

# SAFETY DATA SHEET



## Opteon™ XP10 (R-513A) Refrigerant

Version	Revision Date:	SDS Number:	Date of last issue: 13.11.2024
3.0	05.03.2025	3946976-00015	Date of first issue: 09.01.2019

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

#### 1.1 Product identifier

Trade name : Opteon™ XP10 (R-513A) Refrigerant

SDS-Identcode : 130000051352

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

Use of the Sub-  
stance/Mixture : Refrigerant

Recommended restrictions  
on use : Consumer use, For professional users only.

#### 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

+(44)-870-8200418 (CHEMTREC - Recommended)

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### SECTION 2: Hazards identification

#### 2.1 Classification of the substance or mixture

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

Gases under pressure, Liquefied gas	H280: Contains gas under pressure; may explode if heated.
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#### 2.2 Label elements

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

Hazard pictograms :



Signal word : Warning

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Hazard statements : H280 Contains gas under pressure; may explode if heated.

Precautionary statements : **Storage:**  
P410 + P403 Protect from sunlight. Store in a well-ventilated place.

### 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.

May displace oxygen and cause rapid suffocation.

## SECTION 3: Composition/information on ingredients

### 3.2 Mixtures

#### Components

Chemical name	CAS-No. EC-No. Index-No. Registration number	Classification	Concentration (% w/w)
2,3,3,3-Tetrafluoropropene#	754-12-1 468-710-7 01-0000019665-61	Flam. Gas 1B; H221 Press. Gas Liquefied gas; H280	55.72
1,1,1,2-Tetrafluoroethane#	811-97-2 212-377-0 01-2119459374-33	Press. Gas Liquefied gas; H280	44

For explanation of abbreviations see section 16.

#: Voluntarily-disclosed substance

## 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 : No special precautions are necessary for first aid responders.

If inhaled : If inhaled, remove to fresh air.  
If not breathing, give artificial respiration.

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- If breathing is difficult, give oxygen.  
Get medical attention immediately.
- In case of skin contact : Thaw frosted parts with lukewarm water. Do not rub affected area.  
Get medical attention immediately.
- In case of eye contact : Get medical attention immediately.
- If swallowed : Ingestion is not considered a potential route of exposure.

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

- Symptoms : May cause cardiac arrhythmia.
- Other symptoms potentially related to misuse or inhalation abuse are  
Cardiac sensitisation  
Anaesthetic effects  
Light-headedness  
Dizziness  
confusion  
Lack of coordination  
Drowsiness  
Unconsciousness
- Skin contact may provoke the following symptoms:  
Irritation  
Swelling of tissue  
Itching  
Discomfort  
Redness
- Eye contact may provoke the following symptoms  
tearing  
Redness  
Discomfort

- Risks : Gas reduces oxygen available for breathing.  
Contact with liquid or refrigerated gas can cause cold burns and frostbite.

### 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 : Not applicable  
Will not burn

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Unsuitable extinguishing media : Not applicable  
Will not burn

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

Specific hazards during fire-fighting : Exposure to combustion products may be a hazard to health. If the temperature rises there is danger of the vessels bursting due to the high vapor pressure.

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

### 5.3 Advice for firefighters

Special protective equipment for firefighters : Wear self-contained breathing apparatus for firefighting if necessary. Use personal protective equipment.

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

## SECTION 6: Accidental release measures

### 6.1 Personal precautions, protective equipment and emergency procedures

Personal precautions : Evacuate personnel to safe areas.  
Avoid skin contact with leaking liquid (danger of frostbite).  
Ventilate the area.  
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.  
Retain and dispose of contaminated wash water.

