

Praxair™ Material Safety Data Sheet

1. Chemical Product and Company Identification

Product Name: Halocarbon 23 (MSDS No. P-4668-E)	Trade Name: Not applicable
Chemical Name: Trifluoromethane	Synonyms: Fluoroform, Methyl Trifluoride, Fluoryl
Formula: CHF ₃	Chemical Family: Fluorocarbon
Telephone:	Company Name: Praxair, Inc. 39 Old Ridgebury Road Danbury CT 06810-5113
Emergencies: 1-800-645-4633* CHEMTREC 1-800-424-9300* Routine: 1-800-PRAXAIR	

*Call emergency numbers 24 hours a day only for spills, leaks, fire, exposure, or accidents involving this product. For routine information contact your supplier, Praxair sales representative, or call 1-800-PRAXAIR (1-800-772-9247).

2. Composition / Information on Ingredients

For custom mixtures of this product request a Material Safety Data Sheet for each component. See Section 16 for important information about mixtures.

INGREDIENT NAME	CAS NUMBER	PERCENTAGE	OSHA PEL	ACGIH TLV
Trifluoromethane	75-46-7	>99*	None currently established	None currently established

*The symbol ">" means "greater than."

3. Hazards Identification

EMERGENCY OVERVIEW

CAUTION! High-pressure liquid and gas.

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.

Odor: Ether-like.

THRESHOLD LIMIT VALUE: None currently established.

EFFECTS OF A SINGLE (ACUTE) OVEREXPOSURE:

INHALATION—Asphyxiant. Very high concentrations can cause dizziness, nausea, vomiting, disorientation, confusion, incoordination, and narcosis—effects due to suffocation. Lack of oxygen can kill.

SKIN CONTACT—Liquid Halocarbon 23 may cause frostbite; harmful amounts may be absorbed if skin contact is prolonged or widespread.

SWALLOWING—An unlikely route of exposure, but frostbite of the lips and mouth may result from contact with the liquid.

EYE CONTACT—Liquid may cause severe corneal injury.

EFFECTS OF REPEATED (CHRONIC) OVEREXPOSURE: No harm expected.

OTHER EFFECTS OF OVEREXPOSURE: At very high concentrations, Halocarbon 23 may produce cardiac arrhythmias or arrest due to sensitization of the heart to adrenaline and noradrenalin. Exposure to fluorocarbon thermal decomposition products may produce flu-like symptoms including chills, fever, weakness, muscular aches, headache, chest discomfort, sore throat, and dry cough. Complete recovery usually occurs within 24 hours after exposure.

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE: The toxicology and the physical and chemical properties of the material suggest that overexposure is unlikely to aggravate existing medical conditions.

SIGNIFICANT LABORATORY DATA WITH POSSIBLE RELEVANCE TO HUMAN HEALTH HAZARD EVALUATION: None known.

CARCINOGENICITY: Halocarbon 23 is not listed by NTP, OSHA, and IARC.

4. First Aid Measures

INHALATION: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, qualified personnel may give oxygen. Call a physician.

SKIN CONTACT: For exposure to liquid, immediately warm frostbite area with warm water not to exceed 105°F (41°C). In case of massive exposure, remove clothing while showering with warm water. Call a physician.

SWALLOWING: An unlikely route of exposure. This product is a gas at normal temperature and pressure.

EYE CONTACT: For contact with the liquid, 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. See a physician, preferably an ophthalmologist, immediately.

NOTES TO PHYSICIAN: *Do not administer adrenaline; fluorocarbons have a sensitizing effect on the myocardium. Treatment of overexposure should be directed at the control of symptoms and the clinical condition. Exposure to fluorocarbon pyrolysis products should be considered in the diagnostic evaluation of occupationally related fever of short duration and unknown origin. Signs of exposure include tachycardia, hyperpnea, and pharyngeal congestion; investigation may reveal pulmonary edema and leucocytosis.*

5. Fire Fighting Measures

FLASH POINT (test method)	Not applicable	AUTOIGNITION TEMPERATURE	Not applicable
FLAMMABLE LIMITS IN AIR, % by volume	LOWER	Not applicable	UPPER Not applicable

EXTINGUISHING MEDIA: Halocarbon 23 cannot catch fire. Use media appropriate for surrounding fire.

SPECIAL FIRE FIGHTING PROCEDURES:

CAUTION! High-pressure liquid and gas. Evacuate all personnel from danger area. Immediately deluge cylinders with water from maximum distance until cool, then move them away from fire area if without risk. Self-contained breathing apparatus may be required by rescue workers. On-site fire brigades must comply with OSHA 29 CFR 1910.156.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Heat of fire can build pressure in cylinder and cause it to rupture. No part of cylinder should be subjected to a temperature higher than 125°F (52°C). Halocarbon 23 cylinders are equipped with a pressure relief device. (Exceptions may exist where authorized by DOT.) Toxic fumes may be produced when Halocarbon 23 is heated.

