparatus) for fire fighters.

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### Propylene

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##### Specific methods

- : Use fire control measures appropriate for the surrounding fire. Exposure to fire and heat radiation may cause gas containers to rupture. Cool endangered containers with water spray jet from a protected position. Prevent water used in emergency cases from entering sewers and drainage systems.
- Stop flow of product if safe to do so.
- Use water spray or fog to knock down fire fumes if possible.
- Do not extinguish a leaking gas flame unless absolutely necessary. Spontaneous/explosive re-ignition may occur. Extinguish any other fire.

#### SECTION 6: Accidental release measures

##### 6.1. Personal precautions, protective equipment and emergency procedures

###### General measures

- : Eliminate ignition sources. Evacuate area. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous. Wear self-contained breathing apparatus when entering area unless atmosphere is proven to be safe. Ensure adequate ventilation. Stop leak if safe to do so.

###### 6.1.1. For non-emergency personnel

No additional information available

###### 6.1.2. For emergency responders

No additional information available

##### 6.2. Environmental precautions

Try to stop release. Prevent waste from contaminating the surrounding environment. Prevent soil and water pollution. Dispose of contents/container in accordance with local/regional/national/international regulations. Contact supplier for any special requirements.

##### 6.3. Methods and material for containment and cleaning up

No additional information available

##### 6.4. Reference to other sections

See also sections 8 and 13.

#### SECTION 7: Handling and storage

##### 7.1. Precautions for safe handling

###### Precautions for safe handling

- : Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Use only non-sparking tools. Use only explosion-proof equipment.

Wear leather safety gloves and safety shoes when handling cylinders. Protect cylinders from physical damage; do not drag, roll, slide or drop. While moving cylinder, always keep in place removable valve cover. Never attempt to lift a cylinder by its cap; the cap is intended solely to protect the valve. When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders. 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. Slowly open the valve. If the valve is hard to open, discontinue use and contact your supplier. Close the container valve after each use; keep closed even when empty. Never apply flame or localized heat directly to any part of the container. High temperatures may damage the container and could cause the pressure relief device to fail prematurely, venting the container contents. For other precautions in using this product, see section 16.

## 5. Seguretat i higiene



### Propylene

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#### 7.2. Conditions for safe storage, including any incompatibilities

##### Storage conditions

: Store only where temperature will not exceed 125°F (52°C). Post "No Smoking or Open Flames" signs in storage and use areas. There must be no sources of ignition. Separate packages and protect against potential fire and/or explosion damage following appropriate codes and requirements (e.g., NFPA 30, NFPA 55, NFPA 70, and/or NFPA 221 in the U.S.) or according to requirements determined by the Authority Having Jurisdiction (AHJ). Always secure containers upright to keep them from falling or being knocked over. Install valve protection cap, if provided, firmly in place by hand when the container is not in use. Store full and empty containers separately. Use a first-in, first-out inventory system to prevent storing full containers for long periods. For other precautions in using this product, see section 16.

OTHER PRECAUTIONS FOR HANDLING, STORAGE, AND USE: When handling product under pressure, use piping and equipment adequately designed to withstand the pressures to be encountered. Never work on a pressurized system. Use a back flow preventive device in the piping. Gases can cause rapid suffocation because of oxygen deficiency; store and use with adequate ventilation. If a leak occurs, close the container valve and blow down the system in a safe and environmentally correct manner in compliance with all international, federal/national, state/provincial, and local laws; then repair the leak. Never place a container where it may become part of an electrical circuit.

#### 7.3. Specific end use(s)

None.

### SECTION 8: Exposure controls/personal protection

#### 8.1. Control parameters

Propylene (115-07-1)	
ACGIH	ACGIH TLV-TWA (ppm)
USA OSHA	Not established

#### 8.2. Exposure controls

##### Appropriate engineering controls

: During welding, ensure that there is adequate ventilation to keep worker exposure below applicable limits for fumes, gases, and other by-products of welding. Do not breathe fumes or gases. Short-term overexposure to fumes may cause dizziness, nausea, and dryness or irritation of the nose, throat, and eyes, or may cause other similar discomfort. Use an explosion-proof local exhaust system. Local exhaust and general ventilation must be adequate to meet exposure standards. MECHANICAL (GENERAL): **Inadequate - Use only in a closed system.** Use explosion proof equipment and lighting.

##### Hand protection

: Wear working gloves when handling gas containers. Wear work gloves when handling containers; welding gloves for welding. Gloves must be free of oil and grease.

##### Eye protection

: Wear safety glasses with side shields or goggles when transfilling or breaking transfer connections. Wear safety glasses with side shields.

##### Respiratory protection

: When workplace conditions warrant respirator use, follow a respiratory protection program that meets OSHA 29 CFR 1910.134, ANSI Z88.2, or MSHA 30 CFR 72.710 (where applicable). Use an air-supplied or air-purifying cartridge if the action level is exceeded. Ensure that the respirator has the appropriate protection factor for the exposure level. If cartridge type respirators are used, the cartridge must be appropriate for the chemical exposure (e.g., an organic vapor cartridge). For emergencies or instances with unknown exposure levels, use a self-contained breathing apparatus (SCBA).

##### Thermal hazard protection

: Wear cold insulating gloves when transfilling or breaking transfer connections.

##### Environmental exposure controls

: Refer to local regulations for restriction of emissions to the atmosphere. See section 13 for specific methods for waste gas treatment.

##### Other information

: Wear safety shoes while handling containers. Consider the use of flame resistant anti-static safety clothing. Wear leather safety gloves and safety shoes when handling cylinders.

### SECTION 9: Physical and chemical properties

#### 9.1. Information on basic physical and chemical properties

Physical state	: Gas
Appearance	: Colorless gas.
Molecular mass	: 42 g/mol
Color	: Colorless.