



# Opteon™ SF79

## Specialty Fluid

### Technical Information

#### Introduction

Opteon™ SF79\* specialty fluid is designed to meet the high solvency needs in the industrial cleaning market. Opteon™ SF79 is a safe, nonflammable, and environmentally friendly solvent with no ozone depletion potential (ODP) and a low global warming potential (GWP) (<15), which are all highly desirable in industrial cleaning applications like vapor degreasing.

Opteon™ SF79 is a blend of proprietary fluids and trans-1, 2-dichloroethylene (t-DCE) with azeotrope-like properties. Its exceptional solvency power (KB value = 103) 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™ SF79 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™ SF79 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™ SF79 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 = 103)
- 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™ SF79 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 (<15), no ODP

#### Typical Applications

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

\*Formerly Opteon™ Sion



**Table 1.** Physical Properties

| Property                                   | Units              | Opteon™ SF79 | CFC-113 | HCFC-141b | Novoc® 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 <sup>(1)</sup>              | g/cm <sup>3</sup>  | 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 <sup>(1)</sup>     | kg/m <sup>3</sup>  | 1.81         | 3.47    | 3.83      | N.D. <sup>(2)</sup> | N.D. <sup>(2)</sup> | 4.5   | 5.7                 | 4.24                |
|  | lb/ft <sup>3</sup> | 0.11         | 0.21    | 0.23      |                     |                     | 0.27  | 0.35                | 0.26                |
| Surface Tension <sup>(1)</sup>             | Dyn/cm             | 21           | 17.3    | 19.3      | 19                  | 16.2                | 29.5  | 29.5                | 25.9                |
| Vapor Pressure <sup>(1)</sup>              | 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 <sup>(1)</sup>                   | cP                 | 0.42         | 0.68    | 0.43      | 0.45                | 0.59                | 0.49  | 0.75                | 0.49                |
| Liquid Thermal Conductivity <sup>(1)</sup> | mW/m-K             | 128          | 72.3    | 90.6      | N.D. <sup>(2)</sup> | N.D. <sup>(2)</sup> | 115.9 | N.D. <sup>(2)</sup> | N.D. <sup>(2)</sup> |
| Heat Capacity <sup>(1)</sup>               | kJ/kg °C           | 1.069        | 1.079   | 1.0996    | N.D. <sup>(2)</sup> | 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                                   |                    | 103          | 31      | 56        | 52                  | 31                  | 129   | 90                  | 125                 |

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

## Performance Evaluations

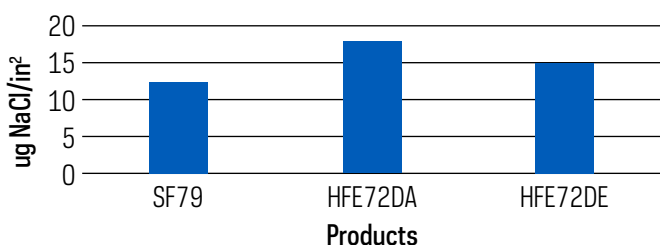
Opteon™ SF79 was evaluated for performance using typical coupon cleaning tests according to ASTM G122. Below are examples of the results from performance evaluations. Contact Chemours to initiate a cleaning trial in one of our regional cleaning laboratories or obtain a sample for on-site testing.

**Table 2.** Performance Evaluations of Opteon™ SF79

|                                 | Contamination Level (mg/cm <sup>2</sup> ) | % 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™ SF79 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™ SF79 has the highest cleaning power of any cleaning fluid in its class as measured by the KB value (KB value = 103). 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™ SF79 for various contaminants is shown in Table 3.

**Table 3.** Solubility of Various Contaminants in Opteon™ SF79

| 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™ SF79 is characterized by good compatibility with a wide selection of metals; for example, stainless steel, copper, brass, and aluminum. Opteon™ SF79 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™ SF79. 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    | Parafleur       | Fluorosilicone |
| Halar         |                |                 |                |
| Kynar         |                |                 |                |

### Safety, Toxicity, and Environmental

Opteon™ SF79 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™ SF79 |
|----------------------------------|---------|--------------|
| 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         | –       | <15          |
| Volatile Organic Compounds (VOC) | g/L     | 1278         |
| Occupational Exposure Limit      | ppm     | 201          |

### Storage and Handling

Opteon™ SF79 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 52 °C (126 °F). When stored properly, an unopened package has no shelf life. Package sizes for Opteon™ SF79 are 20 kg (metal pail) and 227 kg (steel drum). Laminate film gloves are recommended when handling Opteon™ SF79.

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**For additional information on Opteon™ SF79 or other specialty fluids products by Chemours, please visit [vertrel.com](http://vertrel.com) or call 800-969-4758.**

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