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MATERIAL SAFETY DATA SHEET

Preparation date: 03/27/07
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1. Chemical Product and Company Identification

Product Name: CMS Specialty Defluxing Solvent w/Vertrel XF;
#MCC-CMSG; #MCC-CMSP, #MCC-CMSD
Formula: CF₃CHFCHFCF₂CF₃/CH₃CF₂CH₂CF₃/CCIH=CCIH/
MeOH
Chemical Family: Hydrofluorocarbon (HFC) blend.
Packaged By: Micro Care Corp., 595 John Downey Drive, New Britain,
CT, 06051, USA CAGE/FSCM: OATV9
Emergency Telephone: CHEMTREC (800) 424-9300

2. Composition/Information on Ingredients

Chemical Name	Wt.%Range	TLV Units
1,1,1,3,3-Pentafluorobutane CAS # 406-58-6	31.0-41.0	See Section 8
1,1,1,2,3,4,4,5,5,5-decafluoropentane CAS # 138495-42-8	19.0-29.0	See Section 8
Trans,1,2-dichloroethylene CAS #156-60-5	30.0-40.0	See Section 8
Methanol CAS # 67-56-1	03.5-06.5	See Section 8

All components of this material are listed on the TSCA inventory.

3. Hazard Identification

Emergency Overview: Colorless liquid with a slight ethereal odor. This product is not flammable. Liquid will irritate eyes and skin under repeated or prolonged exposure. Product vapors displace air and can cause asphyxiation especially in confined spaces.

Potential Health Effects

Eyes: Moderate irritation. Persons wearing contact lenses should wear chemical protective safety glasses when exposed to this product.

Skin: For repeated contact: dry/chapped skin, risk of chronic dermatitis.

Ingestion: Harmful if swallowed. Irritating to the mouth, throat and stomach.

Inhalation: 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.

Medical Conditions Aggravated by Exposure: Preexisting disease of the heart, lungs, skin and eyes.

4. First Aid Measures

Eyes: Immediately flush with water. Remove any contact lenses and continue flushing for 15 minutes, lifting eyelids occasionally until no evidence of the chemical remains. If irritation develops or persists call a physician.

Skin: Wash promptly with soap and water. Remove contaminated clothing and shoes and replace with clean clothing.

Ingestion: DO NOT induce vomiting. Immediately give two glasses of water. Never give anything by mouth to an unconscious person. Call a physician.

Inhalation: Remove to fresh air. Keep person calm. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

5. Firefighting Measures

Flash Point: None; TCC/TOC

Flammable Limits in Air: LEL/UEL: 7.5-9.0 (% by volume)

Extinguishing Media: CO₂, dry chemical, water spray, water fog

Special Firefighting Procedures: Evacuate personnel. Wear self contained breathing apparatus (SCBA) and full protective equipment. Decomposition may occur. Drums may build pressure and rupture under fire conditions.

6. Accidental Release Measures

Spill or Leak: Evacuate area, absorb spilled liquid with commercial, nonflammable absorbent i.e. sand, vermiculite. Remove unprotected personnel. Protected personnel should remove ignition sources and shut off fire sources. Provide ventilation. Shovel (spark proof) absorbent material into drums and close. Do not flush to sewer.

7. Handling and Storage

Avoid breathing vapors or mist. Use only with adequate ventilation. Avoid repeated or prolonged contact with eyes, skin or clothing. Wash thoroughly after handling. Do not store in direct sunlight. Store in cool dry place, away from heat, sparks or flames which may generate toxic decomposition products. Vapors are heavy and may concentrate in low poorly ventilated areas. For industrial use only. Keep away from children.

8. Exposure Controls/Personal Protection

Respiratory Protection: Use only with adequate ventilation. Keep container tightly closed. Use approved NIOSH self-contained or supplied air respirators for emergencies and in situations where air may be displaced by vapors.

Eye Protection: Use chemical protective safety glasses.

Protective Clothing: Where there is potential for skin contact, use appropriate impervious gloves, apron, pants and jacket.

Exposure Guidelines: Applicable Exposure Limits.

1,1,1,3,3-Pentafluorobutane:

PEL (OSHA)	None Established
TLV (ACGIH)	None Established
AEL (Solvay)	500 ppm, 8 & 12 hr. TWA

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

PEL (OSHA)	None Established
AEL (DuPont)	200 ppm, 8 & 12 hr. TWA, 400 ppm ceiling
TLV (ACGIH)	None Established

Trans,1,2-dichloroethylene:

PEL (OSHA)	200 ppm, 790 mg/m ³ , 8 hour TWA
TLV (ACGIH)	200 ppm STEL, 8 hour TWA
AEL (DuPont)	200 ppm, 8 & 12 hour TWA

Methanol:

AEL (OSHA)	200 ppm (260 mg/m ³)
STEL (OSHA)	250 ppm (310 mg/m ³)
TLV (ACGIH)	200 ppm TWA

NFPA, NPCA-HIMIS RATING:

Health	2
Flammability	1
Reactivity	1

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

9. Physical and Chemical Properties

Physical Form:	Clear colorless liquid
Odor:	Slight Ethereal
Boiling Point:	37° C / 99° F
Freezing Point:	-35° C / -31° F
pH:	7.1
Solubility in Water:	600 ppm
Specific Gravity:	1.34
% Volatile by Weight:	100
Vapor Pressure:	65 kilopascals at 20° C / 77° F
Vapor Density (air=1):	4

10. Reactivity

Chemical Stability: Material is stable.

