

Vertrel™ SDG

Specialty Fluid

Precision Cleaning and Degreasing

Technical Information

Introduction

Vertrel™ SDG is an engineered mixture of nonflammable hydrofluorocarbons (HFCs) and trans-1,2-dichloroethylene (t-DCE).

Vertrel™ SDG is designed to replace trichloroethylene (TCE) and n-propyl bromide (nPB) and perform in applications where maximum cleaning power is needed. It can also be used as a substitute for other cleaners, such as HCFC-225 and its blends, HCFC-141b, HFEs, PFCs, CFCs, and aqueous cleaners, where safety and environmental concerns and/or floor space and cleanliness are at a premium.

Vertrel™ SDG has excellent solvency power for a wide range of soils, including oils, greases, waxes, and hydraulic fluids. The high solvency power, low surface tension, and non-flammability properties of Vertrel™ SDG make it an ideal ultrasonic vapor degreasing solvent.

Features and Benefits

Vertrel™ SDG does a good job balancing performance with favorable environmental and worker safety properties.

- Excellent solvency power (Kb value = 95): Superior cleaning performance
- Good solvency for silicone fluids
- Fast drying: Increases productivity
- Low surface tension: Able to penetrate and clean tight areas
- Compatible with most plastics, elastomers, and metals
- Can be used with ultrasonics

- Nonflammable
- Low toxicity
- Zero ozone depletion potential (ODP)
- Low global warming potential (GWP)
- Existing equipment can be used with minor or no modification
- No surfactants needed: Residue-free cleaning is promoted.

Typical Applications

Vertrel™ SDG is ideal for a wide range of cleaning applications, including:

- Oil, grease, and wax removal
- Silicone carrier fluid
- Silicone grease removal
- Precision cleaning

Specification Conformity Tests

Vertrel™ SDG has been tested in a variety of industry tests, including:

Boeing D6-17487 Revision P
Solvent Cleaners; General Cleaning

ARP 1755 B
Effect of Cleaning Agent on Aircraft Engine Materials

Douglas Aircraft Company
Type 1: Materials and Procedures for General Exterior Cleaning of Painted and Unpainted Surfaces (General Purpose Cleaner)

Environmental

Vertrel™ SDG has zero ozone depletion potential and low global warming potential. See **Table 1** for various environmental properties of Vertrel™ SDG. Vertrel™ SDG 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 (solvent category). It is not SNAP-approved for aerosol packages.

Table 1. Environmental Properties

Property	Vertrel™ SDG
Ozone Depletion Potential (ODP)	0
Global Warming Potential (GWP/100 yr ITH)*	148
Volatile Organic Compounds (VOC, g/L)	1,150

*IPCC Second Assessment Report (1995)

All components are listed in the TSCA inventory. Refer to the SDS for regulatory information.

Table 2. Physical Properties

Property	Vertrel™ SDG	HCFC-225 ca/cb	TCE	nPB	CFC-113	HCFC-141b
Boiling Point, °C (°F)	43 (109)	54 (129)	87 (189)	71 (160)	48 (118)	32 (90)
Freezing Point, °C (°F)	<-50 (<-58)	-131 (-204)	-86 (-123)	<-76 (<-105)	-35 (-31)	-103.5 (-154.3)
Liquid Density, kg/L (lb/gal)	1.29 (10.8)	1.55 (12.9)	1.46 (12.15)	1.35 (11.26)	1.56 (13.06)	1.23 (10.26)
Surface Tension at 25 °C (77 °F), N/m (dyn/cm)	0.0212 (21.2)	0.0162 (16.2)	0.0323 (32.3)	0.0259 (25.9)	0.1073 (17.3)	0.0193 (19.3)
Viscosity at 25 °C (77 °F), cP	0.59	0.59	0.54	0.49	0.47	0.43
Vapor Pressure at 25 °C (77 °F)						
kPa	51.7	38.5	9.9	20.3	44.5	76.9
atm	0.51	0.38	0.099	0.20	0.44	0.75
psia	7.5	5.6	1.4	2.9	6.46	11.15
Heat of Vaporization at Boiling Point, kJ/kg (cal/g)	283 (67.1)	146 (35)	237.9 (56)	248.0 (58.8)	148 (35)	225 (53.2)
Heat Capacity at 20 °C (77 °F), kJ/kg·°C (Btu/lb·°F)	1.12 (0.27)	1.2 (0.29)	0.87 (0.21)	-	0.87 (0.21)	1.41 (0.34)
Kb Value	95	31	129	125	37	56

Safety/Flammability/Storage

Data from acute toxicity studies has demonstrated that Vertrel™ SDG has low toxicity. It has a calculated Acceptable Exposure Limit (AEL) of 193 ppm, based on its individual components. AEL is an airborne inhalation exposure limit established by Chemours that specifies time-weighted average (TWA) concentrations to which nearly all workers may be repeatedly exposed without adverse effects. The calculated AEL is in accordance with ACGIH formulas for TLVs for mixtures. Vertrel™ SDG is a slight skin and eye irritant and has low acute inhalation toxicity.

Please refer to the Safety Data Sheet (SDS) for information on detailed exposure limits and toxicity-related data.

Vertrel™ SDG exhibits no closed cup or open cup flash point and is not classified as a flammable liquid by NFPA or DOT. The product is volatile; and, if allowed to evaporate and mix with air, the vapor may become flammable. Flash point data and vapor flammability limits in air are shown in **Table 3**.

Addition of alcohols, such as methanol, ethanol, or isopropanol, to Vertrel™ SDG will increase the flammability of Vertrel™ SDG. Therefore, it is recommended that alcohol should not be mixed with Vertrel™ SDG.

Table 3. Flammable Properties

Property	Test Method	Vertrel™ SDG
Closed Cup Flash Point	ASTM D93	None
Open Cup Flash Point	ASTM D1310	None
Vapor Flammability in Air Lower Explosivity Limit Upper Explosivity Limit	ASTM E681	7 vol% in air 14 vol% in air

Vertrel™ SDG 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.

Disposal and Recovery of Spent Solvent

Please read SDS and discuss disposal options with a knowledgeable Chemours or distributor representative prior to disposal or recovery. The presence of high concentrations of certain soils (such as petroleum-based lubricating oils) may affect the flammability characteristics of the material during disposal and/or recovery operations. Users should test for flammability in their particular application and test the spent Vertrel™ SDG to ensure proper classification for waste disposal.

Material Compatibility

Vertrel™ SDG is compatible with metals. Plastics that may show signs of softening, swelling, or other changes, include acrylics, ABS, and polycarbonate. Elastomers, if affected, will generally revert to within a few percent of original size after air-drying. Prior to use, testing of plastics and elastomers should be performed under conditions expected during normal operation (e.g., time in contact with Vertrel™ SDG, temperature, etc.). For more information on material compatibility, contact Chemours or a Vertrel™ distributor.

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

Product Description, Packaging, and Availability

Table 4. Vertrel™ SDG Composition (Typical)

Property	Vertrel™ SDG
Hydrofluorocarbon Mixture, wt%	17–20
Trans-1,2-dichloroethylene, wt%	80–83
Water, ppm	<200
Nonvolatile Residue, ppm	<10 (drums) <50 (pails)
Appearance	Clear, colorless

Vertrel™ SDG is available commercially in 55-gal (208-L) drums with a net weight of 500 lb (227 kg) and in 5-gal (19-L) pails with a net weight of 45 lb (20 kg).

For more information on Vertrel™, please visit vertrel.com or call (800) 235-7882.

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