

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006



## Freon™ MO49 Plus (R-437A) Refrigerant

Version 7.4      Revision Date: 20.06.2018      SDS Number: 1333379-00038      Date of last issue: 23.10.2017  
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 : Freon™ MO49 Plus (R-437A) Refrigerant  
Product code : D13583198  
SDS-Identcode : 130000033955

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

Use of the Sub-stance/Mixture : Refrigerant  
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

+(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.

#### 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.

### Additional Labelling

Contains fluorinated greenhouse gases. (HFC-134a, HFC-125)

### 2.3 Other hazards

This mixture contains no substance considered to be persistent, bioaccumulating and toxic (PBT).  
This mixture contains no substance considered to be very persistent and very bioaccumulating (vPvB).  
May displace oxygen and cause rapid suffocation.  
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

#### Hazardous components

Chemical name	CAS-No. EC-No. Index-No. Registration number	Classification	Concentration (% w/w)
1,1,1,2-Tetrafluoroethane*	811-97-2 212-377-0 01-2119459374-33	Press. Gas Liquefied gas; H280	78.5
Pentafluoroethane*	354-33-6 206-557-8 01-2119485636-25	Press. Gas Liquefied gas; H280	19.5
Butane	106-97-8 203-448-7 601-004-00-0	Flam. Gas 1; H220 Press. Gas Liquefied gas; H280 STOT SE 3; H336	1.4
n-Pentane	109-66-0 203-692-4 601-006-00-1	Flam. Liq. 2; H225 STOT SE 3; H336 Asp. Tox. 1; H304 Aquatic Chronic 2; H411	0.6

\* Voluntarily-disclosed non-hazardous substance  
For explanation of abbreviations see section 16.

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### 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.  
Get medical attention if symptoms occur.
- 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
- Risks : 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 : Treat symptomatically and supportively.
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### SECTION 5: Firefighting measures

#### 5.1 Extinguishing media

- Suitable extinguishing media : Not applicable  
Will not burn
- Unsuitable extinguishing media : Not applicable  
Will not burn

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### 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  
carbonyl fluoride  
Carbon oxides  
Fluorine compounds

### 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.
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## 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 and personal protective equipment recommendations.

### 6.2 Environmental precautions

- Environmental precautions : 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 : Handle in accordance with good industrial hygiene and safety practice, based on the results of the workplace exposure assessment  
Wear cold insulating gloves/ face shield/ eye protection.  
Prevent backflow into the gas tank.  
Open the valves slowly to prevent pressure surges.  
Close valve after each use and when empty. Do NOT change or force fit connections.  
Prevent the intrusion of water into the gas tank.  
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.
- Avoid breathing gas.  
Valve protection caps and valve outlet threaded plugs must remain in place unless container is secured with valve outlet piped to use point.  
Use a check valve or trap in the discharge line to prevent hazardous back flow into the cylinder.  
Use a pressure reducing regulator when connecting cylinder to lower pressure (<3000 psig) piping or systems.  
Never attempt to lift cylinder by its cap.  
Do not drag, slide or roll cylinders.  
Use a suitable hand truck for cylinder movement.
- Hygiene measures : Ensure that eye flushing systems and safety showers are located 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 : Do not store with the following product types:  
Self-reactive substances and mixtures  
Organic peroxides  
Oxidizing agents

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Flammable liquids  
Flammable solids  
Pyrophoric liquids  
Pyrophoric solids  
Self-heating substances and mixtures  
Substances and mixtures, which in contact with water, emit flammable gases  
Explosives  
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

Components	CAS-No.	Value type (Form of exposure)	Control parameters	Basis
1,1,1,2-Tetrafluoroethane	811-97-2	TWA	1,000 ppm 4,240 mg/m <sup>3</sup>	GB EH40
Further information	Where no specific short-term exposure limit is listed, a figure three times the long-term exposure should be used			
n-Pentane	109-66-0	TWA	1,000 ppm 3,000 mg/m <sup>3</sup>	2006/15/EC
Further information	Indicative			
		TWA	600 ppm 1,800 mg/m <sup>3</sup>	GB EH40
Further information	Where no specific short-term exposure limit is listed, a figure three times the long-term exposure should be used			

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

Substance name	End Use	Exposure routes	Potential health effects	Value
1,1,1,2-Tetrafluoroethane	Workers	Inhalation	Long-term systemic effects	13936 mg/m <sup>3</sup>
	Consumers	Inhalation	Long-term systemic effects	2476 mg/m <sup>3</sup>
Pentafluoroethane	Workers	Inhalation	Long-term systemic effects	16444 mg/m <sup>3</sup>

