



**1 PRODUCT AND COMPANY IDENTIFICATION**

**DFO**  
2000 Market Street

Philadelphia, PA 19103

**EMERGENCY PHONE NUMBERS:**  
Chemtrec: (800) 424-9300 (24hrs) or (703) 527-3887  
Medical: Rocky Mountain Poison Control Center  
(866) 767-5089 (24Hrs)

Information Telephone Numbers	Phone Number	Available Hrs
Product Information	800-245-5858	8:00 am - 5:30 pm (Eastern)

Product Name Forane (R) 12  
Product Synonym(s) A list of applicable product can be found in Section 16  
R-12, CFC-12, ISOTRON 12

Chemical Family chlorofluorocarbon  
Chemical Formula CCl<sub>2</sub>F<sub>2</sub>  
Chemical Name dichlorodifluoromethane  
EPA Reg Num  
Product Use Refrigerant

**2 COMPOSITION / INFORMATION ON INGREDIENTS**

Ingredient Name	CAS RegistryNumber	Typical Wt. %	OSHA
dichlorodifluoromethane (CFC-12)	75-71-8	100%	Y

The substance(s) marked with a "Y" in the OSHA column, are identified as hazardous chemicals according to the criteria of the OSHA Hazard Communication Standard (29 CFR 1910.1200)

This material is classified as hazardous under Federal OSHA regulation.

The components of this product are all on the TSCA Inventory list.

**3 HAZARDS IDENTIFICATION**

**Emergency Overview**

Colorless liquified gas with faint ether odor.

**WARNING!**

LIQUID AND GAS UNDER PRESSURE, OVERHEATING AND OVERPRESSURIZING MAY CAUSE GAS RELEASE OR VIOLENT CYLINDER BURSTING. MAY DECOMPOSE ON CONTACT WITH FLAMES OR EXTREMELY HOT METAL SURFACES TO PRODUCE TOXIC AND CORROSIVE PRODUCTS. VAPOR REDUCES OXYGEN AVAILABLE FOR BREATHING AND IS HEAVIER THAN AIR. HARMFUL IF INHALED AND MAY CAUSE HEART IRREGULARITIES, UNCONSCIOUSNESS OR DEATH. LIQUID CONTACT WITH EYES OR SKIN MAY CAUSE FROSTBITE.

**Potential Health Effects**

Inhalation and skin contact are expected to be the primary routes of occupational exposure to this material. As with most liquified gases, contact with the rapidly volatilizing liquid can cause frostbite to any tissue. High vapor concentrations are irritating to the eyes and respiratory tract and may result in central nervous system (CNS) effects such as headache, dizziness, drowsiness and, in severe exposure, loss of consciousness and death. The dense vapor of this material may reduce the available oxygen for breathing. Prolonged exposure to an oxygen-deficient atmosphere may be fatal. Inhalation may cause an increase in the sensitivity of the heart to adrenaline, which could result in irregular or rapid heartbeats. Medical conditions aggravated by exposure to this material include heart disease or



compromised heart function.

#### 4 FIRST AID MEASURES

IF IN EYES, immediately flush with plenty of water. Get medical attention if irritation persists.

IF ON SKIN, Flush exposed skin with lukewarm water (not hot), or use other means to warm skin slowly. Get medical attention if frostbitten by liquid or if irritation occurs.

IF SWALLOWED, Not applicable - product is a gas at ambient temperatures.

IF INHALED, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention. Do not give adrenaline, epinephrin or similar drugs following exposure to this product.

#### 5 FIRE FIGHTING MEASURES

##### Fire and Explosive Properties

Auto-Ignition Temperature	NE	
Flash Point	NA - GAS	Flash Point Method
Flammable Limits- Upper	NONE	
Lower	NONE	

##### Extinguishing Media

Use extinguishing media appropriate to surrounding fire conditions.

##### Fire Fighting Instructions

Stop the flow of gas if possible. Use water spray on person making shut-off. Fire fighters and others who may be exposed to products of combustion should wear full fire fighting turn out gear (full Bunker Gear) and self-contained breathing apparatus (pressure demand NIOSH approved or equivalent). Fire fighting equipment should be thoroughly decontaminated after use.

