

**DuPont™ VERTREL® SDG specialty fluid**

Version 4.0

Revision Date 11/09/2012

Ref. 130000033958

This SDS adheres to the standards and regulatory requirements of the United States and may not meet the regulatory requirements in other countries.

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	DuPont™ VERTREL® SDG specialty fluid
MSDS Number	:	130000033958
Product Use	:	Cleaning agent
Manufacturer	:	DuPont 1007 Market Street Wilmington, DE 19898
Product Information	:	1-302-774-1000
Medical Emergency	:	1-800-441-3637 (outside the U.S. 1-302-774-1139)
Transport Emergency	:	CHEMTREC: 1-800-424-9300 (outside the U.S. 1-703-527-3887)

SECTION 2. HAZARDS IDENTIFICATION

Emergency Overview

Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing. May cause eye and skin irritation. Prolonged skin contact may defat the skin and produce dermatitis. Effects of breathing high concentrations of vapour may include: May cause cardiac arrhythmia. Central nervous system effects Convulsions

Warning symptoms:

Effects of breathing high concentrations of vapour may include: Tiredness or drowsiness, Central nervous system depression, Convulsions

Potential Health Effects

Skin

trans-Dichloroethylene : Causes skin irritation. May cause:, Pain, burning sensation, itching, redness, swelling, or rash..

Eyes

trans-Dichloroethylene : May cause eye irritation. May cause:, Tearing, redness, or discomfort..



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1,1,2,2,3,3,4-Heptafluorocyclopentane : Causes eye irritation.

Inhalation

trans-Dichloroethylene : May cause: Central nervous system depression with dizziness, confusion, incoordination, drowsiness, or unconsciousness.

1,1,1,2,2,3,4,5,5,5-Decafluoropentane : Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing. Effects of breathing high concentrations of vapour may include: Tiredness or drowsiness, Central nervous system effects, Convulsions.

Ingestion

1,1,2,2,3,3,4-Heptafluorocyclopentane : Aspiration hazard if swallowed - can enter lungs and cause damage.

Repeated exposure

1,1,1,2,2,3,4,5,5,5-Decafluoropentane : Adverse effects from repeated inhalation may include: Central nervous system effects

Target Organ

trans-Dichloroethylene : Central nervous system

Carcinogenicity

None of the components present in this material at concentrations equal to or greater than 0.1% are listed by IARC, NTP, or OSHA, as a carcinogen.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS-No.	Concentration
trans-Dichloroethylene	156-60-5	65 - 90 %


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1,1,1,2,2,3,4,5,5,5-Decafluoropentane	138495-42-8	5 - 25 %
1,1,2,2,3,3,4-Heptafluorocyclopentane	15290-77-4	5 - 15 %

SECTION 4. FIRST AID MEASURES

- Skin contact : Take off all contaminated clothing immediately. Wash off with warm water.
- Eye contact : In case of eye contact
Hold eyelids apart and flush eyes with plenty of water for at least 15 minutes.
Get medical attention.
- Inhalation : Remove from exposure, lie down. Move to fresh air. Keep patient warm and at rest. Artificial respiration and/or oxygen may be necessary. Consult a physician.
- Ingestion : Do not induce vomiting without medical advice. Never give anything by mouth to an unconscious person. Drink 1 or 2 glasses of water. If vomiting occurs, have victim lean forward to reduce the risk of aspiration. Consult a physician.
- General advice : Never give anything by mouth to an unconscious person. Victim to lie down in the recovery position, cover and keep him warm. Give oxygen or artificial respiration if needed. When symptoms persist or in all cases of doubt seek medical advice.
- Notes to physician : Do not give adrenaline or similar drugs.

SECTION 5. FIREFIGHTING MEASURES

- Flammable Properties
- Flash point : Method : Pensky-Martens closed cup - PMCC
does not flash
No flash point was obtained, but the product may release flammable vapour.
- Lower explosion limit/ lower flammability limit : 7 vol%

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- Upper explosion limit/ upper flammability limit : 14 vol%
- Fire and Explosion Hazard : Fire or intense heat may cause violent rupture of packages.
The product is not flammable. Vapours may form flammable mixture with air.
Hazardous combustion products: Hydrogen fluoride Fluorinated hydrocarbons
Carbonyl fluoride Carbon oxides Hydrogen chloride
- Suitable extinguishing media : Water spray, Water mist, Dry chemical, Carbon dioxide (CO2)
- Firefighting Instructions : In the event of fire, wear self-contained breathing apparatus. Use personal protective equipment. Wear neoprene gloves during cleaning up work after a fire. Exposure to decomposition products may be a hazard to health. Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Evacuate personnel to safe areas. Cool containers / tanks with water spray. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.

SECTION 6. ACCIDENTAL RELEASE MEASURES

NOTE: Review FIRE FIGHTING MEASURES and HANDLING (PERSONNEL) sections before proceeding with clean-up. Use appropriate PERSONAL PROTECTIVE EQUIPMENT during clean-up.