HAZARDOUS COMBUSTION PRODUCTS: None known.

6. Accidental Release Measures

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:

CAUTION! High-pressure liquid and gas. Immediately evacuate all personnel from danger area. Use self-contained breathing apparatus where needed. Shut off flow if without risk. Ventilate area or move cylinder to a well-ventilated area. Before entering area, especially confined areas, check for sufficient oxygen with an 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, state, 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. Firmly secure cylinders upright to keep them from falling or being knocked over. Screw valve protection cap firmly in place by hand. Store only where temperature will not exceed 125°F (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 in using Halocarbon 23, 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.

8. Exposure Controls/Personal Protection

VENTILATION/ENGINEERING CONTROLS:

LOCAL EXHAUST—Use a local exhaust system, if necessary, to control the concentration of this product in the worker's breathing zone.

MECHANICAL (general)—General exhaust ventilation may be acceptable if it can maintain an adequate supply of air.

SPECIAL—None

OTHER—None

RESPIRATORY PROTECTION: Use air-supplied respirators for protection against high concentrations. In confined spaces or oxygen-deficient atmospheres, use a full-face, self-contained breathing apparatus operated in the pressure demand mode. Respiratory protection must conform to OSHA rules as specified in 29 CFR 1910.134.

PROTECTIVE GLOVES: Wear work gloves when handling cylinders; insulated neoprene gloves when changing them out.

EYE PROTECTION: Wear safety glasses when handling cylinders, safety goggles or a full face shield when changing them out. Select eye protection in accordance with OSHA 29 CFR 1910.133.

OTHER PROTECTIVE EQUIPMENT: Metatarsal shoes for cylinder handling; protective clothing where needed. Select in accordance with OSHA 29 CFR 1910.132 and 1910.133. Regardless of protective equipment, never touch live electrical parts.

9. Physical and Chemical Properties

MOLECULAR WEIGHT: 70.01	EXPANSION RATIO: Not applicable
SPECIFIC GRAVITY (air=1): At 70°F (21.1°C) and 1 atm: 2.43	SOLUBILITY IN WATER: Slight.
GAS DENSITY: At 70°F (21.1°C) and 1 atm: 0.1821 lbs/ft ₃ (2.917 kg/m ₃)	VAPOR PRESSURE: AT 70°F (21.1°C): 624 psig (4302.3 kPa)
PERCENT VOLATILES BY VOLUME: 100	EVAPORATION RATE (Butyl Acetate=1): High
BOILING POINT (1 atm): -115.9°F (-82.2°C)	pH: Not applicable.
FREEZING POINT (1 atm): -247.4°F (-155.2°C)	
APPEARANCE, ODOR, AND STATE: Colorless gas at normal temperature and pressure; slightly ether-like odor.	

10. Stability and Reactivity

STABILITY:	Unstable		Stable	X
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INCOMPATIBILITY (materials to avoid): Halocarbon 23 is incompatible with polystyrene, natural rubber, alloys of more than 2% Mg in the presence of water, nitrosyl fluoride, N₂O₃, lime at dull red heat, and metals at elevated temperature.

HAZARDOUS DECOMPOSITION PRODUCTS: Thermal decomposition may produce toxic fumes of fluorides.

HAZARDOUS POLYMERIZATION:	May Occur		Will Not Occur	X
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CONDITIONS TO AVOID: Elevated temperatures. (The presence of some metals may promote catalytic decomposition of the gas.)

11. Toxicological Information

See section 3.

12. Ecological Information

Halocarbon 23 does not contain any Class I or Class II ozone-depleting chemicals. Halocarbon 23 is not listed as a marine pollutant by DOT.

13. Disposal Considerations

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

14. Transport Information

DOT/IMO SHIPPING NAME: Trifluoromethane	HAZARD CLASS: 2.2
IDENTIFICATION NUMBER: UN-1984	PRODUCT RQ: None
SHIPPING LABEL(s): NONFLAMMABLE GAS	PLACARD (When required): NONFLAMMABLE 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 a vehicle can present serious safety hazards.

Shipment of compressed gas cylinders that have been filled without the owner's consent is a violation of federal law [49 CFR 173.301(b)].

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, state, and local regulations.

