ALLIED

PRODUCT SAFETY DATA SHEET

GENETRON® 12 Dichlorodifluoromethane

A. GENERAL INFORMATION

TRADE NAME (COMMON NAME)	☒ C.A.S. NO. ☐ ALLIED PRODUCT CODE #
GENETRON® 12 dichlorodifluoromethane	75-71-8

CHEMICAL NAME AND/OR SYNONYM

Dichlorodifluoromethane Synonyms: Fluorocarbon 12; Refrigerant 12; Propellant 12.

FORMULA	MOLECULAR WEIGHT
CCl_2F_2	120.91

ADDRESS (No., STREET, CITY, STATE AND ZIP CODE)

ALLIED CORPORATION
CHEMICAL SECTOR
P.O. Box 1139R
Morristown, N.J. 07960

CONTACT	PHONE NUMBER	LAST ISSUE DATE	CURRENT ISSUE DATE
Director, Product Safety	(201) 455-4157	March, 1982	August, 1985

B. FIRST AID MEASURES

EMERGENCY PHONE NUMBER
(201) 455-2000

Inhalation: Remove immediately to fresh air. If breathing has stopped, give artificial respiration, preferably mouth-to-mouth. Use oxygen as required, provided a qualified operator is available. Do not give epinephrine (adrenalin).

Skin or Eye Contact: Immediately bathe any frostbite (do not rub) with lukewarm (not hot) water. In the absence of water, cover with soft wool or other suitable material. Contact a physician for any low temperature burns from liquid contact.

Ingestion: This is improbable due to the low (circa –30°C) boiling point.

C. HAZARDS INFORMATION

HEALTH

INHALATION

This material is low in toxicity at concentrations as high as 4% (40,000 ppm). When oxygen levels in air are reduced to 12-14%, symptoms of asphyxiation will occur; loss of coordination, increased pulse rate, cardiac sensitization, and deeper respiration are also possible. See Section K for further discussion.

INGESTION

Not applicable, since material is gaseous at normal temperature and pressure.

SKIN

Contact with liquid material can cause frostbite, indicated by pallor or redness, loss of sensation, and swelling.

EYES

Same as for skin.

PERMISSIBLE CONCENTRATION: AIR (SEE SECTION J)

OSHA/TWA: 1000 ppm.

ACGIH/TLV: the same.

BIOLOGICAL

Action Level
None established.

UNUSUAL CHRONIC TOXICITY

No chronic toxicity data found. Some subacute data are available — see Reference (g).

C. HAZARDS (Cont.)

FIRE AND EXPLOSION

FLASH POINT	AUTO IGNITION TEMPERATURE	FLAMMABLE LIMITS IN AIR (% BY VOL.)
N.A. °C (non-flammable) ☐ OPEN CUP ☐ CLOSED CUP	°C Not applicable	LOWER – N.A. UPPER – N.A. (No flame observed upto 25 volume %)

UNUSUAL FIRE AND EXPLOSION HAZARDS

Material is a liquid and gas under its own vapor pressure. While not combustible itself, contact with certain metals (see Section G) may produce exothermic reactions or potentially explosive combinations. See, also, toxic decomposition products under Section G.

D. PRECAUTIONS/PROCEDURES

FIRE EXTINGUISHING AGENTS **RECOMMENDED**

Any standard agent – choose the one that is appropriate for type of fire. Material itself is non-flammable.

FIRE EXTINGUISHING AGENTS TO **AVOID**

Not pertinent.

SPECIAL FIRE FIGHTING PRECAUTIONS

Although not flammable, when this material is in a fire, firefighters should wear self-contained, NIOSH-approved breathing apparatus for protection against suffocation and possible toxic decomposition products. Use water spray to keep fire-exposed containers cool.

VENTILATION

Ventilation should be adequate to meet TLV requirements and minimize exposure.

Provide local exhaust at filling zones and where leakage is probable.

Mechanical (General) ventilation is adequate for other operating areas and for storage areas.

NORMAL HANDLING

Avoid contact with eye, skin or clothing. Do not puncture or drop cylinders or expose them to open flame or excessive heat. Use authorized containers only. Follow standard safety precautions for handling and use of cylinders of compressed gas – Reference (a).

STORAGE

Store in a cool, dry, well-ventilated area away from heat, flame or combustibles. Protect cylinder and its fittings from physical damage. Storage in subsurface locations should be avoided. See Reference (a) for further details on storage.

SPILL OR LEAK (ALWAYS WEAR PERSONAL PROTECTIVE EQUIPMENT – SECTION E)

Using a self-contained air supply and protection against frostbite, personnel should attempt to close valves or repair source of leak.

