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DuPont
Material Safety Data Sheet

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6500FR Vertrel(R) SFR
Revised 20-NOV-2007

CHEMICAL PRODUCT/COMPANY IDENTIFICATION

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)

COMPOSITION/INFORMATION ON INGREDIENTS

Components

Material	CAS Number	%
Trans, 1,2-Dichloroethylene	156-60-5	65-75
	138495-42-8	
Pentane, 1,1,1,2,2,3,4,5,5,5-decafluoro-		15-20
Proprietary Hydrofluorocarbon		10-15
*Methyl Alcohol	67-56-1	1-2.9

* 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.

HAZARDS IDENTIFICATION

Potential Health Effects

Inhalation may cause central nervous system depression with dizziness, confusion, incoordination, drowsiness or unconsciousness; or tremors, nausea, vomiting, weakness, and abdominal cramps. Other effects may include irregular heart beat with a strange sensation in the chest, "heart thumping", apprehension, lightheadedness, feeling of fainting, dizziness, or weakness.

Skin contact may cause severe irritation with burning, redness, swelling, pain or rash.

Eye contact may cause severe eye irritation with tearing,

(HAZARDS IDENTIFICATION - Continued)

pain or blurred vision.

Ingestion may cause pulmonary edema (body fluid in the lungs) with cough, wheezing, abnormal lung sounds, possibly progressing to severe shortness of breath and bluish discoloration of the skin: symptoms may be delayed. Ingestion may also cause pathological changes in the liver, central nervous system depression with dizziness, confusion, incoordination, drowsiness or unconsciousness, and structural (pathological) changes in heart muscle tissue.

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.

FIRST AID MEASURES

First Aid

INHALATION

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

SKIN CONTACT

Flush skin with water after contact. Wash contaminated clothing before reuse.

EYE CONTACT

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

INGESTION

If swallowed, do not induce vomiting. Immediately give 2 glasses of water. Never give anything by mouth to an unconscious person. Call a physician.

Notes to Physicians

Activated charcoal mixture may be beneficial. Suspend 50 g activated charcoal in 400 mL water and mix well. Administer 5 mL/kg, or 350 mL for an average adult.

FIRE FIGHTING MEASURES

Flammable Properties

Flash Point: None
Methods: Closed Cup (Pensky-Martin, ASTM D93) and
Open Cup (ASTM D1310) Classified non-flammable by NFPA
and US Department of Transportation

The product vapors become flammable when mixed with
air (Test Method ASTM E681), within the range given below:

Flammable Limits in Air, Vol %

Lower Explosivity Limit: .7 %
Upper Explosivity Limit: .15%

Users should clear equipment of all vapors and liquids
before performing any maintenance operations that could
result in an ignition source. Users also need to consider
the possibility of vapor flammability of this product to
determine the guidelines for it's safe handling in all other
parts of the user's operations.

Extinguishing Media

Water Spray, Foam, Dry Chemical, CO2.

Fire Fighting Instructions

Evacuate personnel to a safe area. Wear self-contained breathing
apparatus (SCBA) and full protective equipment.

ACCIDENTAL RELEASE MEASURES

Safeguards (Personnel)

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

Wear self-contained breathing apparatus (SCBA) and full protective
gear. Remove source of heat, sparks, and flame.

Initial Containment

Dike spill.

(ACCIDENTAL RELEASE MEASURES - Continued)

Spill Clean Up

Immediately evacuate the area and provide maximum ventilation, especially in low places where heavy vapors might collect. Unprotected personnel should move upwind of spill. Only personnel equipped with proper respiratory and skin/eye protection should be permitted in area. Soak up with sawdust, sand, oil dry or other absorbent material. After all visible traces, including ignitable vapors, have been removed, thoroughly wet vacuum the area. Do not flush to sewer. If area of spill is porous, remove as much contaminated earth, gravel, etc., as necessary and place in closed containers for disposal.

HANDLING AND STORAGE

Handling (Personnel)

Do not inhale. Avoid contact with eyes, skin or clothing. Wash thoroughly after handling. Wash clothing after use.

Handling (Physical Aspects)

Keep container tightly closed.

Storage

Store in a clean, dry area. Do not allow stored product to exceed 52C (125F) to prevent leakage or potential rupture of container from pressure and expansion. Protect from freezing temperatures. If solvent is stored below -10C (14F), mix prior to use.

EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls

Use only with adequate ventilation.

Vapors are heavier than air, posing a hazard of asphyxia if they are trapped in enclosed or low places.

Personal Protective Equipment

EYE/FACE PROTECTION

Wear safety glasses. Where splash potential exists, wear chemical splash goggles.

RESPIRATORS

Wear NIOSH approved respiratory protection, as appropriate.

