



MicroCare™ XE Carrier Solvent & Rinse

Removes Particulate and Ionic Soils

Introduction

MicroCare XE is a proprietary azeotrope of Chemours™ XF hydrofluorocarbon (Decafluoropentane) with ethanol. It is ideally suited for use in vapor degreasing equipment. It offers improved solvency for polar soils, compared to XF Solvent, while maintaining excellent compatibility with most plastic, ceramic, and metal components. Typical applications include precision specialty cleaning, rinsing for removal of particulate, fingerprints, light soils from metal, plastic, and glass parts.

MicroCare XE has “zero” ozone depletion potential, and low global warming potential. It can replace CFC-113, 1,1,1-trichloroethane (1,1,1-TCA), hydrochlorofluorocarbons (HCFCs), and perfluorocarbons (PFCs) in many applications. MicroCare XE is accepted by the U.S. Environmental Protection Agency under the Significant New Alternatives Program (SNAP) program, as a substitute for ozone-depleting substances.

Its unique properties (Tables 1 and 2) include a high density, low viscosity, and low surface tension for effective particle and soil removal.

Table 1:
Physical Properties

Property ¹	XE
Boiling Point, °C (°F)	52 (126)
Liquid Density, g/cc (lb/gal)	1.52 (12.7)
Vapor Pressure, mmHg (psia)	250 (4.8)
Surface Tension, dyn/cm	14.1
Freezing Point, °C (°F)	<-80 (<-112)
Heat of Vaporization (at boiling point), cal/g (Btu/lb)	35 (62)
Heat Capacity, cal/g°C (Btu/lb°F)	0.27 (0.27)
Viscosity, cPs	0.73
Flash Point, °C (°F) Closed Cup ² Open Cup ³	None None
Vapor Flammability in Air, vol% Lower Limit Upper Limit	None None

**Table 2: Density and Vapor Pressure
Change with Temperature**

Temperature, °C (°F)	Density, g/cc (lb/gal)	Vapor Pressure, mmHg (psia)
0 (32)	1.58 (13.2)	58 (1.1)
10 (50)	1.56 (13.0)	111 (2.1)
20 (68)	1.53 (12.8)	194 (3.8)
25 (77)	1.52 (12.7)	250 (4.8)
30 (86)	1.50 (12.6)	316 (6.1)
40 (104)	1.48 (12.3)	485 (9.4)
50 (122)	1.45 (12.1)	708 (13.7)
60 (140)	1.42 (11.9)	993 (19.2)

¹ At 25°C (77°F), except where indicated.

² Pensky Martens Closed Cup Tester (ASTM D93)

³ Tag Open Cup Tester (ASTM D1310-86)

Cleaning Process

Vapor degreasing should be used for optimum cleaning effectiveness and economy. Modern vapor containment technology is recommended for both batch and in-line equipment. These systems have higher freeboard and a secondary set of low temperature (-29°C [-20°F]) condenser coils to greatly reduce vapor losses.

Plastic and Elastomer Compatibility

Most plastics and elastomers can be safely cleaned in *MicroCare* XE. **Tables 3 and 4** summarize test results on short-term exposures of unstressed plastics and elastomers simulating a typical cleaning cycle.

Long-term exposure data simulating exposure of vapor degreaser construction materials is available from *MicroCare* upon request.

Elastomer swelling and shrinking will, in most cases, revert to within a few percent of original size after air drying. Swell, shrinkage, and extractables are strongly affected by the compounding agents, plasticizers, and curing used in the manufacture of plastics and elastomers. Therefore, prior in-use testing is particularly important.

Table 3: Plastic Compatibility

Immersion: 15 Minutes at Room Temperature

Compatible	
Polyethylene	ABS
Polypropylene	Acetal
Polystyrene	Acrylic
Polyester, PET, PBT	Epoxy
Polyphenylene Oxide, PPO	Ionomer
Polyimide, PI, PEI, PAI	Liquid Crystal Polymer
Polyetherketone, PEK	Phenolic
Polyaryletherketone, PEEK	PVC, CPVC
Polysulfone	PTFE, ETFE
Polyarylsulfone	Cellulosic
Polyphenylene Sulfide, PPS	
Incompatible ¹	
None Tested	

Table 4: Elastomer Compatibility

Immersion: 15 Minutes at Room Temperature

Compatible	
Buna N, NBR, Nitrile	Buna S, SBR, GRS
Butyl Rubber, IIR	Chlorosulfonated PE
EPM, EPDM, Nordel®	Polysulfide
Natural Rubber, Isoprene	Neoprene
Urethane	Viton® B
Silicone	
Incompatible ¹	
None Tested	

¹ Material composition varies depending upon compounding agents, plasticizers, processing, etc. Specific materials should be tested for compatibility with solvent.