If a large quantity is released, evacuate personnel and allow to dissipate. (Note Sections C and K for health hazards involved with inhalation and contact exposure.)

SPECIAL: PRECAUTIONS/PROCEDURES/LABEL INSTRUCTIONS **SIGNAL WORD** – WARNING!

This product can cause death or serious personal injury if not handled properly. Follow OSHA regulations for compressed gases – References (1) and (3) – and Reference (a) for cylinder handling. Workers with cardiovascular or pulmonary problems should have medical evaluation before exposure.

E. PERSONAL PROTECTIVE EQUIPMENT

RESPIRATORY PROTECTION

None generally required for adequately-vented situations. For unusual situations, wear a NIOSH-approved, supplied-air respirator or a positive pressure, self-contained breathing apparatus.

EYES AND FACE

Wear chemical safety goggles if there is any reasonable probability of contact with liquid. In this case, do not wear contact lenses.

HANDS, ARMS, AND BODY

Wear protective, impervious gloves with PVA outer layer (2nd choice: neoprene) in situations where leakage or handling of liquid is a possibility. Impervious shoes and clothing should also be worn where leakage is probable. Gloves, clothing and shoes should be thermally insulated to prevent freezing.

OTHER CLOTHING AND EQUIPMENT

Provide convenient water source for first-aid treatment in case of frostbite (see Section B).

F. PHYSICAL DATA

MATERIAL IS (AT NORMAL CONDITIONS):	APPEARANCE AND ODOR	
☐ LIQUID ☐ SOLID ☒ GAS ☐ _____	Colorless liquefied gas with faint ethereal odor.	
BOILING POINT −29.8 °C MELTING POINT −158 °C	SPECIFIC GRAVITY (H_2O = 1) @ 21.1°C, liquid 1.325	VAPOR DENSITY (AIR = 1) @ 21.1°C and 1 atm. 4.26 [Ref. (h)]
SOLUBILITY IN WATER (% by Weight) 0.028 @ 77°F	pH N.A. (gas)	VAPOR PRESSURE (mm Hg at 20°C) ☐ (PSIG) ☐ 85 psia @ 21.1°C (70°F)
EVAPORATION RATE (Butyl Acetate = 1) ☐ (Ether = 1) ☐ N.A. (gas)	% VOLATILES BY VOLUME (At 20°C) N.A. (gas)	

G. REACTIVITY DATA

STABILITY	CONDITIONS TO AVOID
☐ UNSTABLE ☒ STABLE	Lighted cigarettes, hot spots, welding. Temperatures above 550°C – Reference (c). Decomposes in fires.

INCOMPATIBILITY (MATERIALS TO AVOID)

Aluminum in the form of freshly abraded surface (strong exothermic reaction) – Reference (d), or powdered aluminum – Reference (b). Magnesium powder @ 400°C will ignite or, with sparks, will explode – Reference (d). Zinc powder – Reference (b). Chemically active metals, such as sodium, potassium, or calcium – Reference (b).

HAZARDOUS DECOMPOSITION PRODUCTS

Halogens, halogen acids, and possibly carbonyl halides, such as phosgene.

HAZARDOUS POLYMERIZATION	CONDITIONS TO AVOID
☐ MAY OCCUR ☒ WILL NOT OCCUR	Not pertinent.

H. HAZARDOUS INGREDIENTS (Mixtures Only)

MATERIAL OR COMPONENT/C.A.S. #	WT.%	HAZARD DATA (SEE SECT. J)
NOT APPLICABLE.		

I. ENVIRONMENTAL

DEGRADABILITY/AQUATIC TOXICITY

Degradability (BOD): Not pertinent.

Aquatic Toxicity: TLm96: over 1000 ppm – Reference (e).
TLm96 = Lethal concentration, 50% kill (96 hours).

OCTANOL/WATER PARTITION COEFFICIENT: Unknown

EPA HAZARDOUS SUBSTANCE? (CLEAN WATER ACT SECT. 311) ☐ YES ☒ NO — IF SO, REPORTABLE QUANTITY: ____ # — 40 CFR 116-117

WASTE DISPOSAL METHODS (DISPOSER MUST COMPLY WITH FEDERAL, STATE AND LOCAL DISPOSAL OR DISCHARGE LAWS)

Disposal of waste GENETRON® 12 dichlorodifluoromethane may be subject to Federal regulations. Users should review their operations, then consult with appropriate regulatory agencies before discharging or disposing of waste material. Disposal by a licensed waste disposal company may be necessary.

RCRA STATUS OF UNUSED MATERIAL IF DISCARDED: EPA "hazardous waste", if discarded, unused.

