

Praxair Material Safety Data Sheet

1. Chemical Product and Company Identification

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| Product Name: Halocarbon 21 | Trade Name: Halocarbon 21 |
| Product Use: Many. | |
| Chemical Name: Dichlorofluoromethane | Synonym: Fluorodichloromethane, Monofluorodichloromethane, Dichloromonofluoromethane, Refrigerant Gas R21 |
| Chemical Formula: CHCl ₂ F | Chemical Family: Halogenated Alkane |
| Telephone: Emergencies: * 1-800-363-0042 | Supplier /Manufacture: Praxair Canada Inc. 1 City Centre Drive Suite 1200 Mississauga, ON L5B 1M2 Phone: 905-803-1600 Fax: 905-803-1682 |

**Call emergency numbers 24 hours a day only for spills, leaks, fire, exposure, or accidents involving this product. For routine information, contact your supplier or Praxair sales representative.*

2. Composition and Information on Ingredients

| INGREDIENTS | % (VOL) | CAS NUMBER | LD ₅₀ (Species & Routes) | LC ₅₀ (Rat, 4 hrs.) | TLV-TWA (ACGIH) |
|-----------------------|---------|------------|--|-----------------------------------|--------------------|
| Dichlorofluoromethane | 100 | 75-43-4 | Not applicable. | 49900 ppm | 10 ppm. |

3. Hazards Identification

Emergency Overview

CAUTION! Liquid and gas under pressure. Harmful if inhaled. Can cause rapid suffocation. Can cause frostbite. May cause dizziness and drowsiness. Self-contained breathing apparatus may be required by rescue workers.

ROUTES OF EXPOSURE: Inhalation. Swallowing. Skin absorption. Skin contact. Eye contact.

THRESHOLD LIMIT VALUE: TLV-TWA Data from 2007 Guide to Occupational Exposure Values (ACGIH). TLV-TWAs should be used as a guide in the control of health hazards and not as fine lines between safe and dangerous concentrations.

EFFECTS OF A SINGLE (ACUTE) OVEREXPOSURE:

INHALATION: Asphyxiant. Effects are due to lack of oxygen. High concentrations may cause dizziness, nausea, vomiting, disorientation, confusion, incoordination, and narcosis. Lack of oxygen can kill. OSHA TLV: 10 ppm.

SKIN CONTACT: A highly unlikely route of exposure. This product is a gas at normal temperature and pressure. Liquid may cause frostbite.

SKIN ABSORPTION: Prolonged or widespread skin contact with the liquid may result in the absorption of harmful amounts of material.

SWALLOWING:

An unlikely route of exposure. This product is a gas at room temperature and pressure, but frostbite of the lips and mouth may result from contact with the liquid.

EYE CONTACT:

A highly unlikely route of exposure. This product is a gas at room temperature and pressure. Liquid may cause severe corneal injury.

EFFECTS OF REPEATED (CHRONIC) OVEREXPOSURE:

Repeated exposure has produced marked liver damage or failure.

OTHER EFFECTS OF OVEREXPOSURE:

At very high concentrations may produce cardiac arrhythmias or arrest due to sensitization of the heart to adrenalin and nor-adrenalin.

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE:

A knowledge of the available toxicology information and of the physical and chemical properties of the material suggests that overexposure is unlikely to aggravate existing medical conditions.

SIGNIFICANT LABORATORY DATA WITH POSSIBLE RELEVANCE TO HUMAN HEALTH HAZARD EVALUATION:

None currently known.

CARCINOGENICITY:

Not classified or listed by IARC, NTP, OSHA, EU and ACGIH.

4. First Aid Measures

INHALATION:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.

SKIN CONTACT:

If exposed to liquid, avoid breathing vapour. Immediately warm frostbite area with warm water (not to exceed 40 C). In case of massive exposure, remove clothing and shoes while showering with warm water. Get medical attention immediately.

SWALLOWING:

This product is a gas at normal temperature and pressure.

