



1 PRODUCT AND COMPANY IDENTIFICATION

DFO
2000 Market Street

Philadelphia, PA 19103

Information Telephone Numbers

Product Information

Product Name Forane (R) 500

Product Synonym(s)

R-500, CFC/HFC-500, ISOTRON 500

Chemical Family Chlorofluorocarbon/ Hydrofluorocarbon Blend

Chemical Formula CCl₂F₂/CH₃CHF₂

Chemical Name Dichlorodifluoromethane and 1,1-difluoroethane

EPA Reg Num

Product Use Refrigerant

EMERGENCY PHONE NUMBERS:

Chemtrec: (800) 424-9300 (24hrs) or (703) 527-3887

Medical: Rocky Mountain Poison Control Center

(866) 767-5089 (24Hrs)

Phone Number

800-245-5858

Available Hrs

8:00 am - 5:30 pm (Eastern)

2 COMPOSITION / INFORMATION ON INGREDIENTS

Ingredient Name	CAS RegistryNumber	Typical Wt. %	OSHA
dichlorodifluoromethane (CFC-12)	75-71-8	73.8%	Y
1,1-difluoroethane (HFC-152a)	75-37-6	26.2%	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

Skin contact and inhalation are expected to be the primary routes of occupational exposure to this material. As with most liquefied 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.

7 HANDLING AND STORAGE

Storage

Do not apply direct flame to cylinder. Do not store cylinder in direct sun or expose it to heat above 120 F. 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
dichlorodifluoromethane (CFC-12)	
ACGIH TWA	- 1000 ppm 4950 mg/m3
OSHA TWA PEL	- 1000 ppm 4950 mg/m3
1,1-difluoroethane (HFC-152a)	
WEEL TWA	- 2700 mg/m3 (1000 ppm)

- 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	1.14 @ 25 C
Vapor Pressure	100 PSIA @ 21.1 C (70 F)
Vapor Density	(AIR = 1) 3.45
Melting Point	NE
Freezing Point	-159 C / -254 F
Boiling Point	-33.5 C / -28.3 F
Solubility In Water	Slight
Percent Volatile	100
Molecular Weight	99.3

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 could include Halogen acids (HCl and HR), Halogens, Carbon Monoxide, Carbon Dioxide, and Carbonyl Halides.

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

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

1,1-Difluoroethane (HFC-152a)

11 TOXICOLOGICAL INFORMATION

Studies of workers exposed in industry operations did not indicate that this material causes heart arrhythmias. Acute inhalation exposure produced signs of sedation and heart arrhythmias in rats, but no adverse effects were observed in mice or monkeys. Rats did not exhibit increased sensitivity to cardiac effects after chemically induced heart injury, but did show an increased sensitivity after chemically induced injury to lung arteries. Inhalation, followed by intravenous injection of epinephrine to simulate stress reactions, resulted in cardiac sensitization in dogs. Following repeated inhalation exposure, respiratory irritation, sedation and an increase in urinary excretion of fluoride were observed in rats. Effects on nasal tissue and reversible kidney changes were observed in rats following long-term inhalation, but no increase in the incidence of tumors was observed. No birth defects were noted in the offspring of rats exposed by inhalation during pregnancy. No genetic changes were observed in a test using bacteria, but were observed in a test using human cells. Single exposure (acute) studies indicate:

Inhalation - Practically Non-toxic to Rats (4-hr LC50 383,000 ppm)

12 ECOLOGICAL INFORMATION

Ecotoxicological Information

No data are available.

Chemical Fate Information

Dichlorodifluoromethane (CFC 12)

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 and Difluoroethane Azeotropic Mixture
DOT Technical Name	(R-500)
DOT Hazard Class	2.2
UN Number	UN 2602
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.



Arkema Inc.

Ingredient Related Regulatory Information:

SARA Reportable Quantities

dichlorodifluoromethane (CFC-12)
1,1-difluoroethane (HFC-152a)

CERCLA RQ

5000 LBS
NE

SARA TPQ

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.

1,1-difluoroethane (HFC-152a)
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.

1,1-difluoroethane (HFC-152a)
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 8
Supercedes Revision Dated 30-SEP-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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