1. CHEMICAL PRODUCT/COMPANY IDENTIFICATION

Name: **MS-777**
Vertrel XE

Product Use: Cleaning Solvent

MANUFACTURER/DISTRIBUTOR:

Miller-Stephenson Chemical
55 Backus Ave.
Danbury, Conn. 06810 USA
(203) 743-4447

Emergency Phone Number:
(800) 424-9300

2. HAZARDS IDENTIFICATION

GHS Hazard classification
Not a dangerous substance or mixture according to GHS.

GHS Label elements:
Pictogram: not required
Signal word: not required

Other hazards which do not result in classification or are not covered by GHS
Vapors are heavier than air and can cause suffocation by reducing oxygen available for breathing.
Prolonged skin contact may defat the skin and produce dermatitis.
Misuse of intentional inhalation abuse may lead to death without warning.

3. INGREDIENTS

Material (s)	CAS No.	Approximate %
1,1,1,2,2,3,4,5,5,5-Decafluoropentane(HFC-43-10mee)	138495-42-8	95 - 97
Ethanol	64-17-5	3 - 5
Methanol	67-56-1	< 0.5

4. FIRST AID MEASURES

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.

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

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

Oral: If swallowed, do not induce vomiting. Immediately give 2 glasses of water. Never give anything by mouth to an unconscious person. If vomiting occurs, have them lean forward to reduce the risk of aspiration. Call a physician.

Notes to Physician:

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.

5. FIRE FIGHTING MEASURES

Flash Point: Does not flash **Method:** TCC

Fire and Explosion: Containers may rupture under fire conditions. Decomposition (see section 10) may occur.

Extinguishing Media: Water spray, Water mist, Dry Chemical, Carbon Dioxide (CO2).

Special Fire Fighting Instruction: Use water spray to cool containers. Evacuate personnel to safe area. Self-contained breathing apparatus (SCBA) maybe required if a large amount of material is spilled under fire conditions. Fight fire from a distance, heat may rupture containers. Exposure to decomposition products may be a hazard to health

6. 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. Evacuate personnel, thoroughly ventilate area, especially in low or enclosed places where heavy vapors my collect.

Initial Containment

Dike spill. Prevent material from entering sewers, waterways, or low areas. Should not be released into the environment.

Spill Clean Up

If containers rupture or leak, evacuate the area and provide ventilation, especially in low places where heavy vapors might collect. Only personnel equipped with proper respiratory and skin/eye protection should be permitted in area of large spill. Soak up with earth, sand, vermiculite or other non-combustible absorbent material. Place in a container for disposal according to local/national regulations.

7. HANDLING AND STORAGE

Handling: Use in a well-ventilated area to avoid breathing vapors. Vapors are heavier than air and accumulate in low areas. Use only with adequate ventilation. Where ventilation is inadequate, use appropriate respiratory protection. Avoid contact with skin eyes, or clothing. Wash thoroughly after handling.

Storage Conditions: Store in a well-ventilated place and keep container tightly closed. 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.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure Limits:	TLV(ACGIH)	PEL (OSHA)	AEL*(DuPont)
1,1,1,2,2,3,4,5,5,5-Decafluoropentane	None Established	None Established	200 ppm, 8 & 12 Hr. TWA 400 ppm, Ceiling
Methanol	200 ppm, TWA	200 ppm, 8 Hr. TWA	200 ppm, 8 & 12 Hr. TWA Skin
Ethanol		1000 ppm, 8 Hr. TWA	1000 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.

Respiratory Protection: Avoid breathing vapors, mists or spray. Use with mechanical ventilation in enclosed or low places. Local exhaust should be used when large amounts are released. Vapors are heavier than air and can cause suffocation by reducing oxygen available for breathing.

Eye Protection: Avoid eye contact. Use chemical goggles or safety glasses with side shields.

Skin Protection: Avoid contact with skin. Use gloves impervious should be used when handling liquid.

Hygiene measures: Do not eat, drink or smoke when using this product. Do not breathe vapors or spray mist. Avoid contact with skin, eyes, or clothing. Wash exposed areas thoroughly with soap and water.

9. PHYSICAL AND CHEMICAL PROPERTIES

Boiling Point: 126°F/52^{O}C

Density: 1.52 g/cc @ 77°F/25^{O}C

Vapor Density (Air=1): 7.3

pH Information: Neutral

Form: Liquid

Color: Colorless

Percent Volatile by Volume: 100

Vapor Pressure: 250 mmHg @ 77°F/25^{O}C

Solubility in H_2O: 15g/l @ 77°F/25^{O}C

Evaporation Rate (CC14=1): N.A.

Appearance: Clear & Colorless

10. STABILITY AND REACTIVITY

Stability: Stable at normal temperatures and storage conditions.

Material and Conditions to Avoid: Strong alkali or alkaline earth metals. Finely powdered metals. Strong bases. Open flame and high temperatures.

Decomposition: This product can be decomposed by high temperatures (flame, glowing metal surfaces, etc.) forming Fluorinated hydrocarbons, Hydrogen fluoride, Carbon dioxide (CO2), Carbon monoxide, Carbonyl fluoride.

