

# SAFETY DATA SHEET



## Vertrel™ SFR specialty fluid

Version	Revision Date:	SDS Number:	Date of last issue: 16.10.2024
18.1	05.03.2025	1333550-00051	Date of first issue: 27.02.2017

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### SECTION 1: Identification of the substance/mixture and of the company/undertaking

#### 1.1 Product identifier

Trade name : Vertrel™ SFR specialty fluid

SDS-Identcode : 130000033961

#### 1.2 Relevant identified uses of the substance or mixture and uses advised against

Use of the Sub-  
stance/Mixture : Cleaning agent

Recommended restrictions : For professional and industrial installation and use only.  
on use

#### 1.3 Details of the supplier of the safety data sheet

Company : Chemours Netherlands B.V.  
Baanhoekweg 22  
3313 LA Dordrecht Netherlands

Telephone : +31-(0)-78-630-1011

Telefax : +31-78-6163737

E-mail address of person  
responsible for the SDS : sds-support@chemours.com

#### 1.4 Emergency telephone number

0-800-983-611 (Toll free in-country) or +(44)-870-8200418

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### SECTION 2: Hazards identification

#### 2.1 Classification of the substance or mixture

##### Classification (REGULATION (EC) No 1272/2008)

Acute toxicity, Category 4 H332: Harmful if inhaled.

Eye irritation, Category 2 H319: Causes serious eye irritation.

Specific target organ toxicity - single ex-  
posure, Category 3 H336: May cause drowsiness or dizziness.

Long-term (chronic) aquatic hazard, Cat-  
egory 3 H412: Harmful to aquatic life with long lasting ef-  
fects.

#### 2.2 Label elements

##### Labelling (REGULATION (EC) No 1272/2008)

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Hazard pictograms :



Signal word : Warning

Hazard statements :  
H319 Causes serious eye irritation.  
H332 Harmful if inhaled.  
H336 May cause drowsiness or dizziness.  
H412 Harmful to aquatic life with long lasting effects.

Supplemental Hazard Statements : EUH018 In use may form flammable/explosive vapour-air mixture.

Precautionary statements :  
**Prevention:**  
P264 Wash skin thoroughly after handling.  
P271 Use only outdoors or in a well-ventilated area.  
P273 Avoid release to the environment.  
P280 Wear eye protection/ face protection.  
**Response:**  
P304 + P340 + P312 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/ doctor if you feel unwell.  
P337 + P313 If eye irritation persists: Get medical advice/ attention.

Hazardous components which must be listed on the label:

Trans-Dichloroethylene  
Methanol

### Additional Labelling

EUH205 Contains epoxy constituents. May produce an allergic reaction.  
EUH209 Can become highly flammable in use.

## 2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.

Misuse or intentional inhalation abuse may cause death without warning symptoms, due to cardiac effects.

Rapid evaporation of the product may cause frostbite.

## SECTION 3: Composition/information on ingredients

### 3.2 Mixtures

#### Components

Chemical name	CAS-No. EC-No.	Classification	Concentration (% w/w)
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	Index-No. Registration number		
Trans-Dichloroethylene	156-60-5 205-860-2 602-026-00-3 01-2120093504-55	Flam. Liq. 2; H225 Acute Tox. 4; H332 Eye Irrit. 2; H319 STOT SE 3; H336 Aquatic Chronic 3; H412	>= 50 - < 70
Reaction mass of (3R,4R)- 1,1,1,2,2,3,4,5,5,5- decafluoropentane and (3S,4S)- 1,1,1,2,2,3,4,5,5,5- decafluoropentane	138495-42-8 420-640-8 602-100-00-5 01-2119446695-28- 0000	Aquatic Chronic 3; H412	>= 10 - < 20
1,1,2,2,3,3,4- Heptafluorocyclopentane	15290-77-4 430-710-1 602-104-00-7	Aquatic Chronic 3; H412	>= 10 - < 20
Methanol	67-56-1 200-659-6 603-001-00-X 01-2119433307-44	Flam. Liq. 2; H225 Acute Tox. 3; H301 Acute Tox. 3; H331 Acute Tox. 3; H311 STOT SE 1; H370 (optic nerve, Cen- tral nervous sys- tem)	>= 1 - < 3

For explanation of abbreviations see section 16.

## SECTION 4: First aid measures

### 4.1 Description of first aid measures

- General advice : In the case of accident or if you feel unwell, seek medical advice immediately.  
When symptoms persist or in all cases of doubt seek medical advice.
- Protection of first-aiders : First Aid responders should pay attention to self-protection, and use the recommended personal protective equipment when the potential for exposure exists (see section 8).
- If inhaled : If inhaled, remove to fresh air.  
Get medical attention if symptoms occur.
- In case of skin contact : In case of contact, immediately flush skin with plenty of water.  
Remove contaminated clothing and shoes.  
Get medical attention.  
Wash clothing before reuse.  
Thoroughly clean shoes before reuse.
- In case of eye contact : In case of contact, immediately flush eyes with plenty of water for at least 15 minutes.  
If easy to do, remove contact lens, if worn.