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

Methods for cleaning up : Ventilate the area.  
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      | : | Use equipment rated for cylinder pressure. Use a backflow preventative device in piping. Close valve after each use and when empty.  |
| Local/Total ventilation | : | Use only with adequate ventilation.  |
| Advice on safe handling | : | <p>Avoid breathing gas.</p> <p>Handle in accordance with good industrial hygiene and safety practice, based on the results of the workplace exposure assessment</p> <p>Wear cold insulating gloves/ face shield/ eye protection.</p> <p>Valve protection caps and valve outlet threaded plugs must remain in place unless container is secured with valve outlet piped to use point.</p> <p>Prevent backflow into the gas tank.</p> <p>Use a check valve or trap in the discharge line to prevent hazardous back flow into the cylinder.</p> <p>Use a pressure reducing regulator when connecting cylinder to lower pressure (&lt;3000 psig) piping or systems.</p> <p>Close valve after each use and when empty. Do NOT change or force fit connections.</p> <p>Prevent the intrusion of water into the gas tank.</p> <p>Never attempt to lift cylinder by its cap.</p> <p>Do not drag, slide or roll cylinders.</p> <p>Use a suitable hand truck for cylinder movement.</p> <p>Keep away from heat and sources of ignition.</p> <p>Take precautionary measures against static discharges.</p> <p>Take care to prevent spills, waste and minimize release to the environment.</p> |
| 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 | : | Cylinders should be stored upright and firmly secured to prevent falling or being knocked over. Separate full containers from empty containers. Do not store near combustible materials. Avoid area where salt or other corrosive materials are present. Keep in properly labelled containers. Keep in a cool, well-ventilated place. Keep away from direct sunlight. Store in accordance with the particular national regulations. |
| Advice on common storage                      | : | <p>Do not store with the following product types:</p> <p>Self-reactive substances and mixtures</p> <p>Organic peroxides</p> <p>Oxidizing agents</p> <p>Flammable liquids</p> <p>Flammable solids</p>  |

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Pyrophoric liquids  
Pyrophoric solids  
Self-heating substances and mixtures  
Substances and mixtures, which in contact with water, emit flammable gases  
Explosives  
Very acutely toxic substances and mixtures  
Acutely toxic substances and mixtures  
Substances and mixtures with chronic toxicity

Storage period : > 10 yr

Recommended storage temperature : < 52 °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

Contains no substances with occupational exposure limit values.

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

Substance name	End Use	Exposure routes	Potential health effects	Value
2,3,3,3-Tetrafluoropropene	Workers	Inhalation	Long-term systemic effects	950 mg/m3
1,1,1,2-Tetrafluoroethane	Workers	Inhalation	Long-term systemic effects	13936 mg/m3
	Consumers	Inhalation	Long-term systemic effects	2476 mg/m3

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

Substance name	Environmental Compartment	Value
2,3,3,3-Tetrafluoropropene	Fresh water	0.1 mg/l
	Intermittent use/release	1 mg/l
	Fresh water sediment	1.51 mg/kg dry weight (d.w.)
	Soil	1.49 mg/kg dry weight (d.w.)
	Marine water	0.01 mg/l
	Marine sediment	0.151 mg/kg dry weight (d.w.)
1,1,1,2-Tetrafluoroethane	Fresh water	0.1 mg/l
	Marine water	0.01 mg/l
	Intermittent use/release	1 mg/l

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	Fresh water sediment	0.75 mg/kg dry weight (d.w.)
	Sewage treatment plant	73 mg/l

### 8.2 Exposure controls

#### Engineering measures

Ensure adequate ventilation, especially in confined areas.  
Minimize workplace exposure concentrations.

#### Personal protective equipment

Eye/face protection : Wear the following personal protective equipment:  
Chemical resistant goggles must be worn.  
Face-shield

Hand protection  
Material : Low temperature resistant gloves

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 : Skin should be washed after contact.

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

Protective measures : Wear cold insulating gloves/ face shield/ eye protection.

## SECTION 9: Physical and chemical properties

### 9.1 Information on basic physical and chemical properties

Appearance : Liquefied gas

Colour : colourless

Odour : slight, ether-like

Odour Threshold : No data available

pH : No data available

Melting point/freezing point : No data available

Initial boiling point and boiling range : -29.2 °C

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Flash point	:	Not applicable
Evaporation rate	:	> 1 (CCL4=1.0)
Flammability (solid, gas)	:	Will not burn
Upper explosion limit / Upper flammability limit	:	Upper flammability limit Method: ASTM E681 None.
Lower explosion limit / Lower flammability limit	:	Lower flammability limit Method: ASTM E681 None.
Vapour pressure	:	7,063.6 hPa (25 °C)
Relative vapour density	:	3.83 (Air = 1.0)
Relative density	:	1.17 (25 °C)
Solubility(ies) Water solubility	:	No data available
Partition coefficient: n-octanol/water	:	Not applicable
Auto-ignition temperature	:	No data available
Decomposition temperature	:	No data available
Viscosity Viscosity, kinematic	:	Not applicable
Explosive properties	:	Not explosive
Oxidizing properties	:	The substance or mixture is not classified as oxidizing.

### 9.2 Other information

Particle size	:	Not applicable
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## SECTION 10: Stability and reactivity

### 10.1 Reactivity

Not classified as a reactivity hazard.

### 10.2 Chemical stability

Stable if used as directed. Follow precautionary advice and avoid incompatible materials and conditions.

### 10.3 Possibility of hazardous reactions



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Hazardous reactions : Can react with strong oxidizing agents.

