

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

#### 1.1. Product identifier

Product form : Mixture  
 Name : Opteon® XP44 (R-452A)  
 Product code : 100145200

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

##### 1.2.1. Relevant identified uses

Use of the substance/mixture : Refrigerant

##### 1.2.2. Uses advised against

No additional information available

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

##### Supplier

Dehon Service SAS  
 26 Avenue du Petit Parc  
 94683 VINCENNES Cedex  
 France  
 T 01 43 98 75 00 - F 01 43 98 21 51  
[ContactFDS@climalife.dehon.com](mailto:ContactFDS@climalife.dehon.com)

##### Other

Climalife Kft Budepesta sucursală Bucuresti Romania  
 Bulevardul Hristo Botev, Nr. 28, Biroul NR 4, Modulul I  
 Bucuresti Sectorul 3  
 Romania  
[ContactFDS@climalife.dehon.com](mailto:ContactFDS@climalife.dehon.com)

##### Other

Dehon Kälte-Fachvertriebs GmbH  
 Robert-Bosch-Strasse 14  
 40668 MEERBUSCH  
 Germany  
 T 00 49 2150 7073 0 - F 00 49 2150 7073 17  
[ContactFDS@climalife.dehon.com](mailto:ContactFDS@climalife.dehon.com)

##### Other

Dehon Service Belgium s.a/n.v.  
 Avenue Carton de Wiart, 79  
 1090 Bruxelles  
 Belgium  
 T 00 32 2 421 01 70 - F 00 32 2 426 96 62  
[ContactFDS@climalife.dehon.com](mailto:ContactFDS@climalife.dehon.com)

##### Other

Friogas sa  
 Poligono Industrial SEPES Parcela 10  
 46500 SAGUNTO (Valencia)  
 Spain  
 T 00 34 9 6 266 36 32 - F 00 34 9 6 266 50 25  
[ContactFDS@climalife.dehon.com](mailto:ContactFDS@climalife.dehon.com)

##### Other

Prochimac SA  
 ZI Petits Champs 15  
 CH-1400 Yverdon-les-Bains  
 Switzerland  
 T 00 41 32 727 36 00 - F 00 41 32 727 36 19  
[ContactFDS@climalife.dehon.com](mailto:ContactFDS@climalife.dehon.com)

##### Other

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 Villányi út 47  
 1118 Budaörs  
 Hungary  
 T (36) 23 431 660 - F (36) 23 431 661  
[ContactFDS@climalife.dehon.com](mailto:ContactFDS@climalife.dehon.com)

##### Other

Climalife Supplied by Inventec Performance Chemicals Italia SRL  
 Via del Lavoro, 10/G  
 20874 Busnago MB  
 Italia  
 T +39 39-5973480 - F +39 39-5973490  
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##### Other

Dehon nordic service  
 Östra Hamngatan 50B 3tr  
 41109 GÖTEBORG  
 Sweden  
 T 00 46 735 01 90 50  
[ContactFDS@climalife.dehon.com](mailto:ContactFDS@climalife.dehon.com)

##### Other

Dehon Service Nerderland B.V.  
 Van Konijnenburgweg 84  
 NL-4612 PL Bergen Op Zoom  
 Netherlands  
 T 00 31 164 212 830 - F 00 31 164 212 831  
[ContactFDS@climalife.dehon.com](mailto:ContactFDS@climalife.dehon.com)

##### Other

IDS Refrigeration Limited  
 22 Apex Court, Woodlands, Bradley Stoke  
 BS32 4JT Bristol  
 United Kingdom  
 T 00 44 1179 802520 - F 00 44 1179 802521  
[ContactFDS@climalife.dehon.com](mailto:ContactFDS@climalife.dehon.com)

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### 1.4. Emergency telephone number

Emergency number : +33 (0) 1 72 11 00 03

Country	Organisation/Company	Address	Emergency number	Comment
United Kingdom	National Poisons Information Service (Birmingham Centre) City Hospital	Dudley Road B18 7QH	0344 892 0111	Only for healthcare professionals

## SECTION 2: Hazards identification

### 2.1. Classification of the substance or mixture

#### Classification according to Regulation (EC) No. 1272/2008 [CLP]

Press. Gas (Liq.) H280

Full text of hazard classes, H- and EUH-statements: see section 16

#### Adverse physicochemical, human health and environmental effects

Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing. Contact with the liquid may cause frostbite and serious damage to eyes.