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Get medical attention.

If swallowed : If swallowed, DO NOT induce vomiting.  
Get medical attention if symptoms occur.  
Rinse mouth thoroughly with water.

### 4.2 Most important symptoms and effects, both acute and delayed

Symptoms : May cause cardiac arrhythmia.

Skin contact may provoke the following symptoms:

Dermatitis

Irritation

Pain

superficial burning sensation

Itching

Redness

Swelling of tissue

Rash

Discomfort

Eye contact may provoke the following symptoms

Irritation

tearing

Discomfort

Redness

Effects of breathing high concentrations of vapour may include:

Tiredness

Drowsiness

central nervous system effects

Convulsions

Dizziness

confusion

Adverse effects from repeated inhalation may include  
central nervous system effects

Aspiration may cause pulmonary oedema and pneumonitis.

Risks : Causes serious eye irritation.  
Harmful if inhaled.  
May cause drowsiness or dizziness.

### 4.3 Indication of any immediate medical attention and special treatment needed

Treatment : Because of possible disturbances of cardiac rhythm, catecholamine drugs, such as epinephrine, that may be used in situations of emergency life support should be used with special caution.

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**SECTION 5: Firefighting measures****5.1 Extinguishing media**

Suitable extinguishing media : Water spray  
Alcohol-resistant foam  
Carbon dioxide (CO<sub>2</sub>)  
Dry chemical

Unsuitable extinguishing media : None known.

**5.2 Special hazards arising from the substance or mixture**

Specific hazards during fire-fighting : Vapours may form explosive mixtures with air.  
Exposure to combustion products may be a hazard to health.

Hazardous combustion products : Carbon oxides  
Chlorine compounds  
Hydrogen fluoride  
carbonyl fluoride  
Fluorine compounds

**5.3 Advice for firefighters**

Special protective equipment for firefighters : In the event of fire, wear self-contained breathing apparatus.  
Use personal protective equipment.

Specific extinguishing methods : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.  
Use water spray to cool unopened containers.  
Remove undamaged containers from fire area if it is safe to do so.  
Evacuate area.

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**SECTION 6: Accidental release measures****6.1 Personal precautions, protective equipment and emergency procedures**

Personal precautions : Use personal protective equipment.  
Follow safe handling advice (see section 7) and personal protective equipment recommendations (see section 8).

**6.2 Environmental precautions**

Environmental precautions : Avoid release to the environment.  
Prevent further leakage or spillage if safe to do so.  
Prevent spreading over a wide area (e.g. by containment or oil barriers).  
Retain and dispose of contaminated wash water.  
Local authorities should be advised if significant spillages cannot be contained.

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**6.3 Methods and material for containment and cleaning up**

Methods for cleaning up : Soak up with inert absorbent material.  
For large spills, provide dyking or other appropriate containment to keep material from spreading. If dyked material can be pumped, store recovered material in appropriate container. Clean up remaining materials from spill with suitable absorbent.  
Local or national regulations may apply to releases and disposal of this material, as well as those materials and items employed in the cleanup of releases. You will need to determine which regulations are applicable.  
Sections 13 and 15 of this SDS provide information regarding certain local or national requirements.

**6.4 Reference to other sections**

See sections: 7, 8, 11, 12 and 13.

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**SECTION 7: Handling and storage****7.1 Precautions for safe handling**

Technical measures	: See Engineering measures under EXPOSURE CONTROLS/PERSONAL PROTECTION section.
Local/Total ventilation	: If sufficient ventilation is unavailable, use with local exhaust ventilation. If advised by assessment of the local exposure potential, use only in an area equipped with explosion-proof exhaust ventilation.
Advice on safe handling	: Do not get on skin or clothing. Avoid breathing mist or vapours. Do not swallow. Do not get in eyes. Wash skin thoroughly after handling. Handle in accordance with good industrial hygiene and safety practice, based on the results of the workplace exposure assessment Keep away from heat and sources of ignition. Take precautionary measures against static discharges. Take care to prevent spills, waste and minimize release to the environment.
Hygiene measures	: If exposure to chemical is likely during typical use, provide eye flushing systems and safety showers close to the working place. When using do not eat, drink or smoke. Wash contaminated clothing before re-use.

**7.2 Conditions for safe storage, including any incompatibilities**

Requirements for storage areas and containers	: Do not expose drums to direct heat or temperature above 46°C (115°F) to avoid pressurizing and possibly distorting the drums. Material should not be dispensed by pouring from pail/drum shipping containers containing 5 gallons or more. The use of a drum pump is recommended for dispensing from
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pail/drum shipping containers with 5 gallons or more, except for smaller containers where adequate ventilation can be used to manage the exposure. Keep in properly labelled containers. Store locked up. Keep in a cool, well-ventilated place. Store in accordance with the particular national regulations.

Advice on common storage : No special restrictions on storage with other products.

Recommended storage temperature : < 46 °C

Further information on storage stability : The product has an indefinite shelf life when stored properly.