(EXPOSURE CONTROLS/PERSONAL PROTECTION - Continued)

PROTECTIVE CLOTHING

Where there is potential for skin contact have available and wear as appropriate impervious gloves, apron, pants and jacket.

Exposure Guidelines

Applicable Exposure Limits

Trans, 1,2-Dichloroethylene

PEL (OSHA) : 200 ppm, 790 mg/m³, 8 Hr. TWA
 TLV (ACGIH) : 200 ppm, 8 Hr. TWA
 AEL * (DuPont) : 200 ppm, 8 & 12 Hr. TWA

Pentane, 1,1,1,2,2,3,4,5,5,5-decafluoro-

PEL (OSHA) : None Established
 TLV (ACGIH) : None Established
 AEL * (DuPont) : 200 ppm, 8 & 12 Hr. TWA
 400 ppm, Ceiling

Methyl Alcohol

PEL (OSHA) : 200 ppm, 260 mg/m³, 8 Hr. TWA
 TLV (ACGIH) : 200 ppm, 8 Hr. TWA, Skin
 STEL 250 ppm
 AEL * (DuPont) : 200 ppm, 8 & 12 Hr. TWA, Skin

* 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.

Exposure Guideline Comments

Vertrel(R) SFR has a calculated AEL of 187 ppm. This is calculated in accordance with the ACGIH formula for mixtures.

Proprietary Hydrofluorocarbon:

Based on the manufacturer's safety information, an occupational exposure limit (OEL) of 100 ppm 8-hr is recommended.

PHYSICAL AND CHEMICAL PROPERTIES

Physical Data

Boiling Point : 41 C (106 F)
 Vapor Pressure : 8.4 psia @ 25 C
 Solubility in Water : Slightly soluble
 Odor : (slight), Pleasant.
 Form : Liquid.
 Color : Clear, Colorless.
 Liquid Density : 1.28 g/cm³ @ 25 C
 Viscosity : 0.58 cps

(PHYSICAL AND CHEMICAL PROPERTIES - Continued)

Heat of Vaporization : 68 cal/g

STABILITY AND REACTIVITY

Chemical Stability

Stable at normal conditions.

Incompatibility with Other Materials

Incompatible with steam, oxidizers, elevated temperatures, caustic soda, caustic potash, alkali or alkaline earth metals. Contact with highly basic materials, pH 10 and above, is not recommended.

Decomposition

Decomposition products: hydrogen chloride gas, oxides of carbon, hydrofluoric acid and carbonyl fluoride.

Polymerization

Polymerization will not occur.

TOXICOLOGICAL INFORMATION

Animal Data

1,1,1,2,3,4,4,5,5,5 decafluoropentane:

Oral LD50: > 5,000 mg/kg in rats
Dermal ALD: > 5,000 mg/kg in rabbits
Inhalation, 4 hour LC50: 11,100 ppm in rats

Proprietary Hydrofluorocarbon:

Oral LD50: >2 g/kg in rats
Inhalation 4 hour LC50: >10,000 ppm in rats

t-DCE:

Oral LD50: 1275 mg/kg in rats
Dermal LD50: > 5000 mg/kg in rabbits
Inhalation LC50, 4 hr: 24,100 ppm in rats

Methyl Alcohol:

Oral LD50: 9,100 mg/kg in rats
Dermal LD50: 15,840 mg/kg in rabbits
Inhalation 1 hour LC50: > 145,000 ppm in rats

1,1,1,2,3,4,4,5,5,5 decafluoropentane:

(TOXICOLOGICAL INFORMATION - Continued)

Animal testing indicates that 1,1,1,2,3,4,4,5,5,5 decafluoropentane is a slight skin irritant and a mild eye irritant, but is not a skin sensitizer.

1,1,1,2,3,4,4,5,5,5 decafluoropentane did not cause cardiac sensitization in dogs exposed to 1000 or 5000 ppm. The cardiac sensitization potential was not evaluated at or above 10,000 ppm due to clinical signs consistent with central nervous system toxicity.

Single exposure to 5,000 ppm 1,1,1,2,3,4,4,5,5,5 decafluoropentane by inhalation caused tremors. A different single exposure study by inhalation in rats caused incoordination, hyperactivity and prostration; pathological examination of rats from this study revealed kidney and lung changes, and external hair loss. Repeated exposures to 1,900 - 3,500 ppm caused tremors or convulsions, behavioral effects, and altered clinical chemistry.