**10.4 Conditions to avoid**

Conditions to avoid : This substance is not flammable in air at temperatures up to 100 °C (212 °F) at atmospheric pressure. However, mixtures of this substance with high concentrations of air at elevated pressure and/or temperature can become combustible in the presence of an ignition source. This substance can also become combustible in an oxygen enriched environment (oxygen concentrations greater than that in air). Whether a mixture containing this substance and air, or this substance in an oxygen enriched atmosphere become combustible depends on the inter-relationship of 1) the temperature 2) the pressure, and 3) the proportion of oxygen in the mixture. In general, this substance should not be allowed to exist with air above atmospheric pressure or at high temperatures; or in an oxygen enriched environment. For example this substance should NOT be mixed with air under pressure for leak testing or other purposes.  
Heat, flames and sparks.

**10.5 Incompatible materials**

Materials to avoid : Avoid impurities (e.g. rust, dust, ash), risk of decomposition.  
Incompatible with acids and bases.  
Incompatible with oxidizing agents.  
Oxygen  
Peroxides  
peroxide compounds  
Powdered metals

**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  
Eye contact

**Acute toxicity**

Not classified based on available information.

**Components:****2,3,3,3-Tetrafluoropropene:**

Acute inhalation toxicity : LC50 (Rat): > 405800 ppm  
Exposure time: 4 h  
Test atmosphere: gas  
Method: OECD Test Guideline 403

No observed adverse effect concentration (Dog): 120000 ppm

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Test atmosphere: gas  
Remarks: Cardiac sensitisation

Lowest observed adverse effect concentration (Dog): > 120000 ppm  
Test atmosphere: gas  
Remarks: Cardiac sensitisation

Cardiac sensitisation threshold limit (Dog): > 559,509 mg/m3  
Test atmosphere: gas  
Remarks: Cardiac sensitisation

### 1,1,1,2-Tetrafluoroethane:

Acute oral toxicity : Assessment: The substance or mixture has no acute oral toxicity

Acute inhalation toxicity : LC50 (Rat): > 567000 ppm  
Exposure time: 4 h  
Test atmosphere: gas  
Method: OECD Test Guideline 403

No observed adverse effect concentration (Dog): 40000 ppm  
Test atmosphere: gas  
Remarks: Cardiac sensitisation

Lowest observed adverse effect concentration (Dog): 80000 ppm  
Test atmosphere: gas  
Symptoms: May cause cardiac arrhythmia.

Cardiac sensitisation threshold limit (Dog): 334,000 mg/m3  
Test atmosphere: gas  
Symptoms: May cause cardiac arrhythmia.

Acute dermal toxicity : Assessment: The substance or mixture has no acute dermal toxicity

### Skin corrosion/irritation

Not classified based on available information.

### Components:

#### 2,3,3,3-Tetrafluoropropene:

Result : No skin irritation

#### 1,1,1,2-Tetrafluoroethane:

Result : No skin irritation

### Serious eye damage/eye irritation

Not classified based on available information.

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### Components:

#### **2,3,3,3-Tetrafluoropropene:**

|||Result : No eye irritation

#### **1,1,1,2-Tetrafluoroethane:**

|||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:

#### **2,3,3,3-Tetrafluoropropene:**

|||Exposure routes : Skin contact  
|||Result : negative

#### **1,1,1,2-Tetrafluoroethane:**

|||Exposure routes : Skin contact  
|||Result : negative

|||Exposure routes : Inhalation  
|||Species : Rat  
|||Result : negative

|||Exposure routes : Inhalation  
|||Species : Humans  
|||Result : negative

### **Germ cell mutagenicity**

Not classified based on available information.

### Components:

#### **2,3,3,3-Tetrafluoropropene:**

|||Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)  
Method: OECD Test Guideline 471  
Result: positive  
  
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: inhalation (gas)  
Method: OECD Test Guideline 474

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<div style="border-left: 3px double black; height: 100px; margin-left: 10px;"></div>	<p>Result: negative</p> <p>Test Type: In vivo mammalian alkaline comet assay Species: Rat Application Route: inhalation (gas) Method: OECD Test Guideline 489 Result: negative</p> <p>Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay) Species: Rat Application Route: inhalation (gas) Method: OECD Test Guideline 474 Result: negative</p> <p>Germ cell mutagenicity- Assessment : Weight of evidence does not support classification as a germ cell mutagen.</p>
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**1,1,1,2-Tetrafluoroethane:**

<div style="border-left: 3px double black; height: 100px; margin-left: 10px;"></div>	<p>Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES) Method: OECD Test Guideline 471 Result: negative</p> <p>Test Type: Chromosome aberration test in vitro Method: OECD Test Guideline 473 Result: negative</p> <p>Genotoxicity in vivo : Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay) Species: Mouse Application Route: inhalation (gas) Method: OECD Test Guideline 474 Result: negative</p> <p>Test Type: Unscheduled DNA synthesis (UDS) test with mammalian liver cells in vivo Species: Rat Application Route: inhalation (gas) Method: OECD Test Guideline 486 Result: negative</p> <p>Germ cell mutagenicity- Assessment : Weight of evidence does not support classification as a germ cell mutagen.</p>
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**Carcinogenicity**

Not classified based on available information.