### 7.3 Specific end use(s)

Specific use(s) : No data available

## SECTION 8: Exposure controls/personal protection

### 8.1 Control parameters

#### Occupational Exposure Limits

Components	CAS-No.	Value type (Form of exposure)	Control parameters	Basis
Trans-Dichloroethylene	156-60-5	OEL-RL	400 ppm	ZA OEL
Further information: Occupational Exposure Limits - Restricted Limits For Hazardous Chemical Agents				
Reaction mass of (3R,4R)-1,1,1,2,2,3,4,5,5,5-decafluoropentane and (3S,4S)-1,1,1,2,2,3,4,5,5,5-decafluoropentane	138495-42-8	TWA	225 ppm 2.320 mg/m3	WEEL
		STEL	700 ppm 7.217 mg/m3	WEEL
Methanol	67-56-1	OEL-RL	400 ppm	ZA OEL
Further information: danger of cutaneous absorption, Occupational Exposure Limits - Restricted Limits For Hazardous Chemical Agents				
		OEL- RL STEL/C	500 ppm	ZA OEL
Further information: danger of cutaneous absorption, Occupational Exposure Limits - Restricted Limits For Hazardous Chemical Agents				
		TWA	200 ppm 260 mg/m3	2006/15/EC

#### Biological occupational exposure limits

Substance name	CAS-No.	Control parameters	Sampling time	Basis
Methanol	67-56-1	Methanol: 15 mg/l (Urine)	End of shift	ZA BEI

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**Derived No Effect Level (DNEL) according to Regulation (EC) No. 1907/2006**

Substance name	End Use	Exposure routes	Potential health effects	Value
Trans-Dichloroethylene	Workers	Inhalation	Long-term systemic effects	797 mg/m3
	Consumers	Inhalation	Long-term systemic effects	198 mg/m3
	Consumers	Ingestion	Long-term systemic effects	57 mg/kg bw/day
Reaction mass of (3R,4R)-1,1,1,2,2,3,4,5,5,5-decafluoropentane and (3S,4S)-1,1,1,2,2,3,4,5,5,5-decafluoropentane	Workers	Inhalation	Long-term systemic effects	2072 mg/m3
	Workers	Inhalation	Acute systemic effects	2072 mg/m3
	Consumers	Inhalation	Long-term systemic effects	1546 mg/m3
	Consumers	Ingestion	Long-term systemic effects	37 mg/kg bw/day
	Consumers	Inhalation	Acute systemic effects	1546 mg/m3
Methanol	Workers	Inhalation	Long-term systemic effects	130 mg/m3
	Workers	Inhalation	Acute systemic effects	130 mg/m3
	Workers	Inhalation	Long-term local effects	130 mg/m3
	Workers	Inhalation	Acute local effects	130 mg/m3
	Workers	Skin contact	Long-term systemic effects	20 mg/kg bw/day
	Workers	Skin contact	Acute systemic effects	20 mg/kg bw/day
	Consumers	Inhalation	Long-term systemic effects	26 mg/m3
	Consumers	Inhalation	Acute systemic effects	26 mg/m3
	Consumers	Inhalation	Long-term local effects	26 mg/m3
	Consumers	Inhalation	Acute local effects	26 mg/m3
	Consumers	Skin contact	Long-term systemic effects	4 mg/kg bw/day
	Consumers	Skin contact	Acute systemic effects	4 mg/kg bw/day
	Consumers	Ingestion	Long-term systemic effects	4 mg/kg bw/day
	Consumers	Ingestion	Acute systemic effects	4 mg/kg bw/day

**Predicted No Effect Concentration (PNEC) according to Regulation (EC) No. 1907/2006**

Substance name	Environmental Compartment	Value
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Trans-Dichloroethylene	Fresh water	0,0364 mg/l
	Freshwater - intermittent	0,3636 mg/l
	Marine water	0,0036 mg/l
	Marine sediment	0,055 mg/kg dry weight (d.w.)
	Fresh water sediment	0,5483 mg/kg dry weight (d.w.)
	Sewage treatment plant	17 mg/l
	Soil	0,056 mg/kg dry weight (d.w.)
Reaction mass of (3R,4R)-1,1,1,2,2,3,4,5,5,5-decafluoropentane and (3S,4S)-1,1,1,2,2,3,4,5,5,5-decafluoropentane	Fresh water	0,0344 mg/l
	Freshwater - intermittent	0,106 mg/l
	Marine water	0,0034 mg/l
	Marine sediment	0,175 mg/kg dry weight (d.w.)
	Fresh water sediment	1,75 mg/kg dry weight (d.w.)
	Soil	0,215 mg/kg dry weight (d.w.)

### 8.2 Exposure controls

#### Engineering measures

Minimize workplace exposure concentrations.

If sufficient ventilation is unavailable, use with local exhaust ventilation.

If advised by assessment of the local exposure potential, use only in an area equipped with explosion-proof exhaust ventilation.

