



Right to Know Hazardous Substance Fact Sheet

Common Name: **CHLORODIFLUOROMETHANE**

Synonyms: Difluoromonochloromethane; Freon 22®; Genetron-22®

Chemical Name: Methane, Chlorodifluoro-

Date: January 1999 Revision: October 2008

CAS Number: 75-45-6

RTK Substance Number: 0386

DOT Number: UN 1018

Description and Use

Chlorodifluoromethane is a colorless gas with a slight *Ether*-like odor. It is used as a refrigerant and a solvent. It is shipped as a liquified gas.

Reasons for Citation

- ▶ **Chlorodifluoromethane** is on the Right to Know Hazardous Substance List because it is cited by ACGIH, DOT, NIOSH, DEP, IARC, IRIS and EPA.

[SEE GLOSSARY ON PAGE 5.](#)

FIRST AID

Eye Contact

- ▶ Immediately flush with large amounts of water for at least 15 minutes, lifting upper and lower lids. Remove contact lenses, if worn, while flushing. Seek medical attention.

Skin Contact

- ▶ Immerse affected part in warm water. Seek medical attention.

Inhalation

- ▶ Remove the person from exposure
- ▶ Begin rescue breathing (using universal precautions) if breathing has stopped and CPR if heart action has stopped.
- ▶ Transfer promptly to a medical facility.

EMERGENCY NUMBERS

Poison Control: 1-800-222-1222

CHEMTREC: 1-800-424-9300

NJDEP Hotline: 1-877-927-6337

National Response Center: 1-800-424-8802

EMERGENCY RESPONDERS >>>> SEE BACK PAGE

Hazard Summary

Hazard Rating	NJDOH	NFPA
HEALTH	1	-
FLAMMABILITY	0	-
REACTIVITY	0	-
POISONOUS GASES ARE PRODUCED IN FIRE CONTAINERS MAY EXPLODE IN FIRE		

Hazard Rating Key: 0=minimal; 1=slight; 2=moderate; 3=serious; 4=severe

- ▶ **Chlorodifluoromethane** can affect you when inhaled.
- ▶ Contact can irritate the skin and eyes.
- ▶ Contact with *liquid Chlorodifluoromethane* can cause frostbite.
- ▶ Inhaling **Chlorodifluoromethane** can irritate the nose, throat and lungs.
- ▶ Very high exposure can decrease the amount of *Oxygen* in the air. This can cause headache, dizziness, lightheadedness, passing out and even death.
- ▶ Higher exposure may affect the heartbeat causing irregular rhythms and skipped beats.

Workplace Exposure Limits

NIOSH: The recommended airborne exposure limit (REL) is **1,000 ppm** averaged over a 10-hour workshift and **1,250 ppm**, not to be exceeded during any 15-minute work period.

ACGIH: The threshold limit value (TLV) is **1,000 ppm** averaged over an 8-hour workshift.

Determining Your Exposure

- ▶ Read the product manufacturer's Material Safety Data Sheet (MSDS) and the label to determine product ingredients and important safety and health information about the product mixture.
- ▶ For each individual hazardous ingredient, read the New Jersey Department of Health Hazardous Substance Fact Sheet, available on the RTK website (www.nj.gov/health/eoh/rtkweb) or in your facility's RTK Central File or Hazard Communication Standard file.
- ▶ You have a right to this information under the New Jersey Worker and Community Right to Know Act, the Public Employees Occupational Safety and Health (PEOSH) Act if you are a public worker in New Jersey, and under the federal Occupational Safety and Health Act (OSHA) if you are a private worker.
- ▶ The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard (29 CFR 1910.1200) and the PEOSH Hazard Communication Standard (N.J.A.C. 12:100-7) require employers to provide similar information and training to their employees.

This Fact Sheet is a summary of available information regarding the health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

Health Hazard Information

Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to

Chlorodifluoromethane:

- ▶ Contact can irritate the skin and eyes.
- ▶ Contact with *liquid Chlorodifluoromethane* can cause frostbite.
- ▶ Inhaling **Chlorodifluoromethane** can irritate the nose, throat and lungs causing tightness in the chest and/or difficulty in breathing.
- ▶ Very high exposure can decrease the amount of *Oxygen* in the air. This can cause headache, nausea, dizziness, weakness, sleepiness, tremors, loss of coordination, lightheadedness, passing out and even death.

Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to **Chlorodifluoromethane** and can last for months or years:

Cancer Hazard

- ▶ While **Chlorodifluoromethane** has been tested, it is not classifiable as to its potential to cause cancer.

Reproductive Hazard

- ▶ There is limited evidence that **Chlorodifluoromethane** may damage the developing fetus in animals.

Other Effects

- ▶ Higher exposure may affect the heartbeat causing irregular rhythms and skipped beats.