**Components:****2,3,3,3-Tetrafluoropropene:**

<div style="border-left: 3px double black; height: 100px; margin-left: 10px;"></div>	<p>Result : negative</p> <p>Carcinogenicity - Assessment : Weight of evidence does not support classification as a carcinogen</p>
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### 1,1,1,2-Tetrafluoroethane:

Species	: Rat
Application Route	: inhalation (gas)
Exposure time	: 2 Years
Method	: OECD Test Guideline 453
Result	: negative

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

Not classified based on available information.

### Components:

#### 2,3,3,3-Tetrafluoropropene:

Effects on fertility	: Test Type: Two-generation reproduction toxicity study Species: Rat Application Route: inhalation (gas) Method: OECD Test Guideline 416 Result: negative
Effects on foetal development	: Test Type: Prenatal development toxicity study (teratogenicity) Species: Rat Application Route: inhalation (gas) Method: OECD Test Guideline 414 Result: negative
Reproductive toxicity - Assessment	: Weight of evidence does not support classification for reproductive toxicity, No effects on or via lactation

#### 1,1,1,2-Tetrafluoroethane:

Effects on fertility	: Species: Mouse Application Route: Inhalation Result: negative
Effects on foetal development	: Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test Species: Rabbit Application Route: inhalation (gas) Method: OECD Test Guideline 414 Result: negative
Reproductive toxicity - Assessment	: Weight of evidence does not support classification for reproductive toxicity

### STOT - single exposure

Not classified based on available information.

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**Components:****2,3,3,3-Tetrafluoropropene:**

Exposure routes	: inhalation (gas)
Assessment	: No significant health effects observed in animals at concentrations of 20000 ppmV/4h or less

**1,1,1,2-Tetrafluoroethane:**

Exposure routes	: inhalation (gas)
Assessment	: No significant health effects observed in animals at concentrations of 20000 ppmV/4h or less

**STOT - repeated exposure**

Not classified based on available information.

**Components:****2,3,3,3-Tetrafluoropropene:**

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

**1,1,1,2-Tetrafluoroethane:**

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

**Repeated dose toxicity****Components:****2,3,3,3-Tetrafluoropropene:**

Species	: Rat, male and female
NOAEL	: 50000 ppm
LOAEL	: >50000 ppm
Application Route	: inhalation (gas)
Exposure time	: 13 Weeks
Method	: OECD Test Guideline 413

**1,1,1,2-Tetrafluoroethane:**

Species	: Rat, male and female
NOAEL	: 50000 ppm
LOAEL	: >50000 ppm
Application Route	: inhalation (gas)
Exposure time	: 2 yr
Method	: OECD Test Guideline 453

**Aspiration toxicity**

Not classified based on available information.

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**Components:****2,3,3,3-Tetrafluoropropene:**

|| No aspiration toxicity classification

**1,1,1,2-Tetrafluoroethane:**

|| No aspiration toxicity classification

**SECTION 12: Ecological information****12.1 Toxicity****Components:****2,3,3,3-Tetrafluoropropene:**

Toxicity to fish	:	LC50 (Cyprinus carpio (Carp)): > 197 mg/l Exposure time: 96 h Method: OECD Test Guideline 203
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): > 100 mg/l Exposure time: 48 h Method: OECD Test Guideline 202
Toxicity to algae/aquatic plants	:	EC50 (Selenastrum capricornutum (green algae)): > 100 mg/l Exposure time: 72 h Method: OECD Test Guideline 201  NOEC (Selenastrum capricornutum (green algae)): > 75 mg/l Exposure time: 3 d Method: OECD Test Guideline 201

**1,1,1,2-Tetrafluoroethane:**

Toxicity to fish	:	LC50 (Oncorhynchus mykiss (rainbow trout)): 450 mg/l Exposure time: 96 h Method: Regulation (EC) No. 440/2008, Annex, C.1
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 980 mg/l Exposure time: 48 h Method: Regulation (EC) No. 440/2008, Annex, C.2
Toxicity to algae/aquatic plants	:	ErC50 (green algae): > 100 mg/l Exposure time: 96 h Remarks: Based on data from similar materials

