

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006



## Opteon™ XL20 (R-454C) Refrigerant

Version 4.3      Revision Date: 25.04.2018      SDS Number: 1354853-00036      Date of last issue: 22.11.2017  
Date of first issue: 27.02.2017

---

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

#### 1.1 Product identifier

Trade name : Opteon™ XL20 (R-454C) Refrigerant  
SDS-Identcode : 130000143547

#### 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 : For professional and industrial installation and use only., Do not use product for anything outside of the above specified uses

#### 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)

---

### SECTION 2: Hazards identification

#### 2.1 Classification of the substance or mixture

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

Flammable gases, Category 1      H220: Extremely flammable gas.  
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 :



# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006



## Opteon™ XL20 (R-454C) Refrigerant

Version 4.3      Revision Date: 25.04.2018      SDS Number: 1354853-00036      Date of last issue: 22.11.2017  
Date of first issue: 27.02.2017

Signal word : Danger

Hazard statements : H220 Extremely flammable gas.  
H280 Contains gas under pressure; may explode if heated.

Precautionary statements : **Prevention:**  
P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.  
**Response:**  
P377 Leaking gas fire: Do not extinguish, unless leak can be stopped safely.  
P381 In case of leakage, eliminate all ignition sources.  
**Storage:**  
P410 + P403 Protect from sunlight. Store in a well-ventilated place.

### Additional Labelling

Contains fluorinated greenhouse gases. (HFC-32)

### 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.<br>EC-No.<br>Index-No.<br>Registration number | Classification   | Concentration<br>(% w/w) |
|-----------------------------|---|--|--------------------------|
| 2,3,3,3-Tetrafluoropropene* | 754-12-1<br>468-710-7<br>01-0000019665-61             | Flam. Gas 1; H220<br>Press. Gas Liquefied<br>gas; H280 | 78.5                     |
| Difluoromethane*            | 75-10-5<br>200-839-4<br>01-2119471312-47              | Flam. Gas 1; H220<br>Press. Gas Liquefied<br>gas; H280 | 21.5                     |

\* Voluntarily-disclosed non-hazardous substance

For explanation of abbreviations see section 16.

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006



## Opteon™ XL20 (R-454C) Refrigerant

|         |                |               |                                 |
|---------|----------------|---------------|---------------------------------|
| Version | Revision Date: | SDS Number:   | Date of last issue: 22.11.2017  |
| 4.3     | 25.04.2018     | 1354853-00036 | Date of first issue: 27.02.2017 |

---

### 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.
- 

### 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 : None known.
-

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006



## Opteon™ XL20 (R-454C) Refrigerant

|         |                |               |                                 |
|---------|----------------|---------------|---------------------------------|
| Version | Revision Date: | SDS Number:   | Date of last issue: 22.11.2017  |
| 4.3     | 25.04.2018     | 1354853-00036 | Date of first issue: 27.02.2017 |

---

media

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

Specific hazards during fire-fighting : Vapours may form flammable mixture with air  
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.  
Leaking gas fire: Do not extinguish, unless leak can be stopped safely.  
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.  
Only trained personnel should re-enter the area.  
Remove all sources of ignition.  
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.  
Non-sparking tools should be used.  
Suppress (knock down) gases/vapours/mists with a water spray jet.  
Local or national regulations may apply to releases and disposal of this material, as well as those materials and items

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006



## Opteon™ XL20 (R-454C) Refrigerant

|         |                |               |                                 |
|---------|----------------|---------------|---------------------------------|
| Version | Revision Date: | SDS Number:   | Date of last issue: 22.11.2017  |
| 4.3     | 25.04.2018     | 1354853-00036 | Date of first issue: 27.02.2017 |

---

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.

---

## 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 with local exhaust ventilation. Use only in an area equipped with explosion-proof exhaust ventilation if advised by assessment of the local exposure potential
- Advice on safe handling : Handle in accordance with good industrial hygiene and safety practice, based on the results of the workplace exposure assessment  
Keep container tightly closed.  
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.

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006



## Opteon™ XL20 (R-454C) Refrigerant

Version 4.3      Revision Date: 25.04.2018      SDS Number: 1354853-00036      Date of last issue: 22.11.2017  
Date of first issue: 27.02.2017

### 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 tightly closed. Keep in a cool, well-ventilated place. Keep away from direct sunlight. Store in accordance with the particular national regulations. Keep away from heat and sources of ignition.