##### Fire and Explosion Hazards

May decompose on contact with flames or extremely hot metal surfaces to produce toxic and corrosive products. Liquid and gas under pressure, overheating or overpressurizing may cause gas release and/or violent cylinder bursting. Container may explode if heated due to resulting pressure rise. Some mixtures of HCFCs and/or HFCs, and air or oxygen may be combustible if pressurized and exposed to extreme heat or flame.

#### 6 ACCIDENTAL RELEASE MEASURES

##### In Case of Spill or Leak

Use Halogen leak detector or other suitable means to locate leaks or check atmosphere. Keep upwind. Evacuate enclosed spaces and disperse gas with floor-level forced-air ventilation. Exhaust vapors outdoors. Do not smoke or operate internal combustion engines. Remove flames and heating elements.

#### 7 HANDLING AND STORAGE

##### Handling

Avoid breathing gas. Avoid contact with eyes, skin and clothing. Keep container closed. Use only with adequate ventilation. Do not enter confined spaces unless adequately ventilated.

##### Storage

Do not apply direct flame to cylinder. Do not store cylinder in direct sun or expose it to heat above 120 F.

**7 HANDLING AND STORAGE**

Do not drop or refill this cylinder. Keep away from heat, sparks and flames.

**8 EXPOSURE CONTROLS / PERSONAL PROTECTION**

**Engineering Controls**

Investigate engineering techniques to reduce exposures below airborne exposure limits. Provide ventilation if necessary to control exposure levels below airborne exposure limits (see below). If practical, use local mechanical exhaust ventilation at sources of air contamination such as open process equipment.

**Eye / Face Protection**

Where there is potential for eye contact, wear chemical goggles and have eye flushing equipment available.

**Skin Protection**

Wear appropriate chemical resistant protective clothing and chemical resistant gloves to prevent skin contact. Consult glove manufacturer to determine appropriate type glove material for given application. Rinse contaminated skin promptly. Wash contaminated clothing and clean protective equipment before reuse. Wash skin thoroughly after handling.

**Respiratory Protection**

Avoid breathing gas. When airborne exposure limits are exceeded (see below), use NIOSH approved respiratory protection equipment appropriate to the material and/or its components (full facepiece recommended). Consult respirator manufacturer to determine appropriate type equipment for a given application. Observe respirator use limitations specified by NIOSH or the manufacturer. For emergency and other conditions where exposure limit may be significantly exceeded, use an approved full face positive-pressure, self-contained breathing apparatus or positive-pressure airline with auxiliary self-contained air supply. Respiratory protection programs must comply with 29 CFR § 1910.134.

**Airborne Exposure Guidelines for Ingredients**

Exposure Limit	Value
<b>dichlorodifluoromethane (CFC-12)</b>	
ACGIH TWA	1000 ppm 4950 mg/m3
OSHA TWA PEL	1000 ppm 4950 mg/m3

- Only those components with exposure limits are printed in this section.
- Skin contact limits designated with a "Y" above have skin contact effect. Air sampling alone is insufficient to accurately quantitate exposure. Measures to prevent significant cutaneous absorption may be required.
- ACGIH Sensitizer designator with a value of "Y" above means that exposure to this material may cause allergic reactions.
- WEEL-AIHA Sensitizer designator with a value of "Y" above means that exposure to this material may cause allergic skin reactions.

**9 PHYSICAL AND CHEMICAL PROPERTIES**

Appearance/Odor	Colorless liquified gas with faint ether odor.
pH	NA
Specific Gravity	1.31 @ 25 C
Vapor Pressure	84.8 psia @ 21.1 C (70 F)
Vapor Density	(AIR = 1) 4.20
Melting Point	NE
Freezing Point	-157.8 C (-252 F)
Boiling Point	-29.8 C (-21.6 F)
Solubility In Water	Slight
Percent Volatile	100
Molecular Weight	120.91

**10 STABILITY AND REACTIVITY****Stability**

This material is chemically stable under specified conditions or storage, shipment and/or use. See HANDLING AND STORAGE section of this MSDS for specified conditions.

**Incompatibility**

Avoid contact with strong alkali or alkaline earth metals, finely powdered metals such as aluminum, magnesium or zinc and strong oxidizers, since they may react or accelerate decomposition.

**Hazardous Decomposition Products**

Thermal decomposition products include hydrogen fluoride, hydrogen chloride, carbon monoxide, carbon dioxide and chlorine.