EYE CONTACT:

For contact with the liquid, immediately flush eyes thoroughly with warm water for at least 15 minutes. Hold the eyelids open and away from the eyeballs to ensure that all surfaces are flushed thoroughly. See a physician, preferably an ophthalmologist, immediately.

NOTES TO PHYSICIAN:

This material may be a cardiac sensitizer; avoid the use of epinephrine. There is no specific antidote, and treatment of overexposure should be directed at the control of symptoms and the clinical condition.

5. Fire Fighting Measures

| | | | |
|--|-------------------------------|---------------------------------------|-----------------|
| FLAMMABLE : | No. | IF YES, UNDER WHAT CONDITIONS? | Not applicable. |
| FLASH POINT (test method) | Not applicable. | AUTOIGNITION TEMPERATURE | Not applicable. |
| FLAMMABLE LIMITS IN AIR, % by volume: | LOWER: Not applicable. | UPPER: | Not applicable. |

EXTINGUISHING MEDIA:

This material cannot catch fire. Use media appropriate for surrounding fire.

SPECIAL FIRE FIGHTING PROCEDURES:

CAUTION! Evacuate all personnel to a safe distance. Immediately deluge containers with water spray from maximum distance until cool, then move containers away from fire area if without risk.

UNUSUAL FIRE AND EXPLOSION HAZARD:

Nonflammable material. This material cannot catch fire. Container may rupture due to heat of fire. No part of a container should be subjected to temperature higher than 52 C. Most containers are provided with a pressure relief device designed to vent contents when they are exposed to elevated temperature. Toxic fumes may be produced when heated.

HAZARDOUS COMBUSTION PRODUCTS:

Not applicable.

SENSITIVITY TO IMPACT:

Avoid impact against container.

SENSITIVITY TO STATIC DISCHARGE:

Not applicable.

6. Accidental Release Measures

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:

CAUTION! Immediately evacuate all personnel from danger area. Use self-contained breathing apparatus where needed. Shut off leak if without risk. Ventilate area of leak or move leaking container to well ventilated area. Before entering area, especially confined areas, check atmosphere with appropriate device.

WASTE DISPOSAL METHOD:

Prevent waste from contaminating the surrounding environment. Keep personnel away. Discard any product, residue, disposable container, or liner in an environmentally acceptable manner, in full compliance with federal, provincial, and local regulations. If necessary, call your local supplier for assistance.

7. Handling and Storage

PRECAUTIONS TO BE TAKEN IN STORAGE:

Store and use with adequate ventilation. Separate flammable cylinders from oxygen, chlorine, and other oxidizers by at least 6 m or use a barricade of non-combustible material. This barricade should be at least 1.5 m high and have a fire resistance rating of at least ½ hour. Firmly secure cylinders upright to keep them from falling or being knocked over. Screw valve protection cap firmly in place by hand. Post "No Smoking or Open Flames" signs in storage and use areas. There must be no sources of ignition. All electrical equipment in storage areas must be explosion-proof. Storage areas must meet national electric codes for Class 1 hazardous areas. Store only where temperature will not exceed 52 C. Store full and empty cylinders separately. Use a first-in, first-out inventory system to prevent storing full cylinders for long periods.

PRECAUTIONS TO BE TAKEN IN HANDLING:

Protect cylinders from damage. Use a suitable hand truck to move cylinders; do not drag, roll, slide, or drop. Never attempt to lift a cylinder by its cap; the cap is intended solely to protect the valve. Never insert an object (e.g., wrench, screwdriver, pry bar) into cap openings; doing so may damage the valve and cause a leak. Use an adjustable strap wrench to remove over-tight or rusted caps. Open valve slowly. If valve is hard to open, discontinue use and contact your supplier. For other precautions, see Section 16.

For additional information on storage and handling, refer to Compressed Gas Association (CGA) pamphlet P-1, *Safe Handling of Compressed Gases in Containers*, available from the CGA. Refer to Section 16 for the address and phone number along with a list of other available publications.

