Opteon™ SF80

Specialty Fluid

Next Generation Low GWP Precision Cleaning 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 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 medium 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

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

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

Performance Evaluations

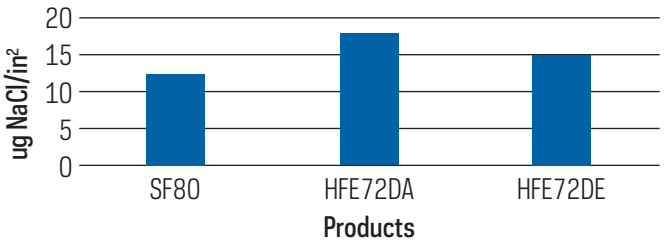
Opteon™ SF80 was evaluated for performance using typical coupon cleaning tests according to ASTM G122. Below are examples of the results from performance evaluations. Contact Chemours to initiate a cleaning trial in one of our regional cleaning laboratories or obtain a sample for on-site testing.

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

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 and 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	–	Negligible
Global Warming Potential	–	<2.5
Volatile Organic Compounds (VOCs)	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 (5.28 gal) metal pail and 227 kg (60 gal) steel drum.

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

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