Medical

Medical Testing

If symptoms develop or overexposure is suspected, the following are recommended:

- ▶ Lung function tests if respiratory symptoms are present
- ▶ Special 24-48 hours EKG (Holter monitor) to observe and record abnormal heart rhythms

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under the OSHA Access to Employee Exposure and Medical Records Standard (29 CFR 1910.1020).

Mixed Exposures

- ▶ Smoking can cause heart disease, lung cancer, emphysema, and other respiratory problems. It may worsen respiratory conditions caused by chemical exposure. Even if you have smoked for a long time, stopping now will reduce your risk of developing health problems.

Workplace Controls and Practices

Very toxic chemicals, or those that are reproductive hazards or sensitizers, require expert advice on control measures if a less toxic chemical cannot be substituted. Control measures include: (1) enclosing chemical processes for severely irritating and corrosive chemicals, (2) using local exhaust ventilation for chemicals that may be harmful with a single exposure, and (3) using general ventilation to control exposures to skin and eye irritants. For further information on workplace controls, consult the NIOSH document on Control Banding at www.cdc.gov/niosh/topics/ctrlbanding/.

The following work practices are also recommended:

- ▶ Label process containers.
- ▶ Provide employees with hazard information and training.
- ▶ Monitor airborne chemical concentrations.
- ▶ Use engineering controls if concentrations exceed recommended exposure levels.
- ▶ Provide eye wash fountains and emergency showers.
- ▶ Wash or shower if skin comes in contact with a hazardous material.
- ▶ Always wash at the end of the workshift.
- ▶ Change into clean clothing if clothing becomes contaminated.
- ▶ Do not take contaminated clothing home.
- ▶ Get special training to wash contaminated clothing.
- ▶ Do not eat, smoke, or drink in areas where chemicals are being handled, processed or stored.
- ▶ Wash hands carefully before eating, smoking, drinking, applying cosmetics or using the toilet.

In addition, the following may be useful or required:

- ▶ Before entering a confined space where **Chlorodifluoromethane** is present, check to make sure sufficient *Oxygen* (19.5%) exists.

Personal Protective Equipment

The OSHA Personal Protective Equipment Standard (29 CFR 1910.132) requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

Gloves and Clothing

- ▶ Avoid skin contact with **Chlorodifluoromethane**. Wear personal protective equipment made from material which can not be permeated or degraded by this substance. Safety equipment suppliers and manufacturers can provide recommendations on the most protective glove and clothing material for your operation.
- ▶ Safety equipment manufacturers recommend Polyvinyl Alcohol, Silver Shield®/4H®, Viton, and Barrier® gloves for *Freons* and Tychem® BR, LV, Responder®, and TK; Zytron® 500; ONESuit®TEC; and Trelchem®, or the equivalent, as protective materials for *Halogenated compounds*.
- ▶ All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

- ▶ Where exposure to cold equipment, vapors, or liquid may occur, employees should be provided with *insulated* gloves and special clothing designed to prevent the freezing of body tissues.

Eye Protection

- ▶ Wear non-vented, impact resistant goggles when working with fumes, gases, or vapors.
- ▶ If additional protection is needed for the entire face, use in combination with a face shield. A face shield should not be used without another type of eye protection.
- ▶ Do not wear contact lenses when working with this substance.

Respiratory Protection

Improper use of respirators is dangerous. Respirators should only be used if the employer has implemented a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing, and medical exams, as described in the OSHA Respiratory Protection Standard (29 CFR 1910.134).

- ▶ Where the potential exists for exposure over **1,000 ppm**, use a NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.
- ▶ Exposure to **Chlorodifluoromethane** is dangerous because it can replace *Oxygen* and lead to suffocation. Only NIOSH approved self-contained breathing apparatus with a full facepiece operated in the positive pressure mode should be used in *Oxygen*-deficient environments.
- ▶ **DO NOT USE CHEMICAL CARTRIDGE OR CANISTER RESPIRATORS.**

Fire Hazards

If employees are expected to fight fires, they must be trained and equipped as stated in the OSHA Fire Brigades Standard (29 CFR 1910.156).

- ▶ Extinguish fire using an agent suitable for type of surrounding fire. **Chlorodifluoromethane** itself does not burn.
- ▶ Use water spray to reduce vapors.
- ▶ **POISONOUS GASES ARE PRODUCED IN FIRE**, including *Hydrogen Chloride*, *Hydrogen Fluoride*, *Phosgene*, and *Carbonyl Chloride*.
- ▶ **CONTAINERS MAY EXPLODE IN FIRE.**
- ▶ Use water spray to keep fire-exposed containers cool.