#### Personal protective equipment

Eye/face protection : Wear the following personal protective equipment:  
Safety goggles

Hand protection  
Material : Viton®  
Glove thickness : 0,7 mm  
Wearing time : 120 min

Remarks : Choose gloves to protect hands against chemicals depending on the concentration and quantity of the hazardous substance and specific to place of work. For special applications, we recommend clarifying the resistance to chemicals of the aforementioned protective gloves with the glove manufacturer. Wash hands before breaks and at the end of workday. Breakthrough time is not determined for the product. Change gloves often!

Skin and body protection : Wear the following personal protective equipment:  
If assessment demonstrates that there is a risk of explosive atmospheres or flash fires, use flame retardant antistatic pro-

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protective clothing.

Respiratory protection : Use a positive pressure air supplied respirator if there is any potential for uncontrolled release, exposure levels are unknown.

### SECTION 9: Physical and chemical properties

#### 9.1 Information on basic physical and chemical properties

Appearance	: liquid
Colour	: colourless, clear
Odour	: slight, pleasant
Odour Threshold	: No data available
pH	: No data available
Melting point/freezing point	: < -50 °C
Initial boiling point and boiling range	: 41 °C
Flash point	: Method: Pensky-Martens closed cup does not flash
Evaporation rate	: No data available
Flammability (solid, gas)	: Not applicable
Upper explosion limit / Upper flammability limit	: Upper flammability limit 15 %(V) Method: ASTM E681
Lower explosion limit / Lower flammability limit	: Lower flammability limit 7 %(V) Method: ASTM E681
Vapour pressure	: 579 hPa (25 °C)
Relative vapour density	: 2,4
Density	: 1,28 g/cm <sup>3</sup> (25 °C)
Solubility(ies) Water solubility	: No data available
Partition coefficient: n-octanol/water	: Not applicable
Auto-ignition temperature	: No data available

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Decomposition temperature : No data available

Viscosity  
Viscosity, kinematic : No data available

Explosive properties : In use may form flammable/explosive vapour-air mixture.

Oxidizing properties : The substance or mixture is not classified as oxidizing.

### 9.2 Other information

Flammability (liquids) : No data available

Particle size : Not applicable

## SECTION 10: Stability and reactivity

### 10.1 Reactivity

Not classified as a reactivity hazard.

### 10.2 Chemical stability

Stable under normal conditions.

### 10.3 Possibility of hazardous reactions

Hazardous reactions : Vapours may form flammable mixture with air  
In use may form flammable/explosive vapour-air mixture.

### 10.4 Conditions to avoid

Conditions to avoid : None known.

### 10.5 Incompatible materials

Materials to avoid : None.

### 10.6 Hazardous decomposition products

No hazardous decomposition products are known.

## SECTION 11: Toxicological information

### 11.1 Information on toxicological effects

Information on likely routes of exposure : Inhalation  
Skin contact  
Ingestion  
Eye contact

#### Acute toxicity

Harmful if inhaled.

#### Product:

Acute oral toxicity : Acute toxicity estimate: > 2.000 mg/kg  
Method: Calculation method

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Acute inhalation toxicity : Acute toxicity estimate: 14,25 mg/l  
Exposure time: 4 h  
Test atmosphere: vapour  
Method: Calculation method

Acute dermal toxicity : Acute toxicity estimate: > 2.000 mg/kg  
Method: Calculation method

### Components:

#### **Trans-Dichloroethylene:**

Acute oral toxicity : LD50 (Rat): 7.902 mg/kg  
Method: OECD Test Guideline 420

Acute inhalation toxicity : Lowest observed adverse effect concentration (Dog): 250000 ppm  
Test atmosphere: gas  
  
Cardiac sensitisation threshold limit (Dog): 991.309 mg/m3  
Test atmosphere: gas  
  
Acute toxicity estimate: 11 mg/l  
Exposure time: 4 h  
Test atmosphere: vapour  
Method: Expert judgement  
Remarks: Based on harmonised classification in EU regulation 1272/2008, Annex VI

Acute dermal toxicity : LD50 (Rabbit): > 5.000 mg/kg  
Method: OECD Test Guideline 402

Reaction mass of (3R,4R)-1,1,1,2,2,3,4,5,5,5-decafluoropentane and (3S,4S)- 1,1,1,2,2,3,4,5,5,5-decafluoropentane

:

Acute oral toxicity : LD50 (Rat): > 5.000 mg/kg  
Method: OECD Test Guideline 401

Acute inhalation toxicity : LC50 (Rat): 114,428 mg/l  
Exposure time: 4 h  
Test atmosphere: vapour  
Method: OECD Test Guideline 403

No observed adverse effect concentration (Dog): 5000 ppm  
Test atmosphere: gas  
Method: Cardiac sensitisation study

Lowest observed adverse effect concentration (Dog): > 5000 ppm  
Test atmosphere: gas  
Method: Cardiac sensitisation study

Cardiac sensitisation threshold limit (Dog): > 51.544 mg/m3

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Test atmosphere: gas  
Method: Cardiac sensitisation study

Acute dermal toxicity : LD50 (Rabbit): > 5.000 mg/kg  
Method: OECD Test Guideline 402

### **1,1,2,2,3,3,4-Heptafluorocyclopentane:**

Acute oral toxicity : LD50 (Rat): > 2.000 mg/kg

### **Methanol:**

Acute oral toxicity : Acute toxicity estimate (Humans): 300 mg/kg  
Method: Expert judgement

Acute inhalation toxicity : Acute toxicity estimate: 3 mg/l  
Exposure time: 4 h  
Test atmosphere: vapour  
Method: Expert judgement  
Remarks: Based on national or regional regulation.