Advice on common storage : Do not store with the following product types:  
Self-reactive substances and mixtures  
Organic peroxides  
Oxidizing agents  
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

#### 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/m <sup>3</sup>  |
| Difluoromethane            | Workers   | Inhalation      | Long-term systemic effects | 7035 mg/m <sup>3</sup> |
|                            | Consumers | Inhalation      | Long-term systemic effects | 750 mg/m <sup>3</sup>  |

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006



## Opteon™ XL20 (R-454C) Refrigerant

Version 4.3      Revision Date: 25.04.2018      SDS Number: 1354853-00036      Date of last issue: 22.11.2017  
Date of first issue: 27.02.2017

### 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      | 1.77 mg/kg dry weight (d.w.)  |
|                            | Soil                      | 1.54 mg/kg dry weight (d.w.)  |
|                            | Marine water              | 0.01 mg/l                     |
|                            | Marine sediment           | 0.178 mg/kg dry weight (d.w.) |
|                            | Difluoromethane           | Fresh water                   |
|                            | Intermittent use/release  | 1.42 mg/l                     |
|                            | Fresh water sediment      | 0.534 mg/kg                   |

### 8.2 Exposure controls

#### Engineering measures

Minimize workplace exposure concentrations.

Use only in an area equipped with explosion-proof exhaust ventilation if advised by assessment of the local exposure potential

Use with local exhaust ventilation.

#### Personal protective equipment

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

Hand protection  
Material : Heat 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 : Wear the following personal protective equipment:  
Flame retardant antistatic protective clothing, unless assessment demonstrates that the risk of explosive atmospheres or flash fires is low

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.

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006



## Opteon™ XL20 (R-454C) Refrigerant

Version 4.3      Revision Date: 25.04.2018      SDS Number: 1354853-00036      Date of last issue: 22.11.2017  
Date of first issue: 27.02.2017

---

### SECTION 9: Physical and chemical properties

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

|  |   |  |
|--|---|--|
| Appearance                                       | : | Liquefied gas  |
| Colour   | : | clear, 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          | : | -45.9 °C   |
| Flash point                                      | : | Not applicable   |
| Evaporation rate                                 | : | > 1<br>(CCL4=1.0)  |
| Flammability (solid, gas)                        | : | Flammable  |
| Upper explosion limit / Upper flammability limit | : | Upper flammability limit<br>< 15 %(V)<br>Method: ASTM E681 |
| Lower explosion limit / Lower flammability limit | : | Lower flammability limit<br>> 7 %(V)<br>Method: ASTM E681  |
| Vapour pressure                                  | : | 11,691 hPa (25 °C)   |
| Relative vapour density                          | : | 3.2<br>(Air = 1.0)   |
| Relative density                                 | : | 0.99 (25 °C)   |
| Solubility(ies)<br>Water solubility              | : | No data available  |
| Partition coefficient: n-octanol/water           | : | Not applicable   |
| Auto-ignition temperature                        | : | No data available  |
| Decomposition temperature                        | : | No data available  |
| Viscosity<br>Viscosity, kinematic                | : | Not applicable   |



# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006



## Opteon™ XL20 (R-454C) Refrigerant

|         |                |               |                                 |
|---------|----------------|---------------|---------------------------------|
| Version | Revision Date: | SDS Number:   | Date of last issue: 22.11.2017  |
| 4.3     | 25.04.2018     | 1354853-00036 | Date of first issue: 27.02.2017 |

---

Explosive properties : Not explosive

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

### 9.2 Other information

Particle size : Not applicable

---

## 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 : Vapours may form flammable mixture with air  
Can react with strong oxidizing agents.  
Extremely flammable gas.

### 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.

---

## 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): > 405000 ppm  
Exposure time: 4 h  
Test atmosphere: gas

Lowest observed adverse effect concentration (Dog): > 120000 ppm

---

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006



## Opteon™ XL20 (R-454C) Refrigerant

Version 4.3      Revision Date: 25.04.2018      SDS Number: 1354853-00036      Date of last issue: 22.11.2017  
Date of first issue: 27.02.2017

---

Test atmosphere: gas  
Symptoms: Cardiac sensitisation

No observed adverse effect concentration (Dog): 120000 ppm  
Test atmosphere: gas  
Symptoms: Cardiac sensitisation

Cardiac sensitisation threshold limit (Dog): > 559,509 mg/m<sup>3</sup>  
Test atmosphere: gas  
Symptoms: Cardiac sensitisation

### Difluoromethane:

Acute inhalation toxicity : LC50 (Rat): > 520000 ppm  
Exposure time: 4 h  
Test atmosphere: gas

Lowest observed adverse effect concentration (Dog): > 350000 ppm  
Symptoms: Cardiac sensitisation

No observed adverse effect concentration (Dog): 350000 ppm  
Symptoms: Cardiac sensitisation

Cardiac sensitisation threshold limit (Dog): > 735,000 mg/m<sup>3</sup>  
Symptoms: Cardiac sensitisation

### Skin corrosion/irritation

Not classified based on available information.

