Opteon™ SF80

Specialty Fluid

Technical Information

Introduction

Opteon™ SF80 specialty fluid is designed to meet the high solvency needs in the industrial cleaning market. Opteon™ SF80 is a safe, nonflammable, and environmentally friendly solvent with no ozone depletion potential (ODP) and a low global warming potential (GWP) (<2.5) and does not contain any fluorinated greenhouse gases (as listed in Annex 1 of the EU regulations 517/2014), which are all highly desirable in industrial cleaning applications like vapor degreasing.

Opteon™ SF80 is a blend of proprietary fluids and trans-1, 2-dichloroethylene (t-DCE) with azeotrope-like properties. Its exceptional solvency power (KB value = 99) makes it an ideal candidate for replacement of trichloroethylene (TCE), n-propyl bromide (nPB), benzene, perchloroethylene, methylene chloride, and other strong solvency fluids, where maximum cleaning power is a requirement. Opteon™ SF80 is also a great replacement option for solvents with low to mid-solvency power, such as HCFC-225, HCFC-141b, HFEs, PFCs, CFCs, and aqueous cleaners.

Opteon™ SF80 has the ability to clean a wide range of contaminants. The fluid features high solvency and low surface tension, which can improve the efficiency of a vapor degreaser. Opteon™ SF80 is easy to use and provides reliability with hassle-free maintenance.

Features and Benefits

- Superior cleaning performance with best solvency power in its class (KB value = 99)
- Fast drying with an optimum boiling point (47 °C [117 °F]), allows cleaned parts to be processed and used immediately
- High soil loading capacity boosts productivity by reducing equipment downtime associated with solvent change-outs
- Product maintains compositional stability during use (azeotropic-like mixture)
- Maintenance free: No stabilizer maintenance required, easy to maintain and use
- In general, existing vapor degreasing equipment can be used with minor or no modifications. See Opteon™ SF80 Retrofit Guidelines
- No surfactants needed: Removes extra washing steps to achieve residue-free cleaning
- Recyclable and reusable: Reduces cost of ownership and environmental footprint
- Nonflammable
- Low odor and toxicity
- Excellent environmental profile: Low GWP (<2.5, EU 517/2014 compliant), no ODP

Typical Applications

- Oil and grease removal
- Precision cleaning
- High solvency defluxing
- Silicone removal
- Vapor degreasing
- Cold cleaning

Chemours™

Table 1. Physical Properties

Property	Units	Opteon™ SF80	CFC-113	HCFC-141b	Novec® 72DE	HCFC-225 ca/cb	TCE	Perc	nPB
Boiling Point	°C	47	48	32	43	54	87	121	71
	°F	117	118	90	109	129	188	250	160
Liquid Density[1]	g/cm³	1.29	1.56	1.23	1.28	1.55	1.46	1.62	1.35
	lb/gal	10.7	13	10.3	10.7	12.9	12.1	13.5	11.3
Saturated Vapor Density[1]	kg/m³	1.81	3.47	3.83	N.D.[2]	N.D.[2]	4.5	5.7	4.24
	lb/ft³	0.11	0.21	0.23			0.27	0.35	0.26
Surface Tension[1]	Dyn/cm	21	17.3	19.3	19	16.2	29.5	29.5	25.9
Vapor Pressure[1]	kPa	44.7	44.1	79.5	46.7	38.7	8.0	2.4	20.0
	psia	6.5	6.4	11.5	6.8	5.6	1.2	0.35	2.9
Viscosity[1]	cP	0.42	0.68	0.43	0.45	0.59	0.49	0.75	0.49
Liquid Thermal Conductivity[1]	mW/m-K	125	72.3	90.6	N.D.[2]	N.D.[2]	115.9	N.D.[2]	N.D.[2]
Heat Capacity[1]	kJ/kg °C	1.069	1.079	1.0996	N.D.[2]	1.046	0.962	0.855	1.103
	Btu/lb °F	0.26	0.26	0.27		0.25	0.23	0.21	0.27
Heat of Vaporization at Boiling Point	kJ/kg	280	147	223	218	145	236	210	246
KB Value		99	31	56	52	31	129	90	125

All data compiled was furnished from publicly available sources. [1] Values reported are at 25 °C (77 °F), unless otherwise specified. [2] N.D. refers to no reference data available.