Acute dermal toxicity : Acute toxicity estimate: 300 mg/kg  
Method: Expert judgement  
Remarks: Based on national or regional regulation.

### **Skin corrosion/irritation**

Not classified based on available information.

### **Components:**

#### **Trans-Dichloroethylene:**

Species : Rabbit  
Method : OECD Test Guideline 404  
Result : Mild skin irritation

Reaction mass of (3R,4R)-1,1,1,2,2,3,4,5,5,5-decafluoropentane and (3S,4S)- 1,1,1,2,2,3,4,5,5,5-decafluoropentane

:

Species : Rabbit  
Method : OECD Test Guideline 404  
Result : No skin irritation

### **1,1,2,2,3,3,4-Heptafluorocyclopentane:**

Species : Rabbit  
Result : No skin irritation

### **Methanol:**

Species : Rabbit  
Result : No skin irritation

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### Serious eye damage/eye irritation

Causes serious eye irritation.

#### Components:

##### **Trans-Dichloroethylene:**

Species	: Rabbit
Method	: OECD Test Guideline 405
Result	: Irritation to eyes, reversing within 7 days

Reaction mass of (3R,4R)-1,1,1,2,2,3,4,5,5,5-decafluoropentane and (3S,4S)- 1,1,1,2,2,3,4,5,5,5-decafluoropentane

:

Species	: Rabbit
Method	: OECD Test Guideline 405
Result	: No eye irritation

##### **1,1,2,2,3,3,4-Heptafluorocyclopentane:**

Species	: Rabbit
Result	: No eye irritation

##### **Methanol:**

Species	: Rabbit
Result	: No eye irritation

### Respiratory or skin sensitisation

#### **Skin sensitisation**

Not classified based on available information.

#### **Respiratory sensitisation**

Not classified based on available information.

#### Components:

Reaction mass of (3R,4R)-1,1,1,2,2,3,4,5,5,5-decafluoropentane and (3S,4S)- 1,1,1,2,2,3,4,5,5,5-decafluoropentane

:

Test Type	: Buehler Test
Exposure routes	: Skin contact
Species	: Guinea pig
Method	: OECD Test Guideline 406
Result	: negative

Exposure routes	: Inhalation
Result	: negative

##### **1,1,2,2,3,3,4-Heptafluorocyclopentane:**

Test Type	: Maximisation Test
Exposure routes	: Skin contact
Species	: Guinea pig

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Result : negative

### Methanol:

Test Type	: Maximisation Test
Exposure routes	: Skin contact
Species	: Guinea pig
Result	: negative

### Germ cell mutagenicity

Not classified based on available information.

### Components:

#### Trans-Dichloroethylene:

Genotoxicity in vitro	: Test Type: Bacterial reverse mutation assay (AMES) Method: OECD Test Guideline 471 Result: negative
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Test Type: In vitro mammalian cell gene mutation test  
Method: OECD Test Guideline 476  
Result: negative

Test Type: Chromosome aberration test in vitro  
Method: OECD Test Guideline 473  
Result: negative

Genotoxicity in vivo	: Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay) Species: Mouse Application Route: Ingestion Method: OECD Test Guideline 474 Result: negative
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Germ cell mutagenicity- Assessment	: Weight of evidence does not support classification as a germ cell mutagen.
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Reaction mass of (3R,4R)-1,1,1,2,2,3,4,5,5,5-decafluoropentane and (3S,4S)- 1,1,1,2,2,3,4,5,5,5-decafluoropentane

:

Genotoxicity in vitro	: Test Type: Bacterial reverse mutation assay (AMES) Method: OECD Test Guideline 471 Result: negative
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Test Type: In vitro mammalian cell gene mutation test  
Method: OECD Test Guideline 476  
Result: negative

Genotoxicity in vivo	: Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay) Species: Rat Application Route: inhalation (vapour) Method: OECD Test Guideline 474
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Result: negative

Germ cell mutagenicity- Assessment : Weight of evidence does not support classification as a germ cell mutagen.

### **1,1,2,2,3,3,4-Heptafluorocyclopentane:**

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)  
Result: negative

### **Methanol:**

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)  
Method: OECD Test Guideline 471  
Result: negative

Test Type: In vitro mammalian cell gene mutation test  
Result: negative

Test Type: in vitro micronucleus test  
Result: negative

Genotoxicity in vivo : Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)  
Species: Mouse  
Application Route: Intraperitoneal injection  
Result: negative

### **Carcinogenicity**

Not classified based on available information.