### 2.2. Label elements

#### Labelling according to Regulation (EC) No. 1272/2008 [CLP]

Hazard pictograms (CLP) :



GHS04

Signal word (CLP) :

Warning

Hazard statements (CLP) :

H280 - Contains gas under pressure; may explode if heated.

Precautionary statements (CLP) :

P410+P403 - Protect from sunlight. Store in a well-ventilated place.

Extra phrases :

Greenhouse fluorinated gas falling within Kyoto Protocol (GWP=2140).

### 2.3. Other hazards

Contains no PBT/vPvB substances  $\geq 0.1\%$  assessed in accordance with REACH Annex XIII

Component	
Pentafluoroethane (354-33-6)	This substance/mixture does not meet the PBT criteria of REACH regulation, annex XIII This substance/mixture does not meet the vPvB criteria of REACH regulation, annex XIII
2,3,3,3-Tetrafluoroprop-1-ene (754-12-1)	This substance/mixture does not meet the PBT criteria of REACH regulation, annex XIII This substance/mixture does not meet the vPvB criteria of REACH regulation, annex XIII

The mixture does not contain substance(s) included in the list established in accordance with Article 59(1) of REACH for having endocrine disrupting properties, or is not identified as having endocrine disrupting properties in accordance with the criteria set out in Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at a concentration equal to or greater than 0,1 %

## SECTION 3: Composition/information on ingredients

### 3.1. Substances

Not applicable

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### 3.2. Mixtures

Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
Pentafluoroethane	CAS-No.: 354-33-6 EC-No.: 206-557-8 REACH-no: 01-2119485636-25	59	Press. Gas (Liq.), H280
2,3,3,3-Tetrafluoroprop-1-ene	CAS-No.: 754-12-1 EC-No.: 468-710-7 REACH-no: 01-0000019665-61	30	Flam. Gas 1B, H221 Press. Gas (Liq.), H280
Difluoromethane	CAS-No.: 75-10-5 EC-No.: 200-839-4 REACH-no: 01-2119471312-47	11	Flam. Gas 1B, H221 Press. Gas (Liq.), H280

Full text of H- and EUH-statements: see section 16

## SECTION 4: First aid measures

### 4.1. Description of first aid measures

First-aid measures after inhalation	: Move the affected person away from the contaminated area and into the fresh air. If you feel unwell, seek medical advice.
First-aid measures after skin contact	: In the event of contact with the liquid: treat resulting frostbite as a burn. Immediately remove contaminated clothing or footwear. Immediately rinse with plenty of water. If skin burns appear, call a doctor immediately.
First-aid measures after eye contact	: Rinse immediately and thoroughly, pulling the eyelids well away from the eye (15 minutes minimum). Consult an eye specialist immediately.
First-aid measures after ingestion	: Not specifically applicable (gas).

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

Symptoms/effects	: CNS depression. Narcosis. Cardiac disorders. Lack of oxygen: risk of death.
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### 4.3. Indication of any immediate medical attention and special treatment needed

No additional information available

## SECTION 5: Firefighting measures

### 5.1. Extinguishing media

Suitable extinguishing media	: All extinguishing agents can be used.
Unsuitable extinguishing media	: None to our knowledge. If there is a fire close by, use suitable extinguishing agents.

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

Explosion hazard	: pressure rise and possible bursting of container. On heating : Toxic and corrosive vapours are released.
Hazardous decomposition products in case of fire	: Thermal decomposition generates : Carbon oxides (CO, CO <sub>2</sub> ), Hydrogen halogenides, Carbonyl halogenides, fluorinated compounds.

### 5.3. Advice for firefighters

Firefighting instructions	: Use water spray or fog for cooling exposed containers.
Protection during firefighting	: Self-contained breathing apparatus. Complete protective clothing.

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### SECTION 6: Accidental release measures

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

General measures : Avoid contact with skin and eyes. Remove all sources of ignition. Do not smoke. Evacuate the danger area. Do not breathe smoke. Stop the leak.

##### 6.1.1. For non-emergency personnel

No additional information available

##### 6.1.2. For emergency responders

No additional information available

#### 6.2. Environmental precautions

No additional information available

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

Other information : Mechanically ventilate the spillage area.

#### 6.4. Reference to other sections

For further information refer to section 8: "Exposure controls/personal protection".

### SECTION 7: Handling and storage

#### 7.1. Precautions for safe handling

Precautions for safe handling : Avoid breathing mist, vapours. Do not get in eyes, on skin, or on clothing. Ventilation. Vapours are heavier than air and may spread along floors. Under certain temperature and pressure conditions may form a flammable mixture in the presence of air. Do not use joint paste that may contain peroxides.