Performance Evaluations

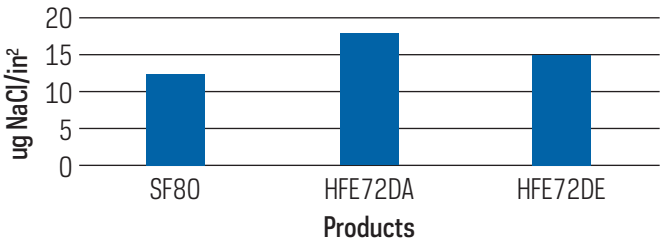
Opteon™ SF80 was evaluated for performance using typical coupon cleaning tests according to ASTM G122. Below are examples of the results from performance evaluations. Contact Chemours to initiate a cleaning trial in one of our regional cleaning laboratories or obtain a sample for on-site testing.

Table 2. Performance Evaluations of Opteon™ SF80

	Contamination Level (mg/cm²)	% Contamination Removed (avg. of 3 trials)
Mineral Oil	2	100%
Hydraulic Fluid (MIL-PRF-83282)	3.29	100%
Grease (MIL-PRF-81322)	16.27	100%

Opteon™ SF80 was evaluated for cleaning fluxes/residues and found effective in cleaning non-polar flux rosin residues from surface mounted technology printed circuit boards.

RMA Residue Removal



Solubility

Opteon™ SF80 has the highest cleaning power of any cleaning fluid in its class as measured by the KB value (KB value = 99). The KB value is determined by ASTM D1133 and is a well known measurement of solvency strength. In general, the higher the KB value, the greater the cleaning power. The solubility of Opteon™ SF80 for various contaminants is shown in Table 3.

Table 3. Solubility of Various Contaminants in Opteon™ SF80

Contaminant	Solubility
Mineral	Miscible
Hydraulic Fluid (MIL-PRF-83282)	Miscible
Grease (MIL-PRF-81322)	Miscible
Silicone (DC-704)	Miscible
Skydrol®*	Miscible

*Registered trademark of Eastman Chemical Company

Materials Compatibility

Opteon™ SF80 is characterized by good compatibility with a wide selection of metals, including stainless steel, copper, brass, and aluminum, after exposure for 2 weeks at 47 °C (117 °F) in sealed tubes per ASTM D5642. Opteon™ SF80 is compatible with these plastics and elastomers: Teflon™ (PTFE), FEP, PFA, polyethylene, polypropylene, Nylon, Kynar, Ryton, Halar, and Kalrez®. Examples of incompatible plastics include PMMA, ABS, polycarbonate, and polystyrene. Most elastomers, including Viton™, Natural rubber, EPDM, silicone, and Hypalon®, show reversible swelling when exposed to Opteon™ SF80. Teflon™ or Teflon™ encapsulated gaskets and O-ring seals are recommended for diaphragm pumps.

Individual plastic and elastomeric formulations can vary with the manufacturer; therefore, the best assurance of material compatibility can be recommended after testing under conditions expected during normal operation. Contact your local technical representative for specific material compatibility concerns.

Table 4. Plastics/Elastomers Compatibility

Plastics		Elastomers	
Compatible	Incompatible	Compatible	Incompatible
Polyethylene	Polystyrene	Teflon™	Silicone
Polypropylene	Polycarbonate	Kalrez®	Hypalon®
Teflon™	ABS	Ryton	EPDM Rubber
Polyester	Polyacrylate	PTFE w/EPDM	Viton™
Nylon	Acrylic (PMMA)	PTFE w/Neoprene	Buna N
FEP/PFA	Polysulfone	Parafluor	Fluorosilicone
Halar			
Kynar			

Safety, Toxicity, and Environmental

Opteon™ SF80 exhibits no closed or open cup flash point and is classified as a nonflammable liquid by NFPA or DOT. The product is volatile; vapor may become flammable when mixed with air in the concentrations shown below. Flash point data and vapor flammability limits in air are shown in Table 5.

Table 5. Safety, Toxicity, and Environmental Properties

Property	Units	Opteon™ SF80
Flash Point, CC, ASTM D56	°C (°F)	None
Flash Point, OC, ASTM D1310	°C (°F)	None
Vapor Flammability Limits	% Vol	7.25–15.25
Ozone Depletion Potential	–	0
Global Warming Potential	–	<2.5
Volatile Organic Compounds (VOC)	g/L	1278
Occupational Exposure Limit, 8-hr TWA	ppm	202

Storage and Handling

Opteon™ SF80 is thermally stable and does not oxidize or degrade during storage. It is recommended to store containers in a clean and dry area, and protect them from freezing and excessive temperatures of 46 °C (115 °F). When stored properly, an unopened package has no shelf life. Package sizes for Opteon™ SF80 are 20 kg (metal pail) and 227 kg (steel drum). Laminate film gloves are recommended when handling Opteon™ SF80.

For additional information on Opteon™ SF80 or other specialty fluids products by Chemours, please visit vertrel.com or call 800-969-4758.

C-11541 (12/17)