HAZARDOUS WASTE NUMBER: (IF APPLICABLE) U075 — 40 CFR 261

J. REFERENCES

PERMISSIBLE CONCENTRATION REFERENCES

(1) TWA: OSHA Standard, 29 CFR 1910 (1982), "Z List".
(2) TLV: ACGIH 1984-85 List, "Threshold Limit Values for Chemical Substances . . .".

REGULATORY STANDARDS — D.O.T. CLASSIFICATION: Nonflammable gas — 49 CFR 173

D.O.T. Classification per 49 CFR 172.101. I.D. No.: UN1028

(3) OSHA regulations for compressed gases: 29 CFR 1910.101.

GENERAL

(a) CGA Pamphlet P-1, "Safe Handling of Compressed Gases in Containers", 1974, Compressed Gas Association (1980 printing).
(b) NIOSH/OSHA Manual, "Pocket Guide to Chemical Hazards", 1978, (8/80 printing).
(c) Merck Index, 10th ed. (1983), Monograph 3048; Merck & Co., Inc. Rahway, NJ.
(d) Bretherick, L., "Handbook of Reactive Chemical Hazards", 2nd ed., 1979, Butterworths, Boston.
(e) NIOSH Registry (RTECS), 1981-82, Accession No. PA8200000.
(f) U.S. Coast Guard CHRIS Manual, Form DCF: "Dichlorodifluoromethane". (continued – Section K below)

K. ADDITIONAL INFORMATION

SECTION J – REFERENCES (General) – continued
(g) AIHA Hygienic Guide, "Dichlorodifluoromethane", 1968, Am. Industrial Hygiene Assoc., Akron, OH 44311.
(h) Compressed Gas Association: "Handbook of Compresed Gases", 2nd ed., 1981, Van Nostrand Reinhold.

SECTION C – HAZARDS INFORMATION – continued

Inhalation:

This material is low in toxicity: Its predominant hazard is simple asphyxia from displacement of air for breathing. However, it must not be considered inert! High concentrations in air (in the order of 20 times the TLV) have been shown to reduce ventilatory capacity of the lungs temporarily and to produce minor cardiac effects, which can be greatly increased by the presence of a second agent, epinephrine (adrenalin). The ACGIH-recommended TLV of 1000 ppm should provide a substantial margin of safety to prevent organic injury as well as cardiac sensitization. – Reference: ACGIH: Documentation of TLVs, 4th edition.

A narcotic effect has been reported; also, published animal studies report that cardiac arrhythmia (which may be fatal in animals and in humans) and myocardial depression are produced in the following species, if inhaled 5 minutes at varying concentrations:

Species	Minimum Inhaled Concentration (ppm)
Monkey	50,000 – 100,000
Mouse	over 400,000
Rat	over 400,000
Dog	100,000

References. Belej, M.A. et al., Toxicology 2, 381-395 (1974). Aviado, D.M., Toxicology 3, 321-332 (1975).

PSDS FILE NO. 874

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ALLIED-SIGNAL INC.

ENVIRONMENTAL DATA SHEET

SUPPLEMENT TO PSDS: GENETRON® 12

CURRENT ISSUE DATE: 08-1985 PSDS #: 874

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SARA -- TITLE III (40 CFR 300)

1. THIS PRODUCT CONTAINS THE FOLLOWING EXTREMELY HAZARDOUS SUBSTANCE(S) (SECTIONS 302 AND 304):

COMPONENT	TPQ (LBS.)	RQ (LBS.)
None Listed	NA	NA

2. THIS PRODUCT CONTAINS THE FOLLOWING CERCLA HAZARDOUS SUBSTANCE(S) (SECTION 302 AND 304):

COMPONENT	WT %	RQ (LBS.)
Dichlorodifluoromethane	100%	5000

NOTE: **THE INFORMATION PROVIDED IN SECTION 1 AND 2 IS REQUIRED FOR EMERGENCY RESPONSE REPORTING.**

3. THIS PRODUCT HAS THE FOLLOWING HAZARDS (SECTIONS 311 AND 312):

	YES	NO
IMMEDIATE	X	
DELAYED		X
FIRE		X
PRESSURE	X	
REACTIVE		X

4. THIS PRODUCT CONTAINS THE FOLLOWING TOXIC CHEMICALS (SECTION 313):

COMPONENT	CAS #	WT %
Dichlorodifluoromethane	75-71-8	100

5. **WARNING**

DO NOT VENT TO THE ATMOSPHERE. TO COMPLY WITH PROVISIONS OF THE U.S. CLEAN AIR ACT, ANY RESIDUAL MUST BE RECOVERED.

CONTAINS GENETRON® 12, A CFC, 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.

FOR ADDITIONAL INFORMATION ON THE ABOVE CHEMICALS, SEE THE MATERIAL SAFETY DATA SHEET.

DATE: 03/16/92