### Components:

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

Species : Not tested on animals  
Result : No skin irritation

#### Difluoromethane:

Species : Not tested on animals  
Result : No skin irritation

### Serious eye damage/eye irritation

Not classified based on available information.

### Components:

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

Species : Not tested on animals  
Result : No eye irritation

#### Difluoromethane:

Species : Not tested on animals  
Result : No eye irritation

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006



## Opteon™ XL20 (R-454C) Refrigerant

Version 4.3      Revision Date: 25.04.2018      SDS Number: 1354853-00036      Date of last issue: 22.11.2017  
Date of first issue: 27.02.2017

---

### 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  
Species : Not tested on animals  
Result : negative

##### Difluoromethane:

Exposure routes : Skin contact  
Species : Not tested on animals  
Result : negative

Species : Not tested on animals  
Result : negative

### Germ cell mutagenicity

Not classified based on available information.

#### Components:

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

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

##### Difluoromethane:

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

### Carcinogenicity

Not classified based on available information.

#### Components:

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

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

### Reproductive toxicity

Not classified based on available information.

#### Components:

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

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006



## Opteon™ XL20 (R-454C) Refrigerant

|         |                |               |                                 |
|---------|----------------|---------------|---------------------------------|
| Version | Revision Date: | SDS Number:   | Date of last issue: 22.11.2017  |
| 4.3     | 25.04.2018     | 1354853-00036 | Date of first issue: 27.02.2017 |

---

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

### Difluoromethane:

Reproductive toxicity - Assessment : Weight of evidence does not support classification for reproductive toxicity, Based on data from similar materials

### STOT - single exposure

Not classified based on available information.

### STOT - repeated exposure

Not classified based on available information.

### Components:

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

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

#### Difluoromethane:

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  
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

#### Difluoromethane:

Species : Rat  
NOAEL : 49100 ppm  
Application Route : inhalation (gas)  
Exposure time : 90 d  
Remarks : No significant adverse effects were reported

### Aspiration toxicity

Not classified based on available information.

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006



## Opteon™ XL20 (R-454C) Refrigerant

Version 4.3      Revision Date: 25.04.2018      SDS Number: 1354853-00036      Date of last issue: 22.11.2017  
Date of first issue: 27.02.2017

---

### 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
- Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): > 100 mg/l  
Exposure time: 48 h
- Toxicity to algae : NOEC (algae): > 100 mg/l  
Exposure time: 72 h

##### **Difluoromethane:**

- Toxicity to fish : LC50 (Fish): 1,507 mg/l  
Exposure time: 96 h
- Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia (water flea)): 652 mg/l  
Exposure time: 48 h
- Toxicity to algae : EC50 (algae): 142 mg/l  
Exposure time: 96 h
- Toxicity to fish (Chronic toxicity) : NOEC: 65.8 mg/l  
Exposure time: 30 d  
Species: Fish

#### 12.2 Persistence and degradability

##### Components:

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

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

##### **Difluoromethane:**

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

#### 12.3 Bioaccumulative potential

##### Components:

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

- Bioaccumulation : Remarks: No bioaccumulation is to be expected (log Pow <= 4).

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006



## Opteon™ XL20 (R-454C) Refrigerant

|         |                |               |                                 |
|---------|----------------|---------------|---------------------------------|
| Version | Revision Date: | SDS Number:   | Date of last issue: 22.11.2017  |
| 4.3     | 25.04.2018     | 1354853-00036 | Date of first issue: 27.02.2017 |

---

### Difluoromethane:

Partition coefficient: n-octanol/water : log Pow: 0.714

### 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: 148.265

---

## 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.

---

## SECTION 14: Transport information

### 14.1 UN number

|              |           |
|--------------|-----------|
| ADN          | : UN 3161 |
| ADR          | : UN 3161 |
| RID          | : UN 3161 |
| IMDG         | : UN 3161 |
| IATA (Cargo) | : UN 3161 |