Hazardous Polymerization: Will not occur.

Incompatibilities: Alkali or alkaline earth metals powdered Al, Zn, Be, Na, Mg, etc. Incompatible w/strong bases such as NaOH, KOH, etc.

Decomposition Products: Decomposes with heat. High temperatures (open flame, glowing metal surfaces, etc.) can decompose forming hydrofluoric acid and possibly carbonyl fluoride. This material is incompatible with strong bases and can react to form salts of hydrofluoric acid and unsaturated compounds of unknown toxicity.

11. Toxicological Information

Toxicity information for the individual components of this product are listed below.

1,1,1,3,3-Pentafluorobutane: Oral LD50>5,000 mg/kg in rats. Dermal ALD > 2,000 mg/kg in rats. Inhalation, 4 hour LC50, rat: 301 mg/liter. Animal testing indicates that 1,1,1,3,3, pentafluorobutane is not a skin irritant for rabbits. It is a slight eye irritant for rabbits. It is not an irritant of the respiratory tract for rats. No sensitization was observed in Guinea Pigs.

This material is currently undergoing chronic toxicity testing.

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. 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. Single exposure to 5,000 ppm by inhalation caused tremors. No cardiac sensitization was observed. 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 1,000 ppm. Results indicate convulsions is an acute effect of 1,1,1,2,3,4,4,-5,5,5-decafluoropentane. The 90 day NOAEL is 500 ppm. In animal testing this material produced developmental effects only at exposure levels producing other toxic effect in the adult animal. No animal data are available to define the carcinogenic or reproductive hazards of this material. Tests have shown that 1,1,1,2,3,4,4,5,5,5-decafluoro-pentane does not cause genetic damage in bacterial mammalian cell cultures. It has not produced genetic damage in tests on animals.

Trans,1,2-dichloroethylene (t-DCE): A severe eye irritant and a moderate to severe skin irritant. Single and repeated exposure 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/anaesthesia, altered white blood cell count, cardiovascular system changes and weak cardiac sensitization, a potentially fatal disturbance of the heart rhythm caused by heightened sensitivity to the action of epinephrine. Long term exposure caused altered liver and lung function. A Dec. 1998 inhalation study conducted with

99.45 pure t-DCE produced no adverse, compound related effects. The NOEL was 4,000ppm. Exposure of pregnant rats shows maternal toxicity at 2,000, 6,000 & 12,000ppm. 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.

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

12. Ecological Information**Aquatic Toxicity:**

<u>1,1,1,2,3,4,4,5,5,5-decafluoropentane:</u>	
96 hour LC50 in fathead minnows:	27.2 mg/L
96 hr LC50 in rainbow trout:	13.9 mg/L
48 hour LC50 in Daphnia magna:	11.7 mg/L

<u>1,1,1,3,3-Pentafluorobutane:</u>	
96 hour LC50 in Zebra fish :	>200 mg/L
48 hour NOEC in Daphnia magna:	>200 mg/L
72 hour NOEC in Algae:	113 mg/L

<u>Trans,1,2-dichloroethylene:</u>	
96 hour LC 50 in bluegill sunfish:	1350 mg/L
48 hour LC50 in Daphnia magna:	220 mg/L

13. Disposal Considerations

Waste Disposal: Reclaim by distillation or remove to a permitted waste disposal facility. Treatment, storage, transportation, and disposal must be in accordance with applicable Federal, State/Provincial and Local regulations.

14. Transportation Information

Not Regulated as hazardous material by DOT, IMO, or IATA.

15. Regulatory Information

Section 313 Supplier Information: This material contains the following toxic chemicals subject to the emergency reporting requirements of Section 313 of the Emergency Planning and Community Right to Know Act of 1986 and 40 CFR 372:

CAS#	Chemical Name	% by Weight
67-56-1	Methanol	5 %

This information must be included in all MSDSs that are copied and distributed for this material.

Title III Hazard Communications Sections 311, 312

Acute	Yes
Chronic	Yes
Fire	No
Reactivity	No
Pressure	No

Lists:

SARA Extremely Hazardous Substance	No
CERCLA Hazardous Substance	*Yes
SARA Toxic Chemicals	No
* Methanol and Trans-1,2-dichloroethylene	

16. Other Information

For additional information, contact Tech Support at Micro Care: Telephone (860) 827-0626 or email: techsupport@microcare.com