VERTREL® MCA

6092FR Revised 15-Sept-2001

CHEMICAL PRODUCT/COMPANY IDENTIFICATION

Material Identification

Formula : CF3CHFCHFCF2CF3,CC1H=CC1H(TRANS)

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	CAS Number	%
1,1,1,2,2,3,4,5,5,5-decafluoropentane (HFC-43-10mee)	138495-42-8	59.0-65.0
TRANS, 1,2-DICHLOROETHYLENE (t-DCE)	156-60-5	35.0-41.0

HAZARDS IDENTIFICATION

Potential Health Effects

Gross overexposure by inhalation to HFC-43-10mee may cause suffocation if air is displaced by vapors and central nervous system stimulation with increased activity or sleeplessness, tremors or convulsions. These effects may be followed by central nervous system depression with dizziness, confusion, incoordination, drowsiness or unconsciousness. Based on data from other fluorocarbons, gross overexposure to HFC-43-10mee may cause irregular heart beat with a strange sensation in the chest, "heart thumping" apprehension, lightheadedness, feeling of fainting, dizziness, weakness, sometimes progressing to loss of consciousness and death. Intentional misuse or deliberate inhalation may cause death without warning. Vapor reduces oxygen available for breathing and is heavier than air. Immediate effects of overexposure to HFC-43-10mee by skin contact may include slight irritation with itching, redness or swelling. Repeated and/or prolonged exposure may cause defatting of the skin with itching, redness or rash. Based on animal data, significant skin permeation, and systemic toxicity after skin contact, appears unlikely. Immediate effects of overexposure to HFC-43-10mee by eye contact may include eye irritation with tearing, pain or blurred vision. The major ingestion hazard of HFC-43-10mee 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 exposure, depending on how much chemical entered the lungs. Increased susceptibility to the effects of HFC-43-10mee may be observed in persons with pre-existing disease of the central nervous system or the cardiovascular system.

Inhalation of t-DCE 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 with t-DCE may cause severe irritation with burning, redness, swelling, pain or rash. Eye contact with t-DCE may cause severe eye irritation with tearing, pain or blurred vision. Ingestion of t-DCE 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, 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

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

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

If vomiting occurs naturally, have victim lean forward to reduce the risk of aspiration.

Notes to Physicians

THIS MATERIAL MAY MAKE THE HEART MORE SUSCEPTIBLE TO ARRHYTHMIAS. Catecholamines such as adrenaline, and other compounds having similar effects, should be reserved for emergencies and then used only with special caution.

FIRE FIGHTING MEASURES

Flammable Properties

Flammable limits in Air, % by Volume
LEL : None.
UEL : None.

Flash Point : None
Method : Pensky-Martens Closed Cup (ASTM D 93)

Flash Point : None
Method : Tag Open Cup (ASTM D 1310)

AUTOIGNITION TEMPERATURE:

Has not yet been determined for "Vertrel" MCA.

Fire and Explosion Hazards:

Use water spray or fog to cool containers. Drums may rupture under fire conditions. Decomposition may occur.

Extinguishing Media

Use media appropriate for surrounding material.

Fire Fighting Instructions

Self-contained breathing apparatus (SCBA) is required if drums rupture and contents are spilled under fire conditions.

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.

Initial Containment

Dike spill. Prevent material from entering sewers, waterways, or low areas.

&bull 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 and gravel, etc. as necessary and place in closed containers for disposal.

HANDLING AND STORAGE

&bull Handling (Personnel)

Avoid breathing vapors or mist. Avoid contact with eyes, skin, or clothing. Wash thoroughly after handling.

The use of gloves is recommended when working with the material containers. Material should not be dispensed from its container by pouring, except for small sample containers where fume hoods or where other ventilation is used to manage the exposure limits. The use of a drum pump is recommended for dispensing from shipping containers.

Storage

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

EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls

Use only with adequate ventilation. Keep container tightly closed.

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 or coverall chemical splash goggles.

RESPIRATORS

Where there is potential for airborne exposures in excess of applicable limits, wear NIOSH approved respiratory protection.

PROTECTIVE CLOTHING

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

Protective gloves and chemical splash goggles should be used when handling liquid.

