



GENETRON® 12 Dichlorodifluoromethane

A. GENERAL INFORMATION

TRADE NAME (COMMON NAME) GENETRON® 12 dichlorodifluoromethane	<input checked="" type="checkbox"/> C.A.S. NO. <input type="checkbox"/> ALLIED PRODUCT CODE # 75-71-8		
CHEMICAL NAME AND/OR SYNONYM Dichlorodifluoromethane Synonyms: Fluorocarbon 12; Refrigerant 12; Propellant 12.			
FORMULA CCl ₂ F ₂	MOLECULAR WEIGHT 120.91		
ADDRESS (No., STREET, CITY, STATE AND ZIP CODE) ALLIED CORPORATION CHEMICAL SECTOR P.O. Box 1139R Morristown, N.J. 07960			
CONTACT Director, Product Safety	PHONE NUMBER (201) 455-4157	LAST ISSUE DATE March, 1982	CURRENT ISSUE DATE August, 1985

B. FIRST AID MEASURES

	EMERGENCY PHONE NUMBER (201) 455-2000
<p><u>Inhalation:</u> 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).</p> <p><u>Skin or Eye Contact:</u> 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.</p> <p><u>Ingestion:</u> This is improbable due to the low (circa -30°C) boiling point.</p>	

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 (non-flammable) <input type="checkbox"/> OPEN CUP <input type="checkbox"/> CLOSED CUP	N.A. °C	AUTO IGNITION TEMPERATURE Not applicable	°C	FLAMMABLE LIMITS IN AIR (% BY VOL.) 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 <u>local exhaust</u> at filling zones and where leakage is probable. <u>Mechanical (General)</u> 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 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.
SIGNAL WORD – WARNING!

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): <input type="checkbox"/> LIQUID <input type="checkbox"/> SOLID <input checked="" type="checkbox"/> GAS <input type="checkbox"/> _____		APPEARANCE AND ODOR Colorless liquefied gas with faint ethereal odor.	
BOILING POINT	-29.8 °C	SPECIFIC GRAVITY (H ₂ O = 1)	VAPOR DENSITY (AIR = 1)
MELTING POINT	-158 °C	@ 21.1°C, liquid 1.325	@ 21.1°C and 1 atm. 4.26 [Ref. (h)]
SOLUBILITY IN WATER (% by Weight)		pH	VAPOR PRESSURE (mm Hg at 20°C) <input type="checkbox"/> (PSIG) <input type="checkbox"/>
0.028 @ 77°F		N.A. (gas)	85 psia @ 21.1°C (70°F)
EVAPORATION RATE (Butyl Acetate = 1) <input type="checkbox"/> (Ether = 1) <input type="checkbox"/>		% VOLATILES BY VOLUME (At 20°C)	
N.A. (gas)		N.A. (gas)	

G. REACTIVITY DATA

STABILITY <input type="checkbox"/> UNSTABLE <input checked="" type="checkbox"/> STABLE	CONDITIONS TO AVOID 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 <input type="checkbox"/> MAY OCCUR <input checked="" type="checkbox"/> WILL NOT OCCUR	CONDITIONS TO AVOID 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		OCTANOL/WATER PARTITION COEFFICIENT	
Degradability (BOD): Not pertinent.		Unknown	
Aquatic Toxicity: T _{Lm96} : over 1000 ppm – Reference (e). T _{Lm96} = Lethal concentration, 50% kill (96 hours).			
EPA HAZARDOUS SUBSTANCE? (CLEAN WATER ACT SECT. 311) <input type="checkbox"/> YES <input checked="" type="checkbox"/> 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 <u>UNUSED</u> 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 Compressed 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

SARA -- TITLE III (40 CFR 300)

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

COMPONENT	TPO (LBS.)	RO (LBS.)
None Listed	NA	NA

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

COMPONENT	WT %	RO (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