- Safeguards (Personnel) : Evacuate personnel to safe areas. Ventilate area, especially low or enclosed places where heavy vapours might collect. In case of insufficient ventilation, wear suitable respiratory equipment. Refer to protective measures listed in sections 7 and 8.
- Spill Cleanup : Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13).
- Accidental Release Measures : Prevent further leakage or spillage. Prevent spreading over a wide area (e.g. by containment or oil barriers). Should not be released into the environment. Do not allow contact with soil, surface or ground water.

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SECTION 7. HANDLING AND STORAGE

- Handling (Personnel) : Avoid contact with skin, eyes and clothing. Avoid breathing vapours or mist. Provide sufficient air exchange and/or exhaust in work rooms. For personal protection see section 8.
Handle in accordance with good industrial hygiene and safety practice. When using do not eat, drink or smoke. Do not breathe vapours or spray mist. Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.
- Handling (Physical Aspects) : Material should not be dispensed from its container by pouring, except for small sample containers where fume hoods or where other ventilation is used to manage the exposure limits. The use of a drum pump is recommended for dispensing from shipping containers.
- Storage : Protect from contamination. Drainage facilities should be constructed for containment of small spills. Keep container tightly closed in a dry and well-ventilated place. Store in original container. Avoid freezing temperatures. If stored below -10°C (14°F), mix prior to use.
Protect from contamination. To prevent leaks or spillages from spreading, provide a suitable liquid retention system. Keep container tightly closed in a dry and well-ventilated place. Store in original container. Avoid freezing temperatures. If stored below -10°C (14°F), mix prior to use.
- Storage temperature : < 52 °C (< 126 °F)

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

- Engineering controls : Use sufficient ventilation to keep employee exposure below recommended limits.
- Personal protective equipment
- Respiratory protection : For rescue and maintenance work in storage tanks use self-contained breathing apparatus. Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.
- Hand protection : Material: Solvent-resistant gloves


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Eye protection : Safety glasses with side-shields Additionally wear a face shield where the possibility exists for face contact due to splashing, spraying or airborne contact with this material.

Skin and body protection : Protective suit

**Exposure Guidelines
Exposure Limit Values**

trans-Dichloroethylene				
PEL:	(OSHA)	200 ppm	790 mg/m ³	8 hr. TWA
TLV	(ACGIH)	200 ppm	TWA	
AEL *	(DUPONT)	200 ppm	8 & 12 hr. TWA	
1,1,1,2,2,3,4,5,5,5-Decafluoropentane				
AEL *	(DUPONT)	200 ppm	8 & 12 hr. TWA	
AEL *	(DUPONT)	400 ppm	Ceiling Limit Value:	

* AEL is DuPont's Acceptable Exposure Limit. Where governmentally imposed occupational exposure limits which are lower than the AEL are in effect, such limits shall take precedence.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Form	: liquid
Color	: clear, colourless
Odor	: slight, ether-like
Freezing point	: < -50 °C (-58 °F)
Boiling point	: 43 °C (109 °F)
Vapour Pressure	: 517 hPa at 25 °C (77 °F)
Density	: 1.29 g/cm ³ at 25 °C (77 °F)

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SECTION 10. STABILITY AND REACTIVITY

- Stability : No decomposition if stored and applied as directed.
- Incompatibility : Alkali metals Alkaline earth metals, Powdered metals, Powdered metal salts, Strong bases
- Hazardous decomposition products : Hazardous decomposition products formed under fire conditions.: Fluorinated hydrocarbons, Hydrogen fluoride, Carbon dioxide (CO₂), Carbon monoxide

SECTION 11. TOXICOLOGICAL INFORMATION

- trans-Dichloroethylene
- Dermal LD50 : > 5,000 mg/kg , rabbit
- Oral LD50 : 7,902 mg/kg , rat
- Inhalation 4 h LC50 : 96.4 mg/l , rat
 Target Organs: Central nervous system
 narcosis
- Inhalation Low Observed Adverse Effect Concentration (LOAEC) : 250000 ppm , rat
 Cardiac sensitization
- Skin irritation : Skin irritation, rabbit
- Eye irritation : Mild eye irritation, rabbit
- Repeated dose toxicity : Inhalation
 rat
 90 d
 No toxicologically significant effects were found.
- Oral - feed
 rat
 90 d
 No toxicologically significant effects were found.
- Mutagenicity : Did not cause genetic damage in animals.
 Tests on bacterial or mammalian cell cultures did not show mutagenic


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effects.

Reproductive toxicity : Animal testing showed no reproductive toxicity.

Teratogenicity : Animal testing showed no developmental toxicity.

Further information : Cardiac sensitisation threshold limit : 793047 mg/m3

1,1,1,2,2,3,4,5,5,5-Decafluoropentane

Dermal LD50 : > 5,000 mg/kg , rabbit

Oral LD50 : > 5,000 mg/kg , rat

Inhalation 4 h LC50 : 114 mg/l , rat
Central nervous system effects
Convulsions

Skin irritation : No skin irritation, rabbit

Eye irritation : No eye irritation, rabbit

Skin sensitization : Did not cause sensitization on laboratory animals., guinea pig

Repeated dose toxicity : Inhalation
rat

No toxicologically significant effects were found.

