



The MSDS format adheres to the standards and regulatory requirements of the United States and may not meet regulatory requirements in other countries.

DuPont  
Material Safety Data Sheet

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2024FR FREON 113 REFRIGERANT  
Revised 19-OCT-1996  
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CHEMICAL PRODUCT/COMPANY IDENTIFICATION  
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Material Identification

"FREON" is a registered trademark of DuPont.

Corporate MSDS Number : DU000126  
Formula : CCl<sub>2</sub>FCClF<sub>2</sub>  
Molecular Weight : 187.38

Tradenames and Synonyms

TRICHLOROTRIFLUOROETHANE  
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE  
"FREON" TF SOLVENT  
"FREON" TF CLEANING AGENT  
"FREON" PRECISION CLEANING AGENT  
"FREON" TF  
"FREON" PCA  
"FREON" TF 113

Company Identification

MANUFACTURER/DISTRIBUTOR  
DuPont Fluoroproducts  
1007 Market Street  
Wilmington, DE 19898

PHONE NUMBERS

Product Information : 1-800-441-7515 (outside the U.S.  
302-774-1000)  
Transport Emergency : CHEMTREC 1-800-424-9300(outside U.S.  
703-527-3887)  
Medical Emergency : 1-800-441-3637 (outside the U.S.  
302-774-1000)

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COMPOSITION/INFORMATION ON INGREDIENTS  
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Components

Material	CAS Number	%
*1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE ("FREON" 113)	76-13-1	100

\* Disclosure as a toxic chemical is required under Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR part 372.

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HAZARDS IDENTIFICATION  
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## Potential Health Effects

PRINCIPAL HEALTH HAZARDS (Including Significant Routes, Effects, Symptoms of Overexposure, and Medical Conditions Aggravated by Exposure)

In acute toxicity testing in animals, "FREON" 113 was of very low toxicity by inhalation. However, life-threatening exposures may occur if handled carelessly. Vapors are heavier than air posing a hazard of asphyxiation if they are trapped in enclosed or low places. At flame temperatures, this fluorocarbon may decompose to hydrogen fluoride which may be lethal at low concentrations. "FREON" 113 poses a hazard of fatal heart irregularities if inhaled at high concentrations. Skin or eye contact may cause irritation. Prolonged skin contact may cause drying of the skin. Inhalation or ingestion may cause dizziness, headache, confusion, incoordination and loss of consciousness.

## ANIMAL DATA:

Inhalation 4 hour LC50: 52,500 ppm in rats  
Skin absorption ALD: >11,000 mg/kg in rabbits  
Oral LD50: 43,000 mg/kg in rats

The liquid is a mild skin irritant and a slight eye irritant. The compound has produced a weak allergic skin reaction (sensitization) in guinea pigs.

Skin: Repeated exposure to high doses of the liquid maintained in close contact with the skin caused severe local irritation in rabbits. This reaction is typically seen when defatting agents are tested under similar conditions.

Inhalation: The effects in animals from high single exposures include anaesthetic effects such as tremors, dizziness, incoordination, and loss of consciousness, and irregular heartbeat (cardiac arrhythmias) due to the heart being made more sensitive to adrenalin (cardiac sensitization). Repeated exposure at high concentrations also produced central nervous system effects during exposure but no evidence of other systemic toxicity.

Ingestion: High, single oral administration of the liquid, at or near lethal doses, produced lethargy within several minutes. Survivors have shown no apparent toxic effects.

There is no evidence of carcinogenicity or teratogenicity in animal testing. In a reproductive toxicity study in rats, no adverse effects on reproductive performance were seen at concentrations of 500 ppm, and only minimal effects (slight decrease in corpora lutea) were observed at 12,500 ppm.

## (HAZARDS IDENTIFICATION - Continued)

This compound does not produce genetic damage in bacterial or mammalian cell cultures. It does not produce heritable genetic damage in male animals (dominant lethal test).

## HUMAN HEALTH EFFECTS OF OVEREXPOSURE BY:

Skin contact may initially include: mild skin irritation, mainly due to rapid evaporation, with possible discomfort or rash. Prolonged skin contact may cause temporary tingling, numbness, coldness, or drying of skin. There are no reports of human skin sensitization. Significant skin permeation, and systemic toxicity, after contact appears unlikely.

