



Material Safety Data Sheet

1. Product and Company Identification

Product name : **Dichlorodifluoromethane**
Chemical formula : CCl₂F₂
Synonyms : Halocarbon 12
Company : Specialty Gases of America, Inc
6055 Brent Dr.
Toledo, OH 43611
Telephone : 419-729-7732
Emergency : 800-424-9300

2. Composition/Information on Ingredients

Components	CAS Number	% Volume
Dichlorodifluoromethane	75-71-8	100%

3. Hazards Identification

Emergency Overview

Can decompose to product toxic gases if involved in a fire.
Can cause central nervous system depression.

Potential Health Effects

Inhalation : Exposure to high concentrations may cause central nervous system depression and irritation to the nose, throat and upper respiratory system. Effects of such overexposure can include light-headedness, giddiness, shortness of breath, and in extreme cases, irregular heartbeats, cardiac arrest, and death. At concentrations of 40000 ppm symptoms of exposure include slurred speech, a tingling sensation, humming in the ears, and apprehension. At 100000 ppm, symptoms of incoordination can appear. All symptoms are more pronounced as the concentration of Dichlorodifluoromethane increases. High concentrations of this gas can cause an oxygen-deficient environment. Individuals breathing such an atmosphere may experience symptoms which include headaches, ringing in ears, dizziness, drowsiness, unconsciousness, nausea, vomiting and depression of all the senses. The skin of a victim of overexposure may have a blue color. Under some circumstances of overexposure, death may occur.

Eye contact : None.

Skin contact : Contact with liquid or rapidly expanding gases (which are released under high pressure) may cause frostbite. Prolonged contact with the skin may cause defatting or dryness of the skin.

Ingestion : Ingestion is not normal route of exposure for gases.

Chronic Health Hazard : May cause cardiac sensitization, permanent neurological abnormalities, and lung damage.

4. First Aid Measures

General advice	:	None.
Eye contact	:	In case of emergency, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.
Skin contact	:	If case of frostbite, place the frostbitten part in warm water. DO NOT USE HOT WATER. If warm water is not available, or is impractical to use, wrap the affected parts gently in blankets. Alternatively, if the fingers or hands are frostbitten, place the affected area in the armpit. Encourage victim to gently exercise the affected area while being warmed. Seek medical attention immediately.
Ingestion	:	None.
Inhalation	:	Remove victim to fresh air immediately. Trained personnel should administer supplemental oxygen and/or cardio-pulmonary resuscitation, if necessary. Only trained personnel should administer supplemental oxygen.

5. Fire-Fighting Measures

Suitable extinguishing media	:	Use extinguishing media appropriate for surrounding fire.
Specific hazards	:	When involved in a fire, this material may decompose and produce toxic gases (e.g. phosgene, hydrogen fluoride, hydrogen chloride, and carbonyl fluoride). Containers may rupture or burst in the heat of the fire.
Special protective equipment for fire-fighters	:	Structural fire fighters must wear self-contained breathing apparatus and full protective equipment. In the event of fire, cool containers with water to prevent failure. Use a water spray or fog to reduce or direct vapors. If unruptured cylinders are exposed to heat, the cylinder may rupture or burst and release the contents. It may be prudent to remove potentially heat-exposed cylinders from the area surrounding a fire, if it is without risk.

6. Accidental Release Measures

Personal precautions	:	Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment.
Environmental precautions	:	Not available.
Methods for cleaning up	:	Uncontrolled releases should be responded to by trained personnel using pre-planned procedures. Proper protective equipment should be used. In case of release, evacuate all personnel upwind and away from affected area. Minimum Personal Protective Equipment should be Level B: mechanical resistant gloves and self-contained breathing apparatus. Allow the gas to dissipate. Monitor the surrounding area for dichlorodifluoromethane and oxygen. Colorimetric tubes can be used to detect the presence of dichlorodifluoromethane. The atmosphere must have at least 19.5% oxygen before personnel can be allowed in the area without self-contained breathing apparatus. Attempt to close the main source valve prior to entering the area. If this does not stop the release (or if it is not possible to reach the valve), allow the gas to release in-place or remove it to a safe area and allow the gas to be released there.
Additional advice	:	None.

7. Handling and Storage

Handling

Keep container closed. Use only with adequate ventilation. Keep away from heat, sparks and flame. To avoid fire, minimize ignition sources. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Do not puncture or incinerate container. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement.

Storage

Keep container tightly closed. Keep container in a cool, well-ventilated area. Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 52 C (125 F). Isolate from oxidizers such as oxygen, chlorine, or fluorine. Use a check valve or trap in the discharge line to prevent hazardous backflow. Post "No Smoking or Open Flame" signs in storage and use areas.

8. Exposure Controls / Personal Protection

Engineering measures

Use only with adequate ventilation. Local exhaust ventilation is preferred, because it prevents Dichlorodifluoromethane dispersion into the work place by eliminating it at its source. If necessary, the work area should be monitored for the level of oxygen.