Spills and Emergencies

If employees are required to clean-up spills, they must be properly trained and equipped. The OSHA Hazardous Waste Operations and Emergency Response Standard (29 CFR 1910.120) may apply.

If **Chlorodifluoromethane** is leaked, take the following steps:

- ▶ Evacuate personnel and secure and control entrance to the area.
- ▶ Eliminate ignition sources.
- ▶ Ventilate area of leak to disperse the gas.
- ▶ Stop flow of gas. If source of leak is a cylinder and the leak cannot be stopped in place, remove the leaking cylinder to a safe place in the open air, and repair leak or allow cylinder to empty.
- ▶ Use water spray to keep containers cool.
- ▶ Ventilate and wash area after clean-up is complete.
- ▶ **Chlorodifluoromethane** is heavier than air and may accumulate in low ceiling spaces causing *Oxygen* deficiency.
- ▶ It may be necessary to contain and dispose of **Chlorodifluoromethane** as a HAZARDOUS WASTE. Contact your state Department of Environmental Protection (DEP) or your regional office of the federal Environmental Protection Agency (EPA) for specific recommendations.

Handling and Storage

Prior to working with **Chlorodifluoromethane** you should be trained on its proper handling and storage.

- ▶ *Liquified Chlorodifluoromethane*, poured into WATER, can be violently explosive.
- ▶ Contact with *red-hot* METAL forms toxic gases of *Chlorine*, *Fluorine*, *Phosgene* and *Carbonyl Chloride*.
- ▶ **Chlorodifluoromethane** is not compatible with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE); ALKALI METALS (such as LITHIUM, SODIUM and POTASSIUM); ALKALINE EARTH METALS (such as BERYLLIUM, MAGNESIUM and CALCIUM); POWDERED ALUMINUM; STRONG ACIDS (such as HYDROCHLORIC, SULFURIC and NITRIC); and CHEMICALLY ACTIVE METALS (such as ZINC).
- ▶ Store in tightly closed containers in a cool, well-ventilated area away from SUNLIGHT, MOISTURE and RUST as **Chlorodifluoromethane** will decompose.
- ▶ **Chlorodifluoromethane** attacks some PLASTICS, RUBBER and COATINGS.

Occupational Health Information Resources

The New Jersey Department of Health offers multiple services in occupational health. These services include providing informational resources, educational materials, public presentations, and industrial hygiene and medical investigations and evaluations.

For more information, please contact:

New Jersey Department of Health
 Right to Know
 PO Box 368
 Trenton, NJ 08625-0368
 Phone: 609-984-2202
 Fax: 609-984-7407
 E-mail: rtk@doh.state.nj.us
 Web address: <http://www.nj.gov/health/eoh/rtkweb>

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 for commercial purposes.***

GLOSSARY

ACGIH is the American Conference of Governmental Industrial Hygienists. They publish guidelines called Threshold Limit Values (TLVs) for exposure to workplace chemicals.

Acute Exposure Guideline Levels (AEGs) are established by the EPA. They describe the risk to humans resulting from once-in-a-lifetime, or rare, exposure to airborne chemicals.

Boiling point is the temperature at which a substance can change its physical state from a liquid to a gas.

A **carcinogen** is a substance that causes cancer.

The **CAS number** is unique, identifying number, assigned by the Chemical Abstracts Service, to a specific chemical.

CFR is the Code of Federal Regulations, which are the regulations of the United States government.

A **combustible** substance is a solid, liquid or gas that will burn.

A **corrosive** substance is a gas, liquid or solid that causes destruction of human skin or severe corrosion of containers.

DEP is the New Jersey Department of Environmental Protection.

DOT is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

EPA is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

ERG is the Emergency Response Guidebook. It is a guide for emergency responders for transportation emergencies involving hazardous substances.

Emergency Response Planning Guideline (ERPG) values provide estimates of concentration ranges where one reasonably might anticipate observing adverse effects.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

IARC is the International Agency for Research on Cancer, a scientific group.

Ionization Potential is the amount of energy needed to remove an electron from an atom or molecule. It is measured in electron volts.

IRIS is the Integrated Risk Information System database on human health effects that may result from exposure to various chemicals, maintained by federal EPA.

LEL or Lower Explosive Limit, is the lowest concentration of a combustible substance (gas or vapor) in the air capable of continuing an explosion.

mg/m³ means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

NFPA is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

NIOSH is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

NTP is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

OSHA is the federal Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

Protective Action Criteria (PAC) are values established by the Department of Energy and are based on AEGs and ERPGs. They are used for emergency planning of chemical release events.

PEOSHA is the New Jersey Public Employees Occupational Safety and Health Act, which adopts and enforces health and safety standards in public workplaces.