Polymerization: Will not occur.

11. TOXICOLOGICAL INFORMATION

Carcinogenicity: None of the components in this product are listed as a carcinogen by IARC, NTP, OSHA, or ACGIH.

1,1,1,2,2,3,4,5,5,5-Decafluoropentane (HFC-43-10mee)

Inhalation: 4 hour LC50: 114mg/l in rats, Central nervous system effects, Convulsions
Oral: LD50: > 5,000 mg/kg in rats
Dermal: LD50: > 5,000 mg/kg in rabbits
Skin Irritation: No skin irritation, rabbit
Eye Irritation: No eye irritation, rabbit
Skin Sensitization: Did not cause sensitization on laboratory animals., guinea pig
Repeated dose toxicity: Inhalation, rat
No toxicologically significant effects were found.
Mutagenicity: Animal testing showed no mutagenic effects.
Reproductive toxicity: Animal testing showed no reproductive toxicity.
Teratogenicity: Animal testing showed no developmental toxicity.

Methanol

Inhalation Acute toxicity: 3mg/l, animals (unspecified species)
Target Organs: Central nervous system, Eye, Central nervous system effects, narcosis, eye effects.
Dermal Acute toxicity: 300 mg/kg in rabbits (unspecified species)
Target Organs: Central nervous system, Eye, Central nervous system effects, narcosis, eye effects.
Oral Acute Toxicity: 100 mg/kg, animals (unspecified species)
Target Organs: Central nervous system, Eye, Central nervous system effects: narcosis, eye effects
Skin irritation: Slight or no irritation, Rabbit
Eye irritation: Slight irritation, Rabbit
Skin sensitization: Did not cause sensitization on laboratory animals, Guinea pig
Carcinogenicity: Not classifiable as a human carcinogen. Overall weight evidence indicates that the substance is not carcinogenic.
Mutagenicity: Animal testing did not show any mutagenic effects.
Tests on bacterial or mammalian cell cultures did not show mutagenic effects.
Overall weight of evidence indicates that the substance is not mutagenic.
Did not cause genetic damage in animals.
Genetic damage in cultured mammalian cells was observed in some laboratory tests but not in others.
Genetic damage in cultured bacterial cells was observed in some laboratory tests but not in others.
Reproductive Toxicity: No toxicity or reproduction. Evidence suggests the substance is not a reproductive toxin in animals.
Teratogenicity: Evidence suggests the substance is not a developmental toxin in animals.

Ethanol

Inhalation: 4 hour LC50: 124.7 mg/l, Rat
Oral: LD50: 10,470 mg/kg, Rat
Skin Irritation: No skin irritation, Rabbit
Eye Irritation: Eye irritation. Rabbit
Skin Sensitization: Does not cause skin sensitisation., Mouse
Repeated dose toxicity: Oral: No toxicologically significant effects were found in rats.
Inhalation: No toxicologically significant effects were found in rats.
Carcinogenicity: Not classifiable as a human carcinogen. Overall weight evidence indicates that the substance is not carcinogenic.
Mutagenicity: Animal testing did not show any mutagenic effects.
Tests on bacterial or mammalian cell cultures did not show mutagenic effects.
Reproductive Toxicity: No toxicity or reproduction. Animal testing showed effects on reproduction at levels equal to or above those causing parental toxicity.
Teratogenicity: Animal testing showed effects on embryo-fetal development at levels equal to or above those causing maternal toxicity.

12. ECOLOGICAL INFORMATION

Aquatic Toxicity:

HFC-43-10mee:

96 hour LC50 in fathead minnows: 27.2 mg/l
96 hour LC50 in rainbow trout: 13.9 mg/l
48 hour LC50 in Daphnia magna: 11.7 mg/l
72 hour EC50 in green algae: > 120 mg/l

Methanol

96 hour LC50 – Flathead minnow: 28,100 mg/l
48 hour EC50 – Daphnia magna (water flea): > 10,000 mg/l
96 hour LC50 – Green algae (Selenastrum carpricornutum): 22,000 mg/l
72 hour EC50 in green algae: > 120mg/L

Ethanol

96 hour LC50 – Flathead minnow: 14,200 mg/l
48 hour EC50 – Daphnia magna(water flea): 5,012 mg/l
96 hour ErC50 – Green algae (Pseudokirchneriella subcapitata): 675 mg/l OECD Test Guideline 201

13. DISPOSAL CONSIDERATIONS

Comply with federal, state and local regulations. Remove to a permitted waste disposal facility.

14. TRANSPORT INFORMATION

U.S. DOT
Not Regulated

IATA
Not Regulated

IMDG
Not Regulated

15. REGULATORY INFORMATION

U.S. Federal Regulations

TSCA: All ingredients are listed in TSCA inventory.

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, including export notification requirements if applicable (40 CFR 721.20), and the applicable record keeping requirements set forth at 40 CFR 721.125.

16. OTHER INFORMATION

FOR INDUSTRIAL USE ONLY

REVISION DATE: MAY 2015