Personal protective equipment

- Respiratory protection : Maintain oxygen levels above 19.5% in the workplace. Use supplied air respiratory protection during emergency response to a release of dichlorodifluoromethane if oxygen levels are below 19.5%. If respiratory protection is required, follow the requirements of the Federal OSHA Respiratory Protection Standard (29 CFR 1910.134) or equivalent State standards. The following NIOSH respiratory protection recommendations for dichlorodifluoromethane in air are provided for additional information:
Up to 10000 ppm – Supplied air respirator (SAR).
Up to 15000 ppm – SAR operated in a continuous-flow mode; or full-facepiece self-contained breathing apparatus (SCBA), or full face SAR.
Emergency or planned entry into unknown concentrations or IDLH conditions – Positive pressure, full-facepiece SCBA, or positive pressure, full-facepiece SAR with an auxiliary positive pressure SCBA.
Escape – Gas mask with organic vapor canister, or escape-type SCBA.
- Hand protection : Wear mechanical resistant gloves when handling cylinders. Wear Viton or rubber gloves when using dichlorodifluoromethane.
- Eye protection : Splash goggles or safety glasses, for protection from rapidly expanding gases. Face-shields should be worn if contact with the liquefied gas is anticipated.
- Skin and body protection : Use body protection appropriate for task. Transfer of large quantities under pressure may require protective equipment appropriate to protect employees from splashes of liquefied product.

9. Physical and Chemical Properties

- Form : Liquefied Gas.
Color : Colorless.
Odor : Slightly ethereal odor.
Vapor pressure : 84.9 psia
Vapor density : 5.056 kg/m³ (air = 1)
Boiling point : -30 C (-21.6 F) @ 1 atm
Freezing point : -158 C (-252 F)
Water solubility : Slightly.
Specific gravity : 4.2 (air = 1)

10. Stability and Reactivity

- Stability : Stable under normal conditions.
Conditions to avoid : Contact with incompatible materials. Cylinders exposed to high temperatures or direct flame can rupture or burst.

- Materials to avoid : Alkaline, alkaline earth metals, and other reactive chemicals (e.g. sodium, potassium, calcium, magnesium, powdered aluminum, and zinc). Silver and copper-bearing alloys can act as catalysts for decomposition of dichlorodifluoromethane at high temperatures.
- Hazardous decomposition products : If exposed to fire, may decompose yielding toxic products (e.g. hydrogen fluoride, phosgene, hydrogen chloride, carbonyl fluoride).

11. Toxicological Information

Toxicity Data

- TCLo (inhalation, human) = 200,000 ppm/30 minutes; eye, pulmonary, liver
 LC50 (inhalation, rat) = 80 pph/30 minutes
 LC50 (inhalation, mouse) = 76 pph/30 minutes
 LC50 (inhalation, rabbit) = 80 pph/30 minutes
 LC50 (inhalation, guinea pig) = 80 pph/30 minutes

Acute Health Hazard

- Ingestion : Not available.
- Inhalation : Dichlorodifluoromethane has very low acute toxicity and acts a weak narcotic. Deaths occur in rats, but not in guinea pigs after 2-hour exposure at 60% dichlorodifluoromethane. In various other experiments, rats, guinea pigs, and cats all survived exposures to concentrations as high as 30%-80% for several hours. It was found that dichlorodifluoromethane produced respiratory-circulatory effects including respiratory depression, bronchioconstriction and tachycardia (abnormal rapidity of heart action) in concentrations of 5-10%. No pathologic changes were observed in guinea pigs, rats, cats and dogs following four weeks of 3.5 hours exposures at 10%. Mice exposed at 4% 30 minutes a day for 3-6 weeks showed some weak pathology.
- Skin irritation : No significant irritation was observed in rats and rabbits treated with a 30/70 mixture of dichlorodifluoromethane and trichloromethane.
- Eye irritation : No significant irritation was observed in rabbits treated with a 30/70 mixture of dichlorodifluoromethane and trichloromethane.

12. Ecological Information

Environmental Stability

This gas will be dissipated rapidly in well-ventilated areas. Dichlorodifluoromethane is a chlorofluorocarbon (CFC) compound. Chlorofluorocarbon compounds have been implicated in the possible depletion of the stratospheric ozone, via series of complex chemical reactions which occur in the upper atmosphere.

Additional environmental data are available as follows:

- Solubility : 0.28 g/L water at 25 C, 1 atm. Log K_{ow} = 2.16. Virtually inert; volatilizes rapidly.
- Biological half-life : Distribution half-life averages 13-14 seconds; elimination half-life is 1.5 hours, because of slower release from fat stores.
- Biodegradation : No significant.
- Bioconcentration : Lipophilic; bioaccumulation may occur with constant exposure.

13. Disposal Considerations

- Waste from residues / unused products : Dispose of non-refillable cylinders in accordance with federal, state and local regulations. If the cylinders are refillable type, return cylinders to supplier with any valve outlet plugs or caps secured and valve protection caps in place.
- Contaminated packaging : Return cylinder to supplier.

14. Transport Information

DOT (US only)

Proper shipping name : Dichlorodifluoromethane
Class : 2.2
UN/ID No. : UN1028
Labeling : Non-Flammable Gas

Further information

Cylinders should be transported in a secure upright position in a well ventilated truck.

15. Regulatory Information

TCSA

Material is listed in TSCA inventory.

SARA Threshold Planning Quantity

Not applicable.

SARA Section 302 (40 CFR 355, Appendix A)

Dichlorodifluoromethane is not subject to the reporting requirements.

SARA Section 304 (40 CFR Table 302.4)

Dichlorodifluoromethane is subject to the reporting requirements.

SARA Section 313 (40 CFR 372.65)

Dichlorodifluoromethane is subject to the reporting requirements.

Other U.S. Federal Regulations

Dichlorodifluoromethane is subject to the requirements under Title VI of the Clean Air Act Amendments of 1990: "Stratospheric Ozone Protection". Dichlorodifluoromethane is listed as a Class II ozone-depleting chemical. Containers may be required to bear the following label:

Warning: Contains Dichlorodifluoromethane, a substance which harms public health and environment by destroying ozone in the upper atmosphere.

16. Other Information

Prepared by : Specialty Gases of America, Inc.
For additional information, please visit our website at www.americangasgroup.com.