### **Components:**

Reaction mass of (3R,4R)-1,1,1,2,2,3,4,5,5,5-decafluoropentane and (3S,4S)- 1,1,1,2,2,3,4,5,5,5-decafluoropentane

:

Carcinogenicity - Assessment : Weight of evidence does not support classification as a carcinogen

### **Methanol:**

Species : Monkey  
Application Route : inhalation (vapour)  
Exposure time : 7 Months  
Result : negative

### **Reproductive toxicity**

Not classified based on available information.

### **Components:**

### **Trans-Dichloroethylene:**

Effects on foetal development : Test Type: Embryo-foetal development  
Species: Rat



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Application Route: Inhalation  
Method: OECD Test Guideline 414  
Result: negative

Reaction mass of (3R,4R)-1,1,1,2,2,3,4,5,5,5-decafluoropentane and (3S,4S)- 1,1,1,2,2,3,4,5,5,5-decafluoropentane

:

Effects on fertility : Test Type: One-generation reproduction toxicity study  
Species: Rat  
Application Route: inhalation (vapour)  
Method: OECD Test Guideline 415  
Result: negative

Effects on foetal development : Test Type: Prenatal development toxicity study (teratogenicity)  
Species: Rat  
Application Route: inhalation (vapour)  
Method: OECD Test Guideline 414  
Result: negative

Reproductive toxicity - Assessment : Weight of evidence does not support classification for reproductive toxicity

### Methanol:

Effects on fertility : Test Type: One-generation reproduction toxicity study  
Species: Monkey  
Application Route: inhalation (vapour)  
Result: negative

Effects on foetal development : Test Type: Reproduction/Developmental toxicity screening test  
Species: Monkey  
Application Route: inhalation (vapour)  
Result: negative

### STOT - single exposure

May cause drowsiness or dizziness.

### Components:

#### Trans-Dichloroethylene:

Assessment : May cause drowsiness or dizziness.

Reaction mass of (3R,4R)-1,1,1,2,2,3,4,5,5,5-decafluoropentane and (3S,4S)- 1,1,1,2,2,3,4,5,5,5-decafluoropentane

:

Exposure routes : Ingestion  
Assessment : No significant health effects observed in animals at concentrations of 2000 mg/kg bw or less

Exposure routes : Skin contact  
Assessment : No significant health effects observed in animals at concentra-

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tions of 2000 mg/kg bw or less

Exposure routes : inhalation (vapour)  
Assessment : No significant health effects observed in animals at concentrations of 20 mg/l/4h or less

### Methanol:

Target Organs : optic nerve, Central nervous system  
Assessment : Causes damage to organs.

### STOT - repeated exposure

Not classified based on available information.

### Components:

#### Trans-Dichloroethylene:

Exposure routes : Inhalation  
Assessment : No significant health effects observed in animals at concentrations of 250 ppmV/6h/d or less.

Exposure routes : Ingestion  
Assessment : No significant health effects observed in animals at concentrations of 100 mg/kg bw or less.

Reaction mass of (3R,4R)-1,1,1,2,2,3,4,5,5,5-decafluoropentane and (3S,4S)- 1,1,1,2,2,3,4,5,5,5-decafluoropentane

:  
Exposure routes : inhalation (vapour)  
Assessment : No significant health effects observed in animals at concentrations of 1 mg/l/6h/d or less.

### Repeated dose toxicity

### Components:

#### Trans-Dichloroethylene:

Species : Rat, male and female  
NOAEL : 4000 ppm  
LOAEL : > 4000 ppm  
Application Route : Inhalation  
Exposure time : 90 Days  
Method : OECD Test Guideline 413

Species : Rat, male and female  
NOAEL : 3.210 mg/kg  
LOAEL : > 3.210 mg/kg  
Application Route : Ingestion  
Exposure time : 98 Days  
Method : OECD Test Guideline 408

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Reaction mass of (3R,4R)-1,1,1,2,2,3,4,5,5,5-decafluoropentane and (3S,4S)- 1,1,1,2,2,3,4,5,5,5-decafluoropentane

:

Species	: Rat, male and female
NOAEL	: 15,463 mg/l
LOAEL	: 20,618 mg/l
Application Route	: inhalation (vapour)
Exposure time	: 90 Days
Method	: OECD Test Guideline 413

### Aspiration toxicity

Not classified based on available information.