**11 TOXICOLOGICAL INFORMATION****Toxicological Information**

Inhalation of high concentrations (40,000 ppm) by humans has been reported to cause a tingling sensation, humming in the ears, electrocardiogram changes, slurred speech, decreased psychological test scores, and in severe cases, partial loss of consciousness with amnesia and heart arrhythmia. Acute inhalation exposure produced anesthesia, heart arrhythmia, reduced heart function, effects on blood pressure, heart sensitization to adrenaline and other effects on the heart and respiratory systems in dogs, rats, mice, rabbits and monkeys. Repeated inhalation exposure produced tremors, mild narcosis and some blood changes in guinea pigs, dogs and monkeys; slight liver changes in guinea pigs; and no adverse effects in rats and rabbits. Slight irritation was observed in rats following repeated skin exposure. Following repeated oral exposure, no adverse effects were observed in rats or dogs. Reduced survival was observed in long-term high dose oral exposure studies in rats; however no adverse effects or increase the incidence of tumors were observed in rats or dogs at lower doses. Following exposure during pregnancy, no birth defects were observed in the offspring of rats (oral, inhalation) or rabbits (inhalation). No effects were seen on the ability of male or female rats to reproduce when exposed orally for 3 generations. No genetic changes were observed in tests using bacteria, animal cells or animals. Single exposure (acute) studies indicate:

Oral - No More than Slightly Toxic to Rats (LD50 >1,000 mg/kg)

Inhalation - Practically Non-toxic to Rats (30-min LC50 >800,000 ppm) and Mice (3-hr LC50 620,000 ppm)

Eye Irritation - Practically Non-irritating to Rabbits

Skin Irritation - Practically Non-irritating to Rabbits

**12 ECOLOGICAL INFORMATION**

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**Ecotoxicological Information**

No data are available.

**Chemical Fate Information**

This material is biodegradable in anaerobic environments. The log Pow is 2.08-2.16.

**13 DISPOSAL CONSIDERATIONS**

**Waste Disposal**

Recover, reclaim or recycle when practical. Dispose of in accordance with federal, state and local regulations. Note: Chemical additions to, processing of, or otherwise altering this material may make this waste management information incomplete, inaccurate, or otherwise inappropriate. Furthermore, state and local waste disposal requirements may be more restrictive or otherwise different from federal laws and regulations.

**14 TRANSPORT INFORMATION**

DOT Name	Dichlorodifluoromethane
DOT Technical Name	
DOT Hazard Class	2.2
UN Number	UN 1028
DOT Packing Group	PG NA
RQ	

**15 REGULATORY INFORMATION**

**Hazard Categories Under Criteria of SARA Title III Rules (40 CFR Part 370)**

Immediate (Acute) Health	Y	Fire	N
Delayed (Chronic) Health	N	Reactive	N
		Sudden Release of Pressure	Y

The components of this product are all on the TSCA Inventory list.

**Ingredient Related Regulatory Information:**

<b>SARA Reportable Quantities</b>	CERCLA RQ	SARA TPQ
dichlorodifluoromethane (CFC-12)	5000 LBS	

**SARA Title III, Section 313**

This product does contain chemical(s) which are defined as toxic chemicals under and subject to the reporting requirements of, Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372. See Section 2

dichlorodifluoromethane (CFC-12)

**Massachusetts Right to Know**

This product does contain the following chemical(s), as indicated below, currently on the Massachusetts Right to Know Substance List.

dichlorodifluoromethane (CFC-12)

**New Jersey Right to Know**

This product does contain the following chemical(s), as indicated below, currently on the New Jersey Right-to-Know Substances List.



**New Jersey Right to Know**

This product does contain the following chemical(s), as indicated below, currently on the New Jersey Right-to-Know Substances List.  
dichlorodifluoromethane (CFC-12)

**Pennsylvania Environmental Hazard**

This product does contain the following chemical(s), as indicated below, currently on the Pennsylvania Environmental Hazard List.  
dichlorodifluoromethane (CFC-12)

**Pennsylvania Right to Know**

This product does contain the following chemical(s), as indicated below, currently on the Pennsylvania Hazardous Substance List.  
dichlorodifluoromethane (CFC-12)

**16 OTHER INFORMATION**

**Revision Information**

Revision Date                      11 OCT 2004                      Revision Number 10  
Supersedes Revision Dated    18-FEB-2004

**Revision Summary**

A TOFINA Chemicals, Inc. has changed its name to Arkema Inc.

**Key**

NE= Not Established    NA= Not Applicable    (R) = Registered Trademark

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