Metals and Other Compatibility

MicroCare XE was found compatible with zinc, stainless steel, aluminum, copper, and brass after exposure for two weeks at 100°C (212°F) in sealed tubes.

Large amounts of water may extract alcohol and affect cleaning performance. Therefore, to reduce alcohol loss, use desiccant dryers rather than water separators in the condensate return line.

Contact with highly basic process materials, pH 10 or above, is not recommended.

Exposure Limits

Data from acute toxicity studies has demonstrated that *MicroCare XE* has low toxicity. *MicroCare XE* is a slight skin and eye irritant and has low acute inhalation toxicity. Table 5 shows the applicable exposure limits for the component materials of *MicroCare XE*.

Table 5: Exposure Limits

Component	Limit	ppm	Type
Vertrel™ XF	AEL ¹	200 400	8- and 12-hr TWA Ceiling ²
Ethanol	AEL ¹ TLV ³	1,000 1,000	8- and 12-hr TWA 8-hr TWA
<i>MicroCare XE</i>	AEL ^{1 2}	235	Calculated ⁴

¹ AEL (Acceptable Exposure Limit) is an airborne inhalation exposure limit that specifies time-weighted average concentrations to which nearly all workers may be repeatedly exposed without adverse effects.

² A ceiling limit is the concentration that should not be exceeded during any part of the working day. The ceiling limit for individual components applies to the blend product as well.

³ TLV (Threshold Limit Value) is an air-borne inhalation exposure limit established by the American Conference of Government and Industrial Hygienists (ACGIH) that specifies time-weighted average concentrations to which nearly all workers may be repeatedly exposed without adverse effects.

⁴ Calculated in accordance with ACGIH formula for TLVs for mixtures.

Safety/Flammability

MicroCare XE exhibits no closed cup or open cup flash point, and is not classified as a flammable liquid by NFPA or DOT. In addition, the product has no vapor flammability limits in air.

Flash point data and limits of flammability in air provide the user with additional information that should be used as elements of a fire risk assessment and to determine guidelines for the safe handling of volatile chemicals. Users should assure compliance with NFPA standards and local fire codes.

Recovery

Due to the azeotropic nature of *MicroCare XE*, the product is easily recoverable by off-line or in-line distillation equipment such as a vapor degreaser or still. The presence of soil, however, may alter the characteristics of the material during the recovery operation. Recovery should be closely monitored to ensure operating levels are maintained. Users should test the spent *MicroCare XE* to ensure proper classification for waste disposal.

Storage/Handling

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

Consideration should be given to retrofit of existing, or purchase of new, vapor degreasing equipment to provide vapor containment technology that enables safe and economical use of *MicroCare XE*.

Drum pumps are recommended to dispense *MicroCare XE* from its container. Refer to the Safety Data Sheet (SDS) for specific handling precautions and instructions.

Environmental Legislation

MicroCare specialty fluids have “zero” ozone depletion potential and low global warming potential (Table 6). They are used as alternatives to CFC-113, methyl chloroform, hydrochlorofluorocarbons (HCFCs), and perfluorocarbons (PFCs) in many critical cleaning, drying, carrier fluid, and other high-value specialty uses where reliability is paramount.

MicroCare XE is accepted by the U.S. Environmental Protection Agency (EPA) under the Significant New Alternatives Policy (SNAP) program, as a substitute for ozone-depleting substances.

The components of *MicroCare XE* are listed in most country chemical inventories, such as TSCA in the U.S., ELINICS in Europe, Chemical Substances Control Law (MITI/MHW) in Japan, DSL (notified) in Canada, NICNAS in Australia, and TCCL in Korea.

Specifications

Composition and specifications are shown in Table 7. All components are listed in the TSCA Inventory.






Table 6: Environmental Properties

Property	XE
Ozone-Depletion Potential (ODP)	0
Global Warming Potential (GWP/100 yr ITH)	1248
Volatile Organic Compounds (VOC, g/L)	61

Table 7: MicroCare CCA Specifications

Vertrel™ XF, wt%	60-100%
Ethanol (SDA), wt%	1-5%
Nonvolatile Residue, ppm wt	2.0 max.
Moisture, ppm wt	200 max.
Appearance	Clear, colorless

Packaging and Availability

Part Number	Package	Weight	Size
MCC-XEGL (sample only)	Glass Liter 	2.5 lb (1.13 kg)	1 Liter
MCC-XEG	Steel Gallon 	10 lb (4.54 kg)	1 Gal (3.79 L)
MCC-XEGG	Glass Gallon 	10 lb (4.54 kg)	1 Gal (3.79 L)
MCC-XEP	Steel Pail 	55 lb (24.95 kg)	5 Gal (18.93 L)
MCC-XED	Steel Drum 	600 lb (272.16 kg)	55 Gal (208.2 L)

Note: Products sold by weight, not volume.

One-gallon and smaller samples in glass containers are available on request.

Discover Perfectly Clean www.MicroCare.com

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