Eye contact may initially include: mild eye irritation with discomfort, tearing, or blurring of vision.

The major ingestion hazard is aspiration (liquid entering the lungs during ingestion or vomiting) which may result in "chemical pneumonia". Symptoms include coughing, gasping, choking, shortness of breath, bluish discoloration of the skin, rapid breathing and heart rate, and fever. Pulmonary edema or bleeding, drowsiness, confusion, coma and seizures may occur in more serious cases. Symptoms may develop immediately or as late as 24 hours after the exposure, depending on how much chemical entered the lungs.

Inhalation or ingestion may include: temporary nervous system depression with anaesthetic effects such as dizziness, headache, confusion, incoordination, and loss of consciousness. Higher exposures may cause temporary alteration of the heart's electrical activity with irregular pulse, palpitations, or inadequate circulation. Fatality may occur from gross overexposure. One report cites two cases where workers who were repeatedly overexposed to the compound experienced liver damage; however, it was not proven that the compound actually caused the damage. Another study evaluated 50 workers exposed for an average of over 2 years to 46 - 4700 ppm. No adverse effects were found except for 1 case of dry skin.

## Carcinogenicity Information

None of the components present in this material at concentrations equal to or greater than 0.1% are listed by IARC, NTP, OSHA or ACGIH as a carcinogen.

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FIRST AID MEASURES  
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## First Aid

## INHALATION

If high concentrations are inhaled, immediately remove persons to fresh air; keep them calm. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

## SKIN CONTACT

In case of skin contact, flush skin with plenty of water for 15 minutes. Get medical attention if irritation is present.

## EYE CONTACT

In case of eye contact, immediately flush eyes with plenty of water for 15 minutes. Call a physician.

## INGESTION

If swallowed, no specific intervention is indicated as the compound is not likely to be hazardous by ingestion. Do not induce vomiting. However, consult a physician if necessary.

## Notes to Physicians

Activated charcoal slurry may be administered. To prepare activated charcoal slurry suspend 50 g activated charcoal in 400 mL water in plastic bottle and shake well. Administer 5 mL/kg, or 350 mL for an average adult.

Because of a possible increased risk of eliciting cardiac dysrhythmias, catecholamine drugs, such as epinephrine, should be used with special caution in situations of emergency life support.

Because of the danger of aspiration, emesis or gastric lavage should not be employed unless the risk is justified by the presence of additional toxic substances. Activated charcoal may induce vomiting, but may be given after emesis or lavage to absorb toxic additives. Steroid therapy in mild to moderate cases does not improve outcome. Bacterial pneumonia often occurs after exposure, but prophylactic antibiotics are not indicated and should be reserved for documented bacterial pneumonia.

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FIRE FIGHTING MEASURES  
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## Flammable Properties

Flash Point : Will not burn  
Autodecomposition : 300 C (572 F)

## Fire and Explosion Hazards:

Drums may rupture under fire conditions. Decomposition may occur.

## Extinguishing Media

As appropriate for combustibles in area.

## Fire Fighting Instructions

Use water spray or fog to cool container. Self-contained breathing apparatus (SCBA) is required if drums rupture and contents are spilled under fire conditions.

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ACCIDENTAL RELEASE MEASURES  
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## Safeguards (Personnel)

NOTE: Review FIRE FIGHTING MEASURES and HANDLING (PERSONNEL) sections before proceeding with clean-up. Use appropriate PERSONAL PROTECTIVE EQUIPMENT during clean-up.

## Accidental Release Measures

Ventilate area. Do not flush into sewers. Dike spill. Collect on absorbent material and transfer to steel drums for recovery or disposal. Use self-contained breathing apparatus (SCBA) for large spills. Comply with Federal, State, and local regulations on reporting releases.

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HANDLING AND STORAGE  
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## Handling (Personnel)

Avoid breathing vapors and prolonged skin exposure. Use with sufficient ventilation to keep employee exposure below recommended limits.

## Storage

Clean, dry area. Do not heat above 125 deg F.