OTHER HAZARDOUS CONDITIONS OF HANDLING, STORAGE, AND USE:

Liquefied gas under pressure. Use piping and equipment adequately designed to withstand pressures to be encountered. **Gas can cause rapid suffocation due to oxygen deficiency.** Store and use with adequate ventilation. Close valve after each use; keep closed even when empty. **Prevent reverse flow.** Reverse flow into cylinder may cause rupture. Use a check valve or other protective device in any line or piping from the cylinder. **When returning cylinder to supplier,** be sure valve is closed, then install valve outlet plug tightly. **Never work on pressurized system.** If there is a leak, close the cylinder valve. Vent the system down in a safe and environmentally sound manner in compliance with all federal, provincial, and local laws; then repair the leak. **Never place a compressed gas cylinder where it may become part of an electrical circuit.**

8. Exposure Controls/Personal Protection

VENTILATION/ENGINEERING CONTROLS:

LOCAL EXHAUST: Preferred. See SPECIAL.

MECHANICAL (general): Acceptable. See SPECIAL.

SPECIAL: Use only in a closed system.

OTHER: See SPECIAL.

PERSONAL PROTECTION:

RESPIRATORY PROTECTION: Use respirable fume respirator or air supplied respirator when working in confined space or where local exhaust or ventilation does not keep exposure below TLV. Select in accordance with the provincial regulations or guidelines. Selection should also be based on the current CSA standards Z94.4, "Selection, care and use of respirators". Respirators should be approved by NIOSH and MSHA.

SKIN PROTECTION: Neoprene gloves.

EYE PROTECTION: Wear safety glasses when handling cylinders.

Select in accordance with the current CSA standard Z94.3, "Industrial Eye and Face Protection", and any provincial regulations, local bylaws or guidelines.

OTHER PROTECTIVE EQUIPMENT: Metatarsal shoes for cylinder handling. Protective clothing where needed. Cuffless trousers should be worn outside the shoes. Select in accordance with the current CSA standard Z195, "Protective Foot Wear", and any provincial regulations, local bylaws or guidelines.

9. Physical and Chemical Properties

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| PHYSICAL STATE: Gas. (Compressed Gas) | FREEZING POINT: -135°C (-211°F) | pH: Not applicable. |
| BOILING POINT 8.9°C (48°F) | VAPOUR PRESSURE 57.9 kPa (@ 20°C) | MOLECULAR WEIGHT: 102.92 g/mole |
| SPECIFIC GRAVITY: Not available. LIQUID (Water = 1) | SOLUBILITY IN WATER, Slight. | |
| SPECIFIC GRAVITY: 3.82 VAPOUR (air = 1) | EVAPORATION RATE High. (Butyl Acetate=1): | COEFFICIENT OF WATER/OIL DISTRIBUTION: Not applicable. |
| VAPOUR DENSITY: Not available. | % VOLATILES BY VOLUME: 100% (v/v). | ODOUR THRESHOLD: Not available. |

APPEARANCE & ODOUR: Colourless.

Odour: Ethereal.

10. Stability and Reactivity

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| STABILITY: | The product is stable. |
| CONDITIONS OF CHEMICAL INSTABILITY: | Elevated temperatures and pressures and/or presence of a catalyst. |
| INCOMPATIBILITY (materials to avoid): | Natural rubber, magnesium and alloys containing greater than 2% magnesium in the presence of water. Many plastics. Chemically active metals: sodium, potassium, calcium, powdered aluminum and zinc. |
| HAZARDOUS DECOMPOSITION PRODUCTS: | Thermal decomposition may produce toxic fumes of fluorides and chlorides. |
| HAZARDOUS POLYMERIZATION: | Will not occur. |
| CONDITIONS OF REACTIVITY: | None known. |

11. Toxicological Information

See section 3.

12. Ecological Information

WARNING! Contains dichlorofluoromethane, a substance which harms public health and environment by destroying ozone in the upper atmosphere. The material is not listed as a marine pollutant by TDG regulations.