### Components:

Reaction mass of (3R,4R)-1,1,1,2,2,3,4,5,5,5-decafluoropentane and (3S,4S)- 1,1,1,2,2,3,4,5,5,5-decafluoropentane

:

No aspiration toxicity classification

## SECTION 12: Ecological information

### 12.1 Toxicity

#### Components:

##### **Trans-Dichloroethylene:**

Toxicity to fish	: LC50 (Lepomis macrochirus (Bluegill sunfish)): 135 mg/l Exposure time: 96 h Remarks: Based on data from similar materials
Toxicity to daphnia and other aquatic invertebrates	: EC50 (Daphnia magna (Water flea)): 220 mg/l Exposure time: 48 h Method: EPA-660/3-75-009
Toxicity to algae/aquatic plants	: EbC50 (Pseudokirchneriella subcapitata (green algae)): 36,36 mg/l Exposure time: 48 h Method: OECD Test Guideline 201

Reaction mass of (3R,4R)-1,1,1,2,2,3,4,5,5,5-decafluoropentane and (3S,4S)- 1,1,1,2,2,3,4,5,5,5-decafluoropentane

:

Toxicity to fish	: LC50 (Danio rerio (zebra fish)): 13 mg/l Exposure time: 96 h Method: OECD Test Guideline 203
Toxicity to daphnia and other aquatic invertebrates	: EC50 (Daphnia magna (Water flea)): 10,6 mg/l Exposure time: 48 h Method: OECD Test Guideline 202

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Toxicity to algae/aquatic plants : EC50 (Selenastrum capricornutum (green algae)): > 120 mg/l  
Exposure time: 72 h  
Method: OECD Test Guideline 201

NOEC (Scenedesmus capricornutum (fresh water algae)): 120 mg/l  
Exposure time: 72 h  
Method: OECD Test Guideline 201

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : NOEC: 1,72 mg/l  
Exposure time: 21 d  
Species: Daphnia magna (Water flea)  
Method: OECD Test Guideline 211

**1,1,2,2,3,3,4-Heptafluorocyclopentane:**

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 66,3 mg/l  
Exposure time: 48 h  
Method: OECD Test Guideline 202

Toxicity to algae/aquatic plants : ErC50 (Pseudokirchneriella subcapitata (green algae)): > 3,75 mg/l  
Exposure time: 72 h  
Method: OECD Test Guideline 201

NOEC (Pseudokirchneriella subcapitata (green algae)): 24,9 mg/l  
Exposure time: 72 h  
Method: OECD Test Guideline 201

**Methanol:**

Toxicity to fish : LC50 (Lepomis macrochirus (Bluegill sunfish)): 15.400 mg/l  
Exposure time: 96 h

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): > 10.000 mg/l  
Exposure time: 48 h  
Method: DIN 38412

Toxicity to algae/aquatic plants : ErC50 (Raphidocelis subcapitata (freshwater green alga)): 22.000 mg/l  
Exposure time: 96 h  
Method: OECD Test Guideline 201

Toxicity to microorganisms : EC50 (activated sludge): > 1.000 mg/l  
Exposure time: 3 h  
Test substance: Neutralised product  
Method: OECD Test Guideline 209

**12.2 Persistence and degradability****Components:****Trans-Dichloroethylene:**

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Biodegradability : Result: not rapidly degradable  
Method: OECD Test Guideline 301D

Reaction mass of (3R,4R)-1,1,1,2,2,3,4,5,5,5-decafluoropentane and (3S,4S)- 1,1,1,2,2,3,4,5,5,5-decafluoropentane

:

Biodegradability : Result: Not readily biodegradable.  
Method: OECD Test Guideline 301D

### 1,1,2,2,3,3,4-Heptafluorocyclopentane:

Biodegradability : Result: Not readily biodegradable.  
Biodegradation: 0 %  
Exposure time: 28 d  
Method: OECD Test Guideline 301C

### Methanol:

Biodegradability : Result: Readily biodegradable.  
Biodegradation: 95 %  
Exposure time: 20 d

## 12.3 Bioaccumulative potential

### Components:

#### Trans-Dichloroethylene:

Partition coefficient: n-octanol/water : log Pow: 2,06

Reaction mass of (3R,4R)-1,1,1,2,2,3,4,5,5,5-decafluoropentane and (3S,4S)- 1,1,1,2,2,3,4,5,5,5-decafluoropentane

:

Bioaccumulation : Remarks: Bioaccumulation is unlikely.

Partition coefficient: n-octanol/water : log Pow: 2,4 (24 °C)

#### 1,1,2,2,3,3,4-Heptafluorocyclopentane:

Partition coefficient: n-octanol/water : log Pow: 2,4

### Methanol:

Bioaccumulation : Species: Leuciscus idus (Golden orfe)  
Bioconcentration factor (BCF): < 10

Partition coefficient: n-octanol/water : log Pow: -0,77

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### 12.4 Mobility in soil

No data available

### 12.5 Results of PBT and vPvB assessment

#### Product:

Assessment : This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

### 12.6 Other adverse effects

#### Product:

Endocrine disrupting potential : The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

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## SECTION 13: Disposal considerations

### 13.1 Waste treatment methods

Product : Dispose of in accordance with local regulations.  
According to the European Waste Catalogue, Waste Codes are not product specific, but application specific.  
Waste codes should be assigned by the user, preferably in discussion with the waste disposal authorities.  
Do not dispose of waste into sewer.

Contaminated packaging : Empty containers should be taken to an approved waste handling site for recycling or disposal.  
If not otherwise specified: Dispose of as unused product.