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	Consumers	Inhalation	Long-term systemic effects	1753 mg/m <sup>3</sup>
n-Pentane	Workers	Inhalation	Long-term systemic effects	3000 mg/m <sup>3</sup>
	Workers	Skin contact	Long-term systemic effects	432 mg/kg bw/day
	Consumers	Inhalation	Long-term systemic effects	643 mg/m <sup>3</sup>
	Consumers	Skin contact	Long-term systemic effects	214 mg/kg bw/day
	Consumers	Ingestion	Long-term systemic effects	214 mg/kg bw/day

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

Substance name	Environmental Compartment	Value
1,1,1,2-Tetrafluoroethane	Fresh water	0.1 mg/l
	Marine water	0.01 mg/l
	Intermittent use/release	1 mg/l
	Fresh water sediment	0.75 mg/kg dry weight (d.w.)
	Sewage treatment plant	73 mg/l
Pentafluoroethane	Fresh water	0.1 mg/l
	Intermittent use/release	1 mg/l
	Fresh water sediment	0.6 mg/kg
n-Pentane	Fresh water	0.23 mg/l
	Marine water	0.23 mg/l
	Intermittent use/release	0.88 mg/l
	Sewage treatment plant	3.6 mg/l
	Fresh water sediment	1.2 mg/kg
	Marine sediment	1.2 mg/kg
	Soil	0.55 mg/kg

## 8.2 Exposure controls

### Engineering measures

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

### Personal protective equipment

Eye 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

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gloves often!

Skin and body protection : Skin should be washed after contact.

Respiratory protection : Use respiratory protection unless adequate local exhaust ventilation is provided or exposure assessment demonstrates that exposures are within recommended exposure guidelines.

Filter type : Organic gas and low boiling vapour type (AX)

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

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### SECTION 9: Physical and chemical properties

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

Appearance : Liquefied gas

Colour : colourless, clear

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 : -32.3 °C

Flash point : Not applicable

Evaporation rate : Not applicable

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 : 7,949 hPa (25 °C)

Relative vapour density : 3.7

Relative density : 1.18 (25 °C)

Density : 1.192 g/cm<sup>3</sup> (21 °C)  
(as liquid)



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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

Hazardous reactions : Can react with strong oxidizing agents.

### 10.4 Conditions to avoid

Conditions to avoid : Heat, flames and sparks.

### 10.5 Incompatible materials

Materials to avoid : Oxidizing agents

### 10.6 Hazardous decomposition products

No hazardous decomposition products are known.

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## SECTION 11: Toxicological information

### 11.1 Information on toxicological effects

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

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### Acute toxicity

Not classified based on available information.

### Components:

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

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

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

Lowest observed adverse effect concentration (Dog): 80000 ppm  
Test atmosphere: gas  
Symptoms: Cardiac sensitisation

Cardiac sensitisation threshold limit (Dog): 334,000 mg/m<sup>3</sup>  
Test atmosphere: gas  
Symptoms: Cardiac sensitisation

#### **Pentafluoroethane:**

Acute inhalation toxicity : LC0 (Rat): > 800000 ppm  
Exposure time: 4 h  
Test atmosphere: gas  
Method: OECD Test Guideline 403

#### **Butane:**

Acute inhalation toxicity : LC50 (Rat): 658 mg/l  
Exposure time: 4 h  
Test atmosphere: vapour

#### **n-Pentane:**

Acute oral toxicity : LD50 (Rat): > 2,000 mg/kg  
Method: OECD Test Guideline 401

Acute inhalation toxicity : LC50 (Rat): > 25.3 mg/l  
Exposure time: 4 h  
Test atmosphere: vapour  
Method: OECD Test Guideline 403  
Remarks: Based on data from similar materials

### Skin corrosion/irritation

Not classified based on available information.

### Components:

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

Species : Rabbit  
Result : No skin irritation

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### **n-Pentane:**

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

Assessment : Repeated exposure may cause skin dryness or cracking.

### **Serious eye damage/eye irritation**

Not classified based on available information.

### **Components:**

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

Species : Rabbit  
Result : No eye irritation

### **n-Pentane:**

Species : Rabbit  
Method : OECD Test Guideline 405  
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:**

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

Exposure routes : Skin contact  
Species : Guinea pig  
Result : negative

Species : Rat  
Result : negative

### **n-Pentane:**

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

### **Germ cell mutagenicity**

Not classified based on available information.

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### Components:

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

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

#### **Pentafluoroethane:**

Genotoxicity in vitro : 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  
Result: negative

#### **Butane:**

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

Genotoxicity in vivo : Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)  
Species: Rat  
Application Route: inhalation (gas)  
Method: OECD Test Guideline 474  
Result: negative  
Remarks: Based on data from similar materials

#### **n-Pentane:**

Genotoxicity in vitro : Test Type: Chromosome aberration test in vitro  
Result: negative

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

Genotoxicity in vivo : Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)  
Species: Rat  
Application Route: inhalation (vapour)  
Method: Directive 67/548/EEC, Annex V, B.12.  
Result: negative

### **Carcinogenicity**

Not classified based on available information.