Exposure Guidelines

Applicable Exposure Limits
1,1,1,2,2,3,4,5,5,5-DECAFLUOROPENTANE (HFC-43-10mee)

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

TRANS, 1,2-DICHLOROETHYLENE (t-DCE)
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

* 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.

PHYSICAL AND CHEMICAL PROPERTIES

Physical Data

Boiling Point	: 39 C (102 F)
Vapor Pressure	: 464 mm Hg @ 25 C (77 F)
Vapor Density	: 5.4 (Air=1.0) Heavier than air.
Form	: Liquid
Color	: Colorless
Density	: 1.41 g/cm3 @ 25 C (77 F) 11.8 lb/gal

STABILITY AND REACTIVITY

Chemical Stability

Stable at normal temperatures and storage conditions.

Incompatibility with Other Materials

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

Incompatible with strong bases such as NaOH, KOH, etc.

Decomposition

Decomposes with heat. High temperatures (open flames, glowing metal surfaces, etc.) can decompose HFC-43-10mee forming hydrofluoric acids and possibly carbonyl halides.

HFC-43-10mee is incompatible with strong bases and can react to form salts of hydrofluoric acid and unsaturated compounds of unknown toxicity.

1,2-Trans DCE is unstable at high temperatures and will form hydrochloric acid and unsaturates as well as break down or react in the presence of caustic to form salts of hydrochloric acid.

Polymerization

Polymerization will not occur.

TOXICOLOGICAL INFORMATION

&bull Animal Data

HFC-43-10mee
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

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

Animal testing indicates that HFC-43-10mee is a slight skin irritant and a mild eye irritant, but is not a skin sensitizer. Single exposure to 5,000 ppm HFC-43-10mee 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. These effects were temporary. In a different repeated exposure test the No-Observed-Adverse-Effect-Level (NOAEL) for convulsions was 1000 ppm. Results indicate convulsions is an acute effect of HFC-43-10mee. The 90-day No-Observed-Adverse-Effect-Level (NOAEL) is 500 ppm. In animal testing HFC-43-10mee produced developmental effects only at exposure levels producing other toxic effects in the adult animal. No animal data are available to define the carcinogenic or reproductive hazards of HFC-43-10mee. Tests have shown that HFC-43-10mee does not cause genetic damage in bacterial or mammalian cell cultures. It has not produced genetic damage in tests on animals.

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 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.

ECOLOGICAL INFORMATION

Ecotoxicological Information

Aquatic Toxicity:

HFC-43-10mee

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

t-DCE

96 hour LC50, bluegill sunfish: 1350 mg/L
48 hour LC50, Daphnia magna: 220 mg/L

DISPOSAL CONSIDERATIONS

Waste Disposal

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

TRANSPORTATION INFORMATION

&bull Shipping Information

DOT/IMO/IATA - Not regulated in containers with less than 2600 lbs. If greater than 2600 lbs. 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)
2600 lbs. ("Vertrel" MCA)

REGULATORY INFORMATION

U.S. Federal Regulations

All Components Are Listed on the TSCA Public Inventory

TITLE III HAZARD CLASSIFICATIONS SECTIONS 311, 312

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

1,1,1,2,2,3,4,5,5,5-DECAFLUOROPENTANE (CAS# 138495-42-8) is controlled by TSCA Section 5, Significant New Use Rule (SNUR; 40 CFR 721.5645) The approved uses are: precision and general cleaning, carrier fluid, displacement drying, printed circuit board cleaning, particulate removal and film cleaning, process medium, heat transfer fluid (dielectric and non-dielectric), and test fluid. Processors and users of this substance must also comply with the applicable general SNUR requirements set forth in 40 CFR 721 subpart A and the applicable record keeping requirements set forth at 40 CFR 721.125.

LISTS:
SARA Extremely Hazardous Substance -No
CERCLA Hazardous Substance -Yes*

*1,2 Dichloroethylene Component Only

OTHER INFORMATION

NFPA, NPCA-HMIS

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

Personal Protection Rating to be supplied by user, depending on use and conditions.

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Responsibility for MSDS:

MSDS Coordinator

DuPont Fluoroproducts

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End of MSDS