**12.2 Persistence and degradability****Components:****2,3,3,3-Tetrafluoropropene:**

Biodegradability	:	Result: Not readily biodegradable. Method: OECD Test Guideline 301F
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### 1,1,1,2-Tetrafluoroethane:

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

## 12.3 Bioaccumulative potential

### Components:

#### 2,3,3,3-Tetrafluoropropene:

Bioaccumulation : Remarks: Bioaccumulation is unlikely.  
Partition coefficient: n-octanol/water : log Pow: 2 (25 °C)

#### 1,1,1,2-Tetrafluoroethane:

Bioaccumulation : Remarks: Bioaccumulation is unlikely.  
Partition coefficient: n-octanol/water : log Pow: 1.06

## 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.

## 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.

Contaminated packaging : Empty containers should be taken to an approved waste han-



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ding site for recycling or disposal.  
Empty pressure vessels should be returned to the supplier.  
If not otherwise specified: Dispose of as unused product.

### SECTION 14: Transport information

#### 14.1 UN number

ADN	:	UN 1078
ADR	:	UN 1078
RID	:	UN 1078
IMDG	:	UN 1078
IATA	:	UN 1078

#### 14.2 UN proper shipping name

ADN	:	REFRIGERANT GAS, N.O.S. (2,3,3,3-Tetrafluoropropene, 1,1,1,2-Tetrafluoroethane)
ADR	:	REFRIGERANT GAS, N.O.S. (2,3,3,3-Tetrafluoropropene, 1,1,1,2-Tetrafluoroethane)
RID	:	REFRIGERANT GAS, N.O.S. (2,3,3,3-Tetrafluoropropene, 1,1,1,2-Tetrafluoroethane)
IMDG	:	REFRIGERANT GAS, N.O.S. (2,3,3,3-Tetrafluoropropene, 1,1,1,2-Tetrafluoroethane)
IATA	:	Refrigerant gas, n.o.s. (2,3,3,3-Tetrafluoropropene, 1,1,1,2-Tetrafluoroethane)

#### 14.3 Transport hazard class(es)

	Class	Subsidiary risks
ADN	: 2	2.2
ADR	: 2	2.2
RID	: 2	2.2, (13)
IMDG	: 2.2	
IATA	: 2.2	

#### 14.4 Packing group

ADN	
Packing group	: Not assigned by regulation
Classification Code	: 2A
Hazard Identification Number	: 20
Labels	: 2.2
ADR	
Packing group	: Not assigned by regulation
Classification Code	: 2A
Hazard Identification Number	: 20
Labels	: 2.2
Tunnel restriction code	: (C/E)

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### RID

Packing group : Not assigned by regulation  
Classification Code : 2A  
Hazard Identification Number : 20  
Labels : 2.2 ((13))

### IMDG

Packing group : Not assigned by regulation  
Labels : 2.2  
EmS Code : F-C, S-V

### IATA (Cargo)

Packing instruction (cargo aircraft) : 200  
Packing group : Not assigned by regulation  
Labels : Non-flammable, non-toxic Gas

### IATA (Passenger)

Packing instruction (passenger aircraft) : 200  
Packing group : Not assigned by regulation  
Labels : Non-flammable, non-toxic Gas

## 14.5 Environmental hazards

### ADN

Environmentally hazardous : no

### ADR

Environmentally hazardous : no

### RID

Environmentally hazardous : no

### IMDG

Marine pollutant : no

## 14.6 Special precautions for user

The transport classification(s) provided herein are for informational purposes only, and solely based upon the properties of the unpackaged material as it is described within this Safety Data Sheet. Transportation classifications may vary by mode of transportation, package sizes, and variations in regional or country regulations.

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

Remarks : Not applicable for product as supplied.

## SECTION 15: Regulatory information

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

Montreal Protocol : 1,1,1,2-Tetrafluoroethane

### 15.2 Chemical safety assessment

Chemical Safety Assessments have been carried out for these substances.

## SECTION 16: Other information

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### Full text of H-Statements

H221 : Flammable gas.  
H280 : Contains gas under pressure; may explode if heated.

### Full text of other abbreviations

Flam. Gas : Flammable gases  
Press. Gas : Gases under pressure

ADN - European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways; ADR - Agreement concerning the International Carriage of Dangerous Goods by Road; AIC - 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; 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

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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:**

Press. Gas Liquefied gas      H280

**Classification procedure:**

Based on product data or assessment

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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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