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## SECTION 14: Transport information

### 14.1 UN number

ADN : Not regulated as a dangerous good  
ADR : Not regulated as a dangerous good  
RID : Not regulated as a dangerous good  
IMDG : Not regulated as a dangerous good  
IATA : Not regulated as a dangerous good

### 14.2 UN proper shipping name

ADN : Not regulated as a dangerous good  
ADR : Not regulated as a dangerous good

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RID	: Not regulated as a dangerous good
IMDG	: Not regulated as a dangerous good
IATA	: Not regulated as a dangerous good

### 14.3 Transport hazard class(es)

ADN	: Not regulated as a dangerous good
ADR	: Not regulated as a dangerous good
RID	: Not regulated as a dangerous good
IMDG	: Not regulated as a dangerous good
IATA	: Not regulated as a dangerous good

### 14.4 Packing group

ADN	: Not regulated as a dangerous good
ADR	: Not regulated as a dangerous good
RID	: Not regulated as a dangerous good
IMDG	: Not regulated as a dangerous good
IATA (Cargo)	: Not regulated as a dangerous good
IATA (Passenger)	: Not regulated as a dangerous good

### 14.5 Environmental hazards

Not regulated as a dangerous good

### 14.6 Special precautions for user

Not applicable

### 14.7 Transport in bulk according to Annex II of Marpol and the IBC Code

Remarks	: Not applicable for product as supplied.
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## SECTION 15: Regulatory information

### 15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

Montreal Protocol	: Reaction mass of (3R,4R)-1,1,1,2,2,3,4,5,5,5-decafluoropentane and (3S,4S)-1,1,1,2,2,3,4,5,5,5-decafluoropentane
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### 15.2 Chemical safety assessment

A Chemical Safety Assessment has not been carried out.

## SECTION 16: Other information

Other information	: Vertrel™ and any associated logos are trademarks or copyrights of The Chemours Company FC, LLC.
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Items where changes have been made to the previous version are highlighted in the body of this document by two vertical lines.

**Full text of H-Statements**

H225	: Highly flammable liquid and vapour.
H301	: Toxic if swallowed.
H311	: Toxic in contact with skin.
H319	: Causes serious eye irritation.
H331	: Toxic if inhaled.
H332	: Harmful if inhaled.
H336	: May cause drowsiness or dizziness.
H370	: Causes damage to organs.
H412	: Harmful to aquatic life with long lasting effects.

**Full text of other abbreviations**

Acute Tox.	: Acute toxicity
Aquatic Chronic	: Long-term (chronic) aquatic hazard
Eye Irrit.	: Eye irritation
Flam. Liq.	: Flammable liquids
STOT SE	: Specific target organ toxicity - single exposure
2006/15/EC	: Europe. Indicative occupational exposure limit values
WEEL	: Workplace Environmental Exposure Levels (WEEL)
ZA BEI	: South Africa. The Regulations for Hazardous Chemical Agents, Biological Exposure Indices
ZA OEL	: South Africa. The Regulations for Hazardous Chemical Agents, Occupational Exposure Limits
2006/15/EC / TWA	: Limit Value - eight hours
WEEL / STEL	: Short term exposure limit
WEEL / TWA	: 8-hr TWA
ZA OEL / OEL-RL	: Occupational Exposure Limit Restricted limit - 8- hour exposure or equivalent (12 hour shifts)
ZA OEL / OEL- RL STEL/C	: Occupational Exposure Limit Restricted limit - Short term occupational exposure limits / ceiling limits

ADN - European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways; ADR - Agreement concerning the International Carriage of Dangerous Goods by Road; AIIC - Australian Inventory of Industrial Chemicals; ASTM - American Society for the Testing of Materials; bw - Body weight; CLP - Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DSL - Domestic Substances List (Canada); ECHA - European Chemicals Agency; EC-Number - European Community number; ECx - Concentration associated with x% response; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China;



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IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; n.o.s. - Not Otherwise Specified; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RID - Regulations concerning the International Carriage of Dangerous Goods by Rail; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; SVHC - Substance of very high concern; TCSI - Taiwan Chemical Substance Inventory; TECI - Thailand Existing Chemicals Inventory; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative

### Further information

Sources of key data used to compile the Safety Data Sheet : Internal technical data, data from raw material SDSs, OECD eChem Portal search results and European Chemicals Agency, <http://echa.europa.eu/>

### Classification of the mixture:

Acute Tox. 4	H332
Eye Irrit. 2	H319
STOT SE 3	H336
Aquatic Chronic 3	H412

### Classification procedure:

Calculation method
Calculation method
Calculation method
Calculation method

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and shall not be considered a warranty or quality specification of any type. The information provided relates only to the specific material identified at the top of this SDS and may not be valid when the SDS material is used in combination with any other materials or in any process, unless specified in the text. Material users should review the information and recommendations in the specific context of their intended manner of handling, use, processing and storage, including an assessment of the appropriateness of the SDS material in the user's end product, if applicable.

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