Hygiene measures : Do not drink, eat or smoke in the workplace.

#### 7.2. Conditions for safe storage, including any incompatibilities

Storage conditions : Store : in a cool, well-ventilated area, away from any source of heat, away from any source of ignition.

Incompatible materials : Strong oxidizing agents. Alkaline hydroxide. Alkaline earth metals. Finely divided metals (Al, Mg, Zn).

Packaging materials : Recommended materials Stainless steel, Carbon steel. Do not use : Alloys containing more than 2% magnesium, Plastic materials.

#### 7.3. Specific end use(s)

No additional information available

### SECTION 8: Exposure controls/personal protection

#### 8.1. Control parameters

##### 8.1.1 National occupational exposure and biological limit values

Pentafluoroethane (354-33-6)	
EU - Indicative Occupational Exposure Limit (IOEL)	
IOEL TWA	4900 mg/m <sup>3</sup> (recommended)
IOEL TWA [ppm]	1000 ppm (recommended)
2,3,3,3-Tetrafluoroprop-1-ene (754-12-1)	
EU - Indicative Occupational Exposure Limit (IOEL)	
IOEL TWA [ppm]	500 ppm (recommended)

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Difluoromethane (75-10-5)	
<b>EU - Indicative Occupational Exposure Limit (IOEL)</b>	
IOEL TWA	2200 (recommended)
IOEL TWA [ppm]	1000 ppm (recommended)

### 8.1.2. Recommended monitoring procedures

No additional information available

### 8.1.3. Air contaminants formed

No additional information available

### 8.1.4. DNEL and PNEC

Pentafluoroethane (354-33-6)	
<b>DNEL/DMEL (Workers)</b>	
Long-term - systemic effects, inhalation	16444 mg/m <sup>3</sup>
<b>DNEL/DMEL (General population)</b>	
Long-term - systemic effects, inhalation	1753 mg/m <sup>3</sup>
<b>PNEC (Water)</b>	
PNEC aqua (freshwater)	0.1 mg/l
PNEC aqua (intermittent, freshwater)	1 mg/l
<b>PNEC (Sediment)</b>	
PNEC sediment (freshwater)	0.6 mg/kg dwt
<b>2,3,3,3-Tetrafluoroprop-1-ene (754-12-1)</b>	
<b>DNEL/DMEL (Workers)</b>	
Long-term - systemic effects, inhalation	23000 mg/m <sup>3</sup>
<b>PNEC (Water)</b>	
PNEC aqua (freshwater)	> 0.1 mg/l
PNEC aqua (marine water)	> 0.01 mg/l
<b>PNEC (Sediment)</b>	
PNEC sediment (marine water)	> 0.178 mg/kg dwt
<b>PNEC (Soil)</b>	
PNEC soil	> 1.54 mg/kg dwt
<b>Difluoromethane (75-10-5)</b>	
<b>DNEL/DMEL (Workers)</b>	
Long-term - systemic effects, inhalation	7035 mg/m <sup>3</sup>
<b>DNEL/DMEL (General population)</b>	
Long-term - systemic effects, inhalation	750 mg/m <sup>3</sup>
<b>PNEC (Water)</b>	
PNEC aqua (freshwater)	0.142 mg/l
<b>PNEC (Sediment)</b>	
PNEC sediment (freshwater)	0.534 mg/kg dwt

### 8.1.5. Control banding

No additional information available

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### 8.2. Exposure controls

#### 8.2.1. Appropriate engineering controls

No additional information available

#### 8.2.2. Personal protection equipment

##### 8.2.2.1. Eye and face protection

###### Eye protection:

Safety glasses with side shields

##### 8.2.2.2. Skin protection

###### Skin and body protection:

Majority cotton protective clothing

###### Hand protection:

Leather protective gloves. Nitrile-rubber protective gloves. VITON gloves

##### 8.2.2.3. Respiratory protection

###### Respiratory protection:

In the event of insufficient ventilation: Gas mask with filter type AX. In a confined area : Self-contained breathing apparatus