U.S. FEDERAL REGULATIONS:**EPA (Environmental Protection Agency)**

CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (40 CFR Parts 117 and 302):

Reportable Quantity (RQ): None

SARA: Superfund Amendment and Reauthorization Act:

- **SECTIONS 302/304:** Require emergency planning based on Threshold Planning Quantity (TPQ) and release reporting based on Reportable Quantities (RQ) of extremely hazardous substances (40 CFR Part 355):

Threshold Planning Quantity (TPQ): None

Extremely Hazardous Substances (40 CFR 355): None

- **SECTIONS 311/312:** Require submission of Material Safety Data Sheets (MSDSs) and chemical inventory reporting with identification of EPA hazard categories. The hazard categories for this products are as follows:

IMMEDIATE: Yes

PRESSURE: Yes

DELAYED: No

REACTIVITY: No

FIRE: No

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

Halocarbon 23 does not require reporting under Section 313.

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

Halocarbon 23 is not listed as a regulated substance.

TSCA: Toxic Substances Control Act: Halocarbon 23 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.

Halocarbon 23 is not listed in Appendix A as a highly hazardous chemical.

STATE REGULATIONS:

CALIFORNIA: This product is not listed by California under the Safe Drinking Water Toxic Enforcement Act of 1986 (Proposition 65).

PENNSYLVANIA: This product is subject to the Pennsylvania Worker and Community Right-To-Know Act (35 P.S. Sections 7301-7320).

16. Other Information

Be sure to read and understand all labels and instructions supplied with all containers of this product.

OTHER HAZARDOUS CONDITIONS OF HANDLING, STORAGE, AND USE: *High-pressure liquid and gas.* Use piping and equipment adequately designed to withstand pressures to be encountered. *Gas can cause rapid suffocation due to oxygen deficiency.* Store and use with adequate ventilation. Close valve after each use; keep closed even when empty. *Do not smoke in areas where fluorocarbons are used.* Wash hands thoroughly after handling fluorocarbons or materials sprayed with them, especially before eating or smoking. *Never work on a pressurized system.* If there is a leak, close the cylinder valve. Blow the system down in an environmentally safe manner in compliance with all federal, state, and local laws, then repair the leak. *Never ground a compressed gas cylinder or allow it to become part of an electrical circuit.*

NOTE: *Prior to using any plastics, confirm their compatibility with Halocarbon 23.*

MIXTURES: When you mix two or more gases or liquefied gases, you can 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 evaluate the end product. Remember, gases and liquids have properties that can cause serious injury or death.

HAZARD RATING SYSTEMS:

NFPA RATINGS:

HEALTH = 2
 FLAMMABILITY = 0
 REACTIVITY = 1
 SPECIAL

HMIS RATINGS:

HEALTH = 0
 FLAMMABILITY = 0
 REACTIVITY = 1

STANDARD VALVE CONNECTIONS FOR U.S. AND CANADA:

THREADED: CGA-660, 320 (limited standard)
PIN-INDEXED YOKE: Not applicable.
ULTRA-HIGH-INTEGRITY CONNECTION: CGA-716

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

Ask your supplier about free Praxair safety literature as referenced on the label for this product; you may also obtain copies by calling 1-800-PRAXAIR. Further information about Halocarbon 23 can be found in the following pamphlets published by the Compressed Gas Association, Inc. (CGA), 1725 Jefferson Davis Highway, Arlington, VA 22202-4102, Telephone (703) 412-0900.

AV-1 *Safe Handling and Storage of Compressed Gases*
 P-1 *Safe Handling of Compressed Gases in Containers*
 P-14 *Accident Prevention in Oxygen-Rich, Oxygen Deficient Atmospheres*
 SB-2 *Oxygen-Deficient Atmospheres*
 V-1 *Compressed Gas Cylinder Valve Inlet and Outlet Connections Handbook of Compressed Gases, Third Edition*

Praxair asks users of this product to study this Material Safety Data Sheet (MSDS) and become aware of product hazards and safety information. To promote safe use of this product, a user should (1) notify employees, agents and contractors of the information on this MSDS and of any other known product hazards and safety information, (2) furnish this information to each purchaser of the product, and (3) ask each purchaser to notify its employees and customers of the product hazards and safety information.

The opinions expressed herein are those of qualified experts within Praxair, 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, Inc., it is the user's obligation to determine the conditions of safe use of the product.

Praxair MSDSs are furnished on sale or delivery by Praxair or the independent distributors and suppliers who package and sell our products. To obtain current Praxair MSDSs for these products, contact your Praxair sales representative or local distributor or supplier. If you have questions regarding Praxair MSDSs, would like the form number and date of the latest MSDS, or would like the names of the Praxair suppliers in your area, phone or write the Praxair Call Center (**Phone:** 1-800-PRAXAIR; **Address:** Praxair Call Center, Praxair, Inc., PO Box 44, Tonawanda, NY 14150-7891).

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