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EXPOSURE CONTROLS/PERSONAL PROTECTION  
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## Engineering Controls

Normal ventilation for standard use procedures is generally adequate. Local exhaust should be used when large amounts are released. Mechanical ventilation should be used in low or enclosed places.

## Personal Protective Equipment

Impervious gloves should be used to avoid prolonged or repeated exposure. Chemical splash goggles should be worn as needed to prevent eye contact. Under normal use conditions, no respiratory protection is required when using this product. Self-contained breathing apparatus (SCBA) is required if a large spill occurs.

## # Exposure Guidelines

## Applicable Exposure Limits

1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE  
PEL (OSHA) : 1,000 ppm, 7,600 mg/m3, 8 Hr. TWA  
TLV (ACGIH) : 1,000 ppm, 7,670 mg/m3, 8 Hr. TWA, A4  
STEL 1,250 ppm, 9,590 mg/m3, A4  
AEL \* (DuPont) : None Established

\* AEL is DuPont's Acceptable Exposure Limit. Where governmentally imposed occupational exposure limits which are lower than the AEL are in effect, such limits shall take precedence.

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PHYSICAL AND CHEMICAL PROPERTIES  
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## Physical Data

Boiling Point : 48 C (118 F)  
Vapor Pressure : 6.46 psia at 25 deg C (77 deg F)  
Vapor Density : 2.9 (Air = 1.0)  
at 25 deg C (77 deg F)  
% Volatiles : 100 WT%  
Evaporation Rate : (CCl4 = 1)  
Greater than 1  
Solubility in Water : 0.02 WT% @ 25 C (77 F)  
pH : Neutral  
Odor : Slight ethereal  
Form : Liquid  
Color : Clear, colorless  
Density : 1.57 g/cc at 25 deg C (77 deg F) - Liquid

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STABILITY AND REACTIVITY  
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## Chemical Stability

Material is stable. However, avoid open flames and high temperatures.

## Incompatibility with Other Materials

Incompatible with alkali or alkaline earth metals- powdered Al, Zn, Be, etc.

## Polymerization

Polymerization will not occur.

## Other Hazards

Decomposition : Decomposition products are hazardous. This compound can be decomposed by high temperatures (open flames, glowing metal surfaces, etc.) forming hydrochloric and hydrofluoric acids, and possibly carbonyl halides.

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ECOLOGICAL INFORMATION  
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## Ecotoxicological Information

## Aquatic Toxicity

96-hour LC50, rainbow trout : 7.4 mg/L

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DISPOSAL CONSIDERATIONS  
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## Waste Disposal

Comply with Federal, State, and local regulations. Remove to a permitted waste disposal facility. EPA Hazardous Waste Nos. F001 and F002 may apply to waste materials.

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TRANSPORTATION INFORMATION  
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## Shipping Information

## Shipping Containers

Tank Cars.  
Tank Trucks.

## Drums

NOT REGULATED AS A HAZARDOUS MATERIAL BY DOT OR IMO.

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REGULATORY INFORMATION  
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## U.S. Federal Regulations

TSCA Inventory Status : Reported/Included.

TITLE III HAZARD CLASSIFICATIONS SECTIONS 311, 312

Acute : Yes  
Chronic : No  
Fire : No  
Reactivity : No  
Pressure : No

## HAZARDOUS CHEMICAL LISTS

SARA Extremely  
Hazardous Substance - No  
CERCLA Hazardous Substance - No  
SARA Toxic Chemical - See Components Section-----  
OTHER INFORMATION  
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## NFPA, NPCA-HMIS

NPCA-HMIS Rating  
Health : 1  
Flammability : 0  
Reactivity : 1

Personal Protection rating to be supplied by user depending on use conditions.

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The data in this Material Safety Data Sheet relates only to the specific material designated herein and does not relate to use in combination with any other material or in any process.Responsibility for MSDS : MSDS Coordinator  
> : DuPont Fluoroproducts  
Address : Wilmington, DE 19898  
Telephone : (800) 441-7515

# Indicates updated section.

This information is based upon technical information believed to be reliable. It is subject to revision as additional knowledge and experience is gained.

End of MSDS