In developmental toxicity studies with laboratory animals, 1,1,1,2,3,4,4,5,5,5 decafluoropentane was not uniquely toxic to the developing fetus. No animal data are available to define the carcinogenic or reproductive hazards of 1,1,1,2,3,4,4,5,5,5 decafluoropentane. Tests have shown that 1,1,1,2,3,4,4,5,5,5 decafluoropentane does not cause genetic damage in bacterial or mammalian cell cultures. It has not produced genetic damage in tests on animals.

t-DCE:

t-DCE is a severe eye irritant, and a moderate to severe skin irritant.

Single and repeated exposure to t-DCE by ingestion caused increased kidney weight, histopathological changes of the lungs, liver effects, decreased motor activity, pulmonary edema, cardiovascular system changes, and mortality.

Single and repeated exposure to t-DCE by inhalation caused pathological changes of the liver and lungs, inactivity or anaesthesia, altered white blood cell count, cardiovascular system changes and weak cardiac sensitization, a potentially fatal disturbance of the heart rhythm caused by a heightened sensitivity to the action of epinephrine. Long-term exposure caused altered liver and lung function.

A more recent inhalation study (Dec. 1998) conducted with well-characterized t-DCE containing > 99.4% t-DCE, produced no adverse, compound-related effects. The NOEL was 4000 ppm.

Exposure of pregnant rats shows maternal toxicity at 2000, 6000 and 12,000 ppm. Developmental toxicity was seen only

(TOXICOLOGICAL INFORMATION - Continued)

at 12,000 ppm. Tests have shown that t-DCE does not cause genetic damage in bacterial or mammalian cell cultures.

No animal data are available to define the carcinogenic or reproductive hazards of t-DCE.

Methyl Alcohol:

Animal testing indicates Methyl Alcohol is an eye and skin irritant.

Eye contact with Methyl Alcohol caused clouding of the eye (corneal opacity).

Repeated skin contact with higher concentrations of Methyl Alcohol caused some mortality.

Single exposure by ingestion caused narcosis, liver effects, and hypothermia. Repeated exposure caused pathological changes of the eyes and acidosis.

Repeated exposure by inhalation caused irritation of the eyes, and blindness.

No animal data are available to define the carcinogenicity of Methyl Alcohol. Exposure of pregnant rats shows the following developmental effects: reduced birth weight, bone abnormalities, and behavioral abnormalities. Exposure of pregnant mice shows the following developmental effects: reduced birth weight, resorption, and bone abnormalities. No adequate animal data are available to define the reproductive effects of Methyl Alcohol. Tests have shown that Methyl Alcohol does not cause genetic damage in bacterial or mammalian cell cultures, or in animals. Methyl Alcohol has not been tested for its ability to cause permanent genetic damage in reproductive cells of mammals (not tested for heritable genetic damage).

ECOLOGICAL INFORMATION

Ecotoxicological Information

Aquatic Toxicity:

1,1,1,2,3,4,4,5,5,5 decafluoropentane:

96 hour LC50 - Fathead minnows: 27.2 mg/L

96 hour LC50 - Rainbow trout: 13.9 mg/L

48 hour LC50 - Daphnia magna: 11.7 mg/L

Proprietary Hydrofluorocarbon:

96 hour LC50 - Rainbow trout: 74.2 mg/L

(ECOLOGICAL INFORMATION - Continued)

t-DCE:

96 hour LC50 - Bluegill sunfish: 1350 mg/L
48 hour LC50 - Daphnia magna: 220 mg/L

Methyl Alcohol:

96 hour LC50 - Fathead minnows: 28,100 mg/L

DISPOSAL CONSIDERATIONS

Waste Disposal

Treatment, storage, transportation, and disposal must be in accordance with applicable Federal, State/Provincial, and Local regulations.

The presence of certain soils in high concentrations may affect the flammability characteristics of the material. Users should test for flammability and test the spent solvent to ensure proper classification for waste disposal.

TRANSPORTATION INFORMATION

Shipping Information

DOT/IMO/IATA - Not regulated in containers less than 1488 lbs (675 kg).

For containers with net weight greater than 1488 lbs (675 kg), use:

Proper Shipping Name : Environmentally Hazardous Substance,
Liquid, N.O.S. (Trans-1,2-Dichloroethylene)

Hazard Class: 9
UN Number: 3082
Packing Group: III
Reportable Quantity: 1000 lbs (Trans-1,2-Dichloroethylene)
...5000 lbs (Methanol)
...1488 lbs (Vertrel(R) SFR)

REGULATORY INFORMATION

U.S. Federal Regulations

TSCA Inventory Status : Listed.

TITLE III HAZARD CLASSIFICATIONS SECTIONS 311, 312

Acute : Yes
Chronic : No
Fire : No
Reactivity : No
Pressure : No-----
OTHER INFORMATION

NFPA, NPCA-HMIS

NPCA-HMIS Rating
Health : 2
Flammability : 1
Reactivity : 1

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

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