### Components:

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

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

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### Reproductive toxicity

Not classified based on available information.

### Components:

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

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

#### **Pentafluoroethane:**

Effects on fertility : Test Type: One-generation reproduction toxicity study  
Species: Rat  
Application Route: inhalation (vapour)  
Result: negative  
Remarks: Based on data from similar materials

Effects on foetal development : Test Type: Embryo-foetal development  
Species: Rat  
Application Route: inhalation (gas)  
Method: OECD Test Guideline 414  
Result: negative

#### **Butane:**

Effects on fertility : Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test  
Species: Rat  
Application Route: inhalation (gas)  
Method: OECD Test Guideline 422  
Result: negative

Effects on foetal development : Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test  
Application Route: inhalation (gas)  
Method: OECD Test Guideline 422  
Result: negative

#### **n-Pentane:**

Effects on fertility : Test Type: Two-generation reproduction toxicity study  
Species: Rat  
Application Route: inhalation (vapour)  
Method: OECD Test Guideline 416  
Result: negative  
Remarks: Based on data from similar materials

Effects on foetal development : Test Type: Embryo-foetal development  
Species: Rabbit  
Application Route: inhalation (vapour)  
Result: negative  
Remarks: Based on data from similar materials

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### STOT - single exposure

Not classified based on available information.

#### Components:

##### **Butane:**

Assessment : May cause drowsiness or dizziness.

##### **n-Pentane:**

Assessment : May cause drowsiness or dizziness.

### STOT - repeated exposure

Not classified based on available information.

#### Components:

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

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

### Repeated dose toxicity

#### Components:

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

Species : Rat  
NOAEL : 50000 ppm  
LOAEL : > 50000 ppm  
Application Route : inhalation (gas)  
Exposure time : 90 d  
Method : OECD Test Guideline 413  
Remarks : No significant adverse effects were reported

##### **Pentafluoroethane:**

Species : Rat  
NOAEL :  $\geq$  50000 ppm  
Application Route : inhalation (gas)  
Exposure time : 13 Weeks  
Method : OECD Test Guideline 413

##### **Butane:**

Species : Rat  
NOAEL : 9000 ppm  
Application Route : inhalation (gas)  
Exposure time : 6 Weeks  
Method : OECD Test Guideline 422

##### **n-Pentane:**

Species : Rat

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NOAEL : > 20.5 mg/l  
Application Route : inhalation (vapour)  
Exposure time : 13 Weeks  
Method : OECD Test Guideline 413

### Aspiration toxicity

Not classified based on available information.

### Components:

#### n-Pentane:

The substance or mixture is known to cause human aspiration toxicity hazards or has to be regarded as if it causes a human aspiration toxicity hazard.

## SECTION 12: Ecological information

### 12.1 Toxicity

#### Components:

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

Toxicity to fish : LC50 (Oncorhynchus mykiss (rainbow trout)): 450 mg/l  
Exposure time: 96 h

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 980 mg/l  
Exposure time: 48 h

Toxicity to algae : ErC50 (algae): 142 mg/l  
Exposure time: 96 h  
Remarks: Based on data from similar materials

NOEC (Pseudokirchneriella subcapitata (green algae)): 13.2 mg/l  
Exposure time: 72 h  
Remarks: Based on data from similar materials

##### Pentafluoroethane:

Toxicity to fish : LC50 (Oncorhynchus mykiss (rainbow trout)): 450 mg/l  
Exposure time: 96 h  
Method: Directive 67/548/EEC, Annex V, C.1.  
Remarks: Based on data from similar materials

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 980 mg/l  
Exposure time: 48 h  
Method: Directive 67/548/EEC, Annex V, C.2.  
Remarks: Based on data from similar materials

Toxicity to algae : EC50 (Pseudokirchneriella subcapitata (green algae)): > 114 mg/l  
Exposure time: 72 h  
Method: OECD Test Guideline 201  
Remarks: Based on data from similar materials

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NOEC (Pseudokirchneriella subcapitata (green algae)): 13.2 mg/l  
Exposure time: 72 h  
Method: OECD Test Guideline 201  
Remarks: Based on data from similar materials

### **n-Pentane:**

Toxicity to fish : LC50 (Oncorhynchus mykiss (rainbow trout)): 4.26 mg/l  
Exposure time: 96 h

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 2.7 mg/l  
Exposure time: 48 h

Toxicity to algae : ErC50 (Scenedesmus quadricauda (Green algae)): 10.7 mg/l  
Exposure time: 72 h  
Method: OECD Test Guideline 201

### **Ecotoxicology Assessment**

Chronic aquatic toxicity : Toxic to aquatic life with long lasting effects.

## 12.2 Persistence and degradability

### Components:

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

Biodegradability : Result: Not readily biodegradable.