13. Disposal Considerations

WASTE DISPOSAL METHOD: Do not attempt to dispose of residual or unused quantities. Return cylinder to supplier.

14. Transport Information

TDG/IMO SHIPPING NAME: Dichlorofluoromethane

| HAZARD CLASS: | IDENTIFICATION #: | PRODUCT RQ: |
|--|-------------------|---|
| C L A S S 2 . 2 : Non-flammable, non-corrosive and non-poisonous gas. | UN1029 | Any accidental release in a quantity that could pose a danger to public safety or any sustained release of 10 minutes or more |

SHIPPING LABEL(s): Non-flammable, non-poisonous gas

PLACARD (when required): Non-flammable, non-poisonous gas

SPECIAL SHIPPING INFORMATION:

Cylinders should be transported in a secure position, in a well-ventilated vehicle. Cylinders transported in an enclosed, nonventilated compartment of vehicle can present serious safety hazards.

15. Regulatory Information

The following selected regulatory requirements may apply to this product. Not all such requirements are identified. Users of this product are solely responsible for compliance with all applicable federal, provincial, and local regulations.

DSL (Canada) This product is on the DSL list
WHMIS (Canada) CLASS A: Compressed gas.

International Regulations

EINECS Not available.
DSCL (EEC) This product is not classified according to the EU regulations.
International Lists No products were found.

16. Other Information

MIXTURES:

When two or more gases, or liquefied gases are mixed, their hazardous properties may combine to create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an Industrial Hygienist, or other trained person when you make your safety evaluation of the end product. Remember, gases and liquids have properties which can cause serious injury or death.

HAZARD RATING SYSTEM:

HMIS RATINGS:

HEALTH 0
FLAMMABILITY 0
PHYSICAL HAZARD 2

STANDARD VALVE CONNECTIONS FOR U.S. AND CANADA:

THREADED: CGA-660
PIN-INDEXED YOKE: Not available.
ULTRA-HIGH-INTEGRITY CONNECTION: Not available.

Use the proper CGA connections. **DO NOT USE ADAPTERS.** Additional limited-standard connections may apply. See CGA pamphlets V-1 and V-7 listed below.

Ask your supplier about free Praxair safety literature as referred to in this MSDS and on the label for this product. Further information about this product can be found in the following pamphlets published by the Compressed Gas Association, Inc. (CGA), 4221 Walney Road, 5th Floor, Chantilly, VA 20151-2923, Telephone (703) 788-2700, Fax (703) 961-1831, website: www.cganet.com.

AV-1 Safe Handling and Storage of Compressed Gas
P-1 Safe Handling of Compressed Gases in Containers
P-14 Accident Prevention in Oxygen-Rich, Oxygen-Deficient Atmosphere
SB-2 Oxygen-Deficient Atmospheres
V-1 Compressed Gas Cylinder Valve Inlet and Outlet Connections
V-7 Standard Method of Determining Cylinder Valve Outlet Connections for Industrial Gas Mixtures
--- Handbook of Compressed Gases, Fourth Edition

PREPARATION INFORMATION:

DATE: 10/15/2007
DEPARTMENT: Safety and Environmental Services
TELEPHONE: 905-803-1600

The opinions expressed herein are those of qualified experts within Praxair Canada Inc. We believe that the information contained herein is current as of the date of this Material Safety Data Sheet. Since the use of this information and the conditions of use of the product are not within the control of Praxair Canada Inc., it is the user's obligation to determine the conditions of safe use of the product.

Praxair Canada Inc. requests the users of this product to study this Material Data Sheet (MSDS) and become aware of product hazards and safety information. To promote safe use of this product, a user should (1) notify its employees, agents and contractors of the information on this MSDS and any product hazards and safety information, (2) furnish this same information to each of its customers for the product, and (3) request such customers to notify their employees and customers for the product of the same product hazards and safety information.

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