##### 8.2.2.4. Thermal hazards

No additional information available

#### 8.2.3. Environmental exposure controls

No additional information available

## SECTION 9: Physical and chemical properties

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

Physical state	: Gas
Colour	: Colourless.
Appearance	: Press. Gas (Liq.).
Odour	: slightly ethereal.
Odour threshold	: Not available
Melting point	: Not applicable
Freezing point	: Not applicable
Boiling point	: -46.93 °C
Flammability	: Non flammable.
Explosive properties	: Not explosive material according to EC criteria.
Oxidising properties	: Non oxidizing material according to EC criteria.
Explosive limits	: Not available
Lower explosion limit	: Not available
Upper explosion limit	: Not available
Flash point	: None
Auto-ignition temperature	: Not available
Decomposition temperature	: Not available
pH	: Not applicable
Viscosity, kinematic	: Not applicable
Solubility	: Insoluble in water.
Partition coefficient n-octanol/water (Log Kow)	: Not available
Vapour pressure	: 1.07 mPa (21.1°C)
Vapour pressure at 50°C	: Not available
Critical pressure	: 40.67 bar
Density	: Not applicable
Relative density	: Not applicable
Relative vapour density at 20°C	: Not available
Particle characteristics	: Not applicable

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### 9.2. Other information

#### 9.2.1. Information with regard to physical hazard classes

No additional information available

#### 9.2.2. Other safety characteristics

No additional information available

## SECTION 10: Stability and reactivity

### 10.1. Reactivity

Decomposes on exposure to temperature rise.

### 10.2. Chemical stability

Stable at ambient temperature and under normal conditions of use.

### 10.3. Possibility of hazardous reactions

No information available. No polymerization.

### 10.4. Conditions to avoid

Under certain temperature and pressure conditions may form a flammable mixture in the presence of air. Avoid high temperatures. Avoid naked flame.

### 10.5. Incompatible materials

Do not use joint paste that may contain peroxides. Alkalis and caustic products. alkali metals. Alkaline earth metals. Finely divided metals (Al, Mg, Zn). Strong oxidizing agents.

### 10.6. Hazardous decomposition products

On thermal decomposition (pyrolysis), releases : Hydrogen fluoride, Carbon oxides (CO, CO<sub>2</sub>), Fluorinated hydrocarbons, Carbonyl halogenides.

## SECTION 11: Toxicological information

### 11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008

Acute toxicity (oral) : Not classified

Acute toxicity (dermal) : Not classified

Acute toxicity (inhalation) : Not classified

#### Pentafluoroethane (354-33-6)

LC50 Inhalation - Rat [ppm]	800000 ppm/4h
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#### 2,3,3,3-Tetrafluoroprop-1-ene (754-12-1)

LC50 Inhalation - Rat [ppm]	> 400000 ppm/4h
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#### Difluoromethane (75-10-5)

LC50 Inhalation - Rat [ppm]	> 520000 ppm/4h
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Skin corrosion/irritation : Not classified  
pH: Not applicable

Additional information : Contact with the liquid causes frostbite

#### Pentafluoroethane (354-33-6)

pH	Not applicable
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Serious eye damage/irritation : Not classified  
pH: Not applicable

Additional information : Contact with the liquefied gas may cause severe ocular lesions

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Pentafluoroethane (354-33-6)	
pH	Not applicable
Respiratory or skin sensitisation	: Not classified
Germ cell mutagenicity	: Not classified
Carcinogenicity	: Not classified
Reproductive toxicity	: Not classified
STOT-single exposure	: Not classified
STOT-repeated exposure	: Not classified

Difluoromethane (75-10-5)	
NOAEC (inhalation, rat, gas, 90 days)	50000 ppmv/6h/day
Aspiration hazard	: Not classified

### 11.2. Information on other hazards

No additional information available

## SECTION 12: Ecological information

### 12.1. Toxicity

Hazardous to the aquatic environment, short-term (acute)	: Not classified
Hazardous to the aquatic environment, long-term (chronic)	: Not classified

Pentafluoroethane (354-33-6)	
LC50 - Fish [1]	> 100 mg/l 96 Hours (Oncorhynchus mykiss)
EC50 - Crustacea [1]	> 100 mg/l 48 Hours (Daphnia magna)
EC50 72h - Algae [1]	> 114 mg/l 72 Hours (Pseudokirchneriella subcapitata)

2,3,3,3-Tetrafluoroprop-1-ene (754-12-1)	
LC50 - Fish [1]	> 197 mg/l Cyprinus carpio (Common carp)
EC50 - Crustacea [1]	> 83 mg/l (Daphnia magna)
EC50 72h - Algae [1]	> 100 mg/l (scenedesmus capricornutum)

### 12.2. Persistence and degradability

Pentafluoroethane (354-33-6)	
Persistence and degradability	5 % biodegradation after 28 days.

2,3,3,3-Tