



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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"FORMACEL" S BLOWING AGENT - FOOD GRADE  
2077FR Revised 5-OCT-1996  
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CHEMICAL PRODUCT/COMPANY IDENTIFICATION  
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Material Identification

"FORMACEL" is a registered trademark of DuPont.

Formula : CHClF2

Company Identification

MANUFACTURER/DISTRIBUTOR

DuPont  
1007 Market Street  
Wilmington, DE 19898

PHONE NUMBERS

Product Information : 1-800-441-9450  
Transport Emergency : CHEMTREC: 1-800-424-9300  
Medical Emergency : 1-800-441-3637

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COMPOSITION/INFORMATION ON INGREDIENTS  
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Components

Material	CAS Number	%
*METHANE, CHLORODIFLUORO- ("FREON" 22)	75-45-6	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)

Inhalation of high concentrations of vapor is harmful and may cause heart irregularities, unconsciousness, or death. Intentional misuse or deliberate inhalation may cause death without warning. Vapor reduces oxygen available for breathing and is heavier than air. Liquid contact can cause frostbite.

ANIMAL DATA:

Inhalation 4-hour LC50: 220,000 ppm in rats

## (HAZARDS IDENTIFICATION - Continued)

The compound is untested for skin and eye irritancy, and is untested for animal sensitization. Toxicity described in animals exposed by inhalation to concentrations ranging from 5% to 70% include effects on the central nervous system, liver, lungs, kidneys, spleen; cardiac sensitization; decreased body weight gain; and partial anesthesia. In chronic inhalation studies FC-22 produced a small, but statistically significant, increase of tumors in male rats, but not female rats or male or female mice at a concentration of 50,000 ppm (v/v). In the same studies, no carcinogenic effects were seen in either species at concentrations of 10,000 ppm or 1000 ppm (v/v). FC-22 was mutagenic in bacterial cell cultures but not mammalian cell cultures, and was not mutagenic in whole animal assays. A slight, but significant, increase in developmental toxicity (eye malformations, decreased fetal weights) has been observed in the offspring of rats exposed to high concentrations (50,000 ppm) of FC-22, a concentration which was also maternally toxic; no effects on the fetus or the maternal rats were seen at 1000 or 100 ppm. Developmental toxicity studies in rabbits at 50,000, 1000 and 100 ppm FC-22 were negative. Based on these findings, FC-22 is not considered a unique hazard to the conceptus and poses no carcinogenic hazard when exposures are below the TLV. Studies of the effects of FC-22 on male reproductive performance have been negative. Specific studies to evaluate the effect on female reproductive performance have not been conducted, however, limited information obtained from studies on developmental toxicity do not indicate adverse effects on female reproductive performance at concentrations up to 50,000 ppm (v/v).

## HUMAN HEALTH EFFECTS:

Overexposure to the vapors by inhalation may include temporary nervous system depression with anesthetic effects such as dizziness, headache, confusion, incoordination, and loss of consciousness. Higher exposures to the vapors may cause temporary alteration of the heart's electrical activity with irregular pulse, palpitations, or inadequate circulation; or fatality from gross overexposure. Skin contact with the liquid may cause frostbite.

Individuals with preexisting diseases of the central nervous or cardiovascular system may have increased susceptibility to the toxicity of excessive exposures.

## 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 large concentrations are inhaled, immediately remove to fresh air. Keep person calm. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

## SKIN CONTACT

In case of skin contact, flush with water for 15 minutes. Treat for frostbite if necessary by gently warming affected area.

## EYE CONTACT

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

## IF SWALLOWED

Ingestion is not considered a potential route of exposure.

## Notes to Physicians

Because of possible disturbances of cardiac rhythm, catecholamine drugs, such as epinephrine, should be used with special caution in situations of emergency life support.

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FIRE FIGHTING MEASURES  
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## Flammable Properties

Flash Point : None  
Method : TOC  
Autodecomposition : 632 C (1170 F)

Other burning material may cause chlorodifluoromethane to burn weakly. Use water spray or fog to cool containers. Cylinders are equipped with pressure and temperature relief devices but may rupture under fire conditions. Decomposition may occur.

Chlorodifluoromethane is not flammable at ambient temperature and atmospheric pressure. However, chlorodifluoromethane has been shown in tests to be combustible at pressures as low as 60 psig at ambient temperature when mixed with air at concentrations of 65 volume % air.

## Fire and Explosion Hazards:

No Information Available.

## (FIRE FIGHTING MEASURES - Continued)

## Extinguishing Media

As appropriate for combustibles in area. Extinguishant for other burning material in area is sufficient to stop burning.

## Fire Fighting Instructions

Self-contained breathing apparatus (SCBA) is required if cylinders rupture or contents are released 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-especially low places where heavy vapors might collect. Remove open flames. Use self-contained breathing apparatus (SCBA) for large spills or releases.

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HANDLING AND STORAGE  
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## Handling (Personnel)

Use with sufficient ventilation to keep employee exposure below recommended limits.

"FORMACEL" S Blowing Agent, in general, should not be used or allowed to be present with high concentrations of air above atmospheric pressure.

## Storage

Clean, dry area. Do not store above 125 deg F (52 deg C).

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EXPOSURE CONTROLS/PERSONAL PROTECTION  
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## Engineering Controls

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

## (EXPOSURE CONTROLS/PERSONAL PROTECTION - Continued)

## Personal Protective Equipment

Impervious gloves and chemical splash goggles should be used when handling liquid. Under normal manufacturing conditions, no respiratory protection is required when using this product. Self-contained breathing apparatus (SCBA) is required if a large release occurs.

## # Exposure Guidelines

## Applicable Exposure Limits

METHANE, CHLORODIFLUORO- ("FREON" 22)  
 PEL (OSHA) : None Established  
 TLV (ACGIH) : 1,000 ppm, 3,540 mg/m<sup>3</sup>, 8 Hr. TWA, 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 : -40.8 C (-41.4 F)  
 Vapor Pressure : 151 psig at 25 deg C (77 deg F)  
 Vapor Density : (Air = 1.0)  
                   3.03 at 25 deg C (77 deg F)  
 % Volatiles : 100 WT%  
 Evaporation Rate : (CCl<sub>4</sub> = 1)  
                   Greater than 1  
 Solubility in Water : 0.3 WT% @ 25 C (77 F)  
 pH : Neutral  
 Odor : Slight ethereal  
 Form : Liquefied gas  
 Color : Colorless  
 Density : 1.194 g/cc at 25 deg C (77 deg F)  
 Appearance : Clear

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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.

## (STABILITY AND REACTIVITY - Continued)

## Polymerization

Polymerization will not occur.

## Other Hazards

Decomposition : Decomposition products are hazardous.  
"FREON" 22 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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DISPOSAL CONSIDERATIONS  
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## Waste Disposal

Reclaim by distillation. Comply with Federal, State, and local regulations.

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TRANSPORTATION INFORMATION  
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## Shipping Information

DOT  
Proper Shipping Name : CHLORODIFLUOROMETHANE  
Hazard Class : NONFLAMMABLE GAS  
I.D. No. (UN/NA) : UN 1018  
DOT Label(s) : NONFLAMMABLE GAS  
DOT Placard : NONFLAMMABLE GAS

DOT/IMO  
Proper Shipping Name : CHLORODIFLUOROMETHANE  
Hazard Class : NONFLAMMABLE GAS 2.2  
UN No. : 1018  
DOT/IMO Label : NONFLAMMABLE GAS

## Shipping Containers

Tank Cars.  
Tank Trucks.

## Cylinders

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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 : Yes

## LISTS:

Extremely Hazardous Substance -No  
CERCLA Hazardous Substance -No  
Toxic Chemicals -Yes-----  
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 : W. J. Brock  
Address : DuPont Chemicals  
P. O. Box 80709, Chestnut Run  
Wilmington, DE 19880-0709  
Telephone : 302-999-5072

# 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