#### **Pentafluoroethane:**

Biodegradability : Result: Not readily biodegradable.  
Biodegradation: 5 %  
Exposure time: 28 d  
Method: OECD Test Guideline 301D

#### **Butane:**

Biodegradability : Result: Readily biodegradable.  
Biodegradation: 100 %  
Exposure time: 385.5 h  
Remarks: Based on data from similar materials

#### **n-Pentane:**

Biodegradability : Result: Readily biodegradable.  
Biodegradation: 87 %  
Exposure time: 28 d

## 12.3 Bioaccumulative potential

### Components:

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



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Partition coefficient: n-octanol/water : log Pow: 1.06

### **Pentafluoroethane:**

Partition coefficient: n-octanol/water : Pow: 1.48 (25 °C)

### **Butane:**

Partition coefficient: n-octanol/water : log Pow: 2.31

### **n-Pentane:**

Partition coefficient: n-octanol/water : log Pow: 3.45

## 12.4 Mobility in soil

No data available

## 12.5 Results of PBT and vPvB assessment

### **Product:**

Assessment : This mixture contains no substance considered to be persistent, bioaccumulating and toxic (PBT).. This mixture contains no substance considered to be very persistent and very bioaccumulating (vPvB)..

## 12.6 Other adverse effects

### **Global warming potential**

Regulation (EU) No 517/2014 on fluorinated greenhouse gases

### **Product:**

100-year global warming potential: 1,805.136

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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.

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

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### 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.  
(1,1,1,2-Tetrafluoroethane, Pentafluoroethane)  
**ADR** : REFRIGERANT GAS, N.O.S.  
(1,1,1,2-Tetrafluoroethane, Pentafluoroethane)  
**RID** : REFRIGERANT GAS, N.O.S.  
(1,1,1,2-Tetrafluoroethane, Pentafluoroethane)  
**IMDG** : REFRIGERANT GAS, N.O.S.  
(1,1,1,2-Tetrafluoroethane, Pentafluoroethane)  
**IATA** : Refrigerant gas, n.o.s.  
(1,1,1,2-Tetrafluoroethane, Pentafluoroethane)

#### 14.3 Transport hazard class(es)

**ADN** : 2  
**ADR** : 2  
**RID** : 2  
**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)

**RID**  
Packing group : Not assigned by regulation  
Classification Code : 2A  
Hazard Identification Number : 20

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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

REACH - Candidate List of Substances of Very High Concern for Authorisation (Article 59) : Not applicable

REACH - List of substances subject to authorisation (Annex XIV) : Not applicable

Regulation (EC) No 1005/2009 on substances that deplete the ozone layer : Not applicable

Regulation (EC) No 850/2004 on persistent organic pollutants : Not applicable

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Regulation (EC) No 649/2012 of the European Parliament and the Council concerning the export and import of dangerous chemicals : Not applicable

REACH - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, preparations and articles (Annex XVII) : Not applicable

Seveso III: Directive 2012/18/EU of the European Parliament and of the Council on the control of major-accident hazards involving dangerous substances.  
Not applicable

### 15.2 Chemical safety assessment

A Chemical Safety Assessment has not been carried out.

## SECTION 16: Other information

Other information : Freon™ and any associated logos are trademarks or copyrights of The Chemours Company FC, LLC. Chemours™ and the Chemours Logo are trademarks of The Chemours Company. Before use read Chemours safety information. For further information contact the local Chemours office or nominated distributors.

### Full text of H-Statements

H220 : Extremely flammable gas.  
H225 : Highly flammable liquid and vapour.  
H280 : Contains gas under pressure; may explode if heated.  
H304 : May be fatal if swallowed and enters airways.  
H336 : May cause drowsiness or dizziness.  
H411 : Toxic to aquatic life with long lasting effects.

### Full text of other abbreviations

Aquatic Chronic : Chronic aquatic toxicity  
Asp. Tox. : Aspiration hazard  
Flam. Gas : Flammable gases  
Flam. Liq. : Flammable liquids  
Press. Gas : Gases under pressure  
STOT SE : Specific target organ toxicity - single exposure  
2006/15/EC : Europe. Indicative occupational exposure limit values  
GB EH40 : UK. EH40 WEL - Workplace Exposure Limits  
2006/15/EC / TWA : Limit Value - eight hours  
GB EH40 / TWA : Long-term exposure limit (8-hour TWA reference period)

ADN - European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways; ADR - European Agreement concerning the International Carriage of Dangerous Goods by Road; AICS - Australian Inventory of Chemical Substances; 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 (Cana-

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da); 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; TRGS - Technical Rule for Hazardous Substances; TSCA - Toxic Substances Control Act (United States); UN - United Nations; 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:

Press. Gas Liquefied gas H280

### Classification procedure:

Based on product data or assessment

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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