Mutagenicity : Did not cause genetic damage in animals.
Did not cause genetic damage in cultured mammalian cells.
Did not cause genetic damage in cultured bacterial cells.

Reproductive toxicity : Animal testing showed no reproductive toxicity.

Teratogenicity : Animal testing showed no developmental toxicity.

1,1,2,2,3,3,4-Heptafluorocyclopentane

Dermal LD50 : > 2,000 mg/kg , rat

Oral LD50 : > 2,000 mg/kg , rat

Inhalation 4 h LC50 : 114 mg/l , rat

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Skin irritation	:	rabbit non-irritant
Eye irritation	:	rabbit irritant
Skin sensitization	:	guinea pig Did not cause sensitization on laboratory animals.
Repeated dose toxicity	:	Oral rat No toxicologically significant effects were found. Inhalation rat No toxicologically significant effects were found.
Mutagenicity	:	Did not cause genetic damage in cultured bacterial cells. Did not cause genetic damage in cultured mammalian cells.

SECTION 12. ECOLOGICAL INFORMATION

Aquatic Toxicity	
trans-Dichloroethylene	
96 h LC50	: Lepomis macrochirus (Bluegill sunfish) 74 mg/l
96 h EC50	: Pseudokirchneriella subcapitata (green algae) 798 mg/l
48 h LC50	: Daphnia magna (Water flea) 79 mg/l
1,1,1,2,2,3,4,5,5,5-Decafluoropentane	
96 h LC50	: Oncorhynchus mykiss (rainbow trout) 13.9 mg/l
96 h LC50	: Pimephales promelas (fathead minnow) 27.2 mg/l
96 h LC50	: Danio rerio (zebra fish) 13 mg/l


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72 h EC50	:	Pseudokirchneriella subcapitata (green algae) > 120 mg/l
48 h LC50	:	Daphnia magna (Water flea) 11.7 mg/l
21 d	:	NOEC Daphnia magna (Water flea) 1.72 mg/l
1,1,2,2,3,3,4-Heptafluorocyclopentane 96 h LC50	:	Oncorhynchus mykiss (rainbow trout) 74.2 mg/l

Environmental Fate

trans-Dichloroethylene

Biodegradability : 95 %
Readily biodegradable.

Bioaccumulation : Bioaccumulation is unlikely.

1,1,1,2,2,3,4,5,5,5-Decafluoropentane

Biodegradability : Not readily biodegradable.

Bioaccumulation : Bioaccumulation is unlikely.

Additional ecological information : No data is available on the product itself.

SECTION 13. DISPOSAL CONSIDERATIONS

Waste Disposal : Can be used after re-conditioning. If recycling is not practicable, dispose of in compliance with local regulations. The product should not be allowed to enter drains, water courses or the soil.

Environmental Hazards : If recycling is not practicable, dispose of in compliance with local regulations.

SECTION 14. TRANSPORT INFORMATION

Not classified as dangerous in the meaning of transport regulations.

DOT only - when shipped in packages with > 1194 lbs., use: UN3082, Environmentally Hazardous Substance,

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Liquid, N.O.S. (Dichloroethylene), 9, PGIII RQ (Dichloroethylene)

SECTION 15. REGULATORY INFORMATION

- TSCA** : 1,1,1,2,2,3,4,5,5,5-DECAFLUOROPENTANE (CAS# 138495-42-8) is controlled by TSCA Section 5, Significant New Use Rule (SNUR; 40 CFR 721.5645) The approved uses are: precision and general cleaning, carrier fluid, displacement drying, printed circuit board cleaning, particulate removal and film cleaning, process medium, heat transfer fluid (dielectric and non-dielectric), and test fluid. Processors and users of this substance must also comply with the applicable general SNUR requirements set forth in 40 CFR 721 subpart A, including export notification requirements if applicable (40 CFR 721.20), and the applicable record keeping requirements set forth at 40 CFR 721.125.
- SARA 313 Regulated Chemical(s)** : trans-Dichloroethylene
- CERCLA Reportable Quantity** : 1,194 lbs
Based on the percentage composition of this chemical in the product.: trans-Dichloroethylene
- California Prop. 65** : Chemicals known to the State of California to cause cancer, birth defects or any other harm: none known
- PA Right to Know Regulated Chemical(s)** : Substances on the Pennsylvania Hazardous Substances List present at a concentration of 1% or more (0.01% for Special Hazardous Substances): trans-Dichloroethylene
- NJ Right to Know Regulated Chemical(s)** : Substances on the New Jersey Workplace Hazardous Substance List present at a concentration of 1% or more (0.1% for substances identified as carcinogens, mutagens or teratogens): trans-Dichloroethylene



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SECTION 16. OTHER INFORMATION

Before use read DuPont's safety information.

For further information contact the local DuPont office or DuPont's nominated distributors.

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Contact person : MSDS Coordinator, DuPont Chemicals and Fluoroproducts, Wilmington, DE
19898, (800) 441-7515

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