Permeated is the movement of chemicals through protective materials.

ppm means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

STEL is a Short Term Exposure Limit which is usually a 15-minute exposure that should not be exceeded at any time during a work day.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

UEL or Upper Explosive Limit is the highest concentration in air above which there is too much fuel (gas or vapor) to begin a reaction or explosion.

Vapor Density is the ratio of the weight of a given volume of one gas to the weight of another (usually *Hydrogen*), at the same temperature and pressure.

The **vapor pressure** is a force exerted by the vapor in equilibrium with the solid or liquid phase of the same substance. The higher the vapor pressure the higher concentration of the substance in air.

Common Name: **CHLORODIFLUOROMETHANE**

Synonyms: Difluoromonochloromethane; Freon 22®; Genetron-22®

CAS No: 75-45-6

Molecular Formula: CHClF₂

RTK Substance No: 0386

Description: Colorless gas with a slight *Ether*-like odor which is shipped as a liquified gas

HAZARD DATA

Hazard Rating	Firefighting	Reactivity
<p>1 - Health</p> <p>0 - Fire</p> <p>0 - Reactivity</p> <p>DOT#: UN 1018</p> <p>ERG Guide #: 126</p> <p>Hazard Class: 2.2 (Nonflammable gas)</p>	<p>Extinguish fire using an agent suitable for type of surrounding fire. Chlorodifluoromethane itself does not burn.</p> <p>Use water spray to reduce vapors.</p> <p>POISONOUS GASES ARE PRODUCED IN FIRE, including <i>Hydrogen Chloride, Hydrogen Fluoride, Phosgene, and Carbonyl Chloride.</i></p> <p>CONTAINERS MAY EXPLODE IN FIRE.</p> <p>Use water spray to keep fire-exposed containers cool.</p>	<p><i>Liquified Chlorodifluoromethane</i>, poured into WATER, can be violently explosive.</p> <p>Contact with <i>red-hot</i> METAL forms toxic gases of <i>Chlorine, Fluorine, Phosgene</i> and <i>Carbonyl Chloride.</i></p> <p>Chlorodifluoromethane is not compatible with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE); ALKALI METALS (such as LITHIUM, SODIUM and POTASSIUM); ALKALINE EARTH METALS (such as BERYLLIUM, MAGNESIUM and CALCIUM); POWDERED ALUMINUM; STRONG ACIDS (such as HYDROCHLORIC, SULFURIC and NITRIC); and CHEMICALLY ACTIVE METALS (such as ZINC).</p>

SPILL/LEAKS

Isolation Distance:
 Large Spill: 500 meters (1/3 mile)
 Fire: 800 meters (1/2 mile)
 Stop flow of gas. If source of leak is a cylinder and the leak cannot be stopped in place, remove the leaking cylinder to a safe place in the open air, and repair leak or allow cylinder to empty.
Chlorodifluoromethane is heavier than air and may accumulate in low ceiling spaces causing *Oxygen* deficiency.
Chlorodifluoromethane may be hazardous to the environment. It will accumulate and disperse in the atmosphere and damage the ozone layer.

PHYSICAL PROPERTIES

Odor Threshold: *Ether*-like odor
Flash Point: Nonflammable
Vapor Density: 2.9 (air = 1)
Vapor Pressure: 7,144 mm Hg at 68°F (20°C)
Specific Gravity: 1.2 (water = 1)
Water Solubility: Soluble
Boiling Point: -41°F (-40.7°C)
Melting Point: -251°F (-157°C)
Ionization Potential: 12.5 eV
Molecular Weight: 86.5

EXPOSURE LIMITS

NIOSH: 1,000 ppm, 10-hr TWA; 1,250 ppm STEL
ACGIH: 1,000 ppm, 8-hr TWA

PROTECTIVE EQUIPMENT

Gloves: Polyvinyl Alcohol, Silver Shield®/4H®, Viton and Barrier® (>4-hr breakthrough for *Freons*)
Coveralls: Tychem® BR, LV, Responder®, and TK; Zytron® 500; ONESuit®TEC; and Trelchem® (>8-hr breakthrough for *Halogenated compounds*)
Respirator: Supplied air or SCBA

HEALTH EFFECTS

Eyes: Irritation, contact with liquid causes frostbite
Skin: Irritation, contact with liquid causes frostbite
Inhalation: Nose, throat and lung irritation with tightness in the chest and difficulty in breathing
 Headache, nausea, dizziness, loss of coordination, passing out, and death

FIRST AID AND DECONTAMINATION

Remove the person from exposure.
Flush eyes with large amounts of water for at least 15 minutes. Remove contact lenses if worn. Seek medical attention.
Immerse affected part in warm water. Seek medical attention.
Begin artificial respiration if breathing has stopped and CPR if necessary.
Transfer promptly to a medical facility