---

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006



## Opteon™ XL20 (R-454C) Refrigerant

Version 4.3      Revision Date: 25.04.2018      SDS Number: 1354853-00036      Date of last issue: 22.11.2017  
Date of first issue: 27.02.2017

---

**IATA (Passenger)** : UN 3161  
Not permitted for transport

### 14.2 UN proper shipping name

**ADN** : LIQUEFIED GAS, FLAMMABLE, N.O.S.  
(2,3,3,3-Tetrafluoropropene, Difluoromethane)

**ADR** : LIQUEFIED GAS, FLAMMABLE, N.O.S.  
(2,3,3,3-Tetrafluoropropene, Difluoromethane)

**RID** : LIQUEFIED GAS, FLAMMABLE, N.O.S.  
(2,3,3,3-Tetrafluoropropene, Difluoromethane)

**IMDG** : LIQUEFIED GAS, FLAMMABLE, N.O.S.  
(2,3,3,3-Tetrafluoropropene, Difluoromethane)

**IATA (Cargo)** : Liquefied gas, flammable, n.o.s.  
(2,3,3,3-Tetrafluoropropene, Difluoromethane)

**IATA (Passenger)** : LIQUEFIED GAS, FLAMMABLE, N.O.S.  
Not permitted for transport

### 14.3 Transport hazard class(es)

**ADN** : 2

**ADR** : 2

**RID** : 2

**IMDG** : 2.1

**IATA (Cargo)** : 2.1

**IATA (Passenger)** : Not permitted for transport

### 14.4 Packing group

**ADN**  
Packing group : Not assigned by regulation  
Classification Code : 2F  
Hazard Identification Number : 23  
Labels : 2.1

**ADR**  
Packing group : Not assigned by regulation  
Classification Code : 2F  
Hazard Identification Number : 23  
Labels : 2.1  
Tunnel restriction code : (B/D)

**RID**  
Packing group : Not assigned by regulation  
Classification Code : 2F  
Hazard Identification Number : 23  
Labels : 2.1 ((13))

**IMDG**  
Packing group : Not assigned by regulation  
Labels : 2.1  
EmS Code : F-D, S-U

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006



## Opteon™ XL20 (R-454C) Refrigerant

|         |                |               |                                 |
|---------|----------------|---------------|---------------------------------|
| Version | Revision Date: | SDS Number:   | Date of last issue: 22.11.2017  |
| 4.3     | 25.04.2018     | 1354853-00036 | Date of first issue: 27.02.2017 |

---

### IATA (Cargo)

Packing instruction (cargo aircraft) : 200  
Packing group : Not assigned by regulation  
Labels : Flammable Gas

IATA (Passenger) : Not permitted for transport

### 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

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



# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006



## Opteon™ XL20 (R-454C) Refrigerant

|         |                |               |                                 |
|---------|----------------|---------------|---------------------------------|
| Version | Revision Date: | SDS Number:   | Date of last issue: 22.11.2017  |
| 4.3     | 25.04.2018     | 1354853-00036 | Date of first issue: 27.02.2017 |

Seveso III: Directive 2012/18/EU of the European Parliament and of the Council on the control of major-accident hazards involving dangerous substances.

|    |                 |                    |                    |
|----|-----------------|--------------------|--------------------|
| P2 | FLAMMABLE GASES | Quantity 1<br>10 t | Quantity 2<br>50 t |
|----|-----------------|--------------------|--------------------|

### Other regulations:

Take note of Directive 94/33/EC on the protection of young people at work or stricter national regulations, where applicable.

### 15.2 Chemical safety assessment

Chemical Safety Assessments have been carried out for these substances.

### SECTION 16: Other information

Other information : Opteon™ 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.  
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 - 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 (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 Develop-

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006



## Opteon™ XL20 (R-454C) Refrigerant

|         |                |               |                                 |
|---------|----------------|---------------|---------------------------------|
| Version | Revision Date: | SDS Number:   | Date of last issue: 22.11.2017  |
| 4.3     | 25.04.2018     | 1354853-00036 | Date of first issue: 27.02.2017 |

ment; 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:

|                          |      |
|--------------------------|------|
| Flam. Gas 1              | H220 |
| Press. Gas Liquefied gas | H280 |

### Classification procedure:

|                                     |
|-------------------------------------|
| Based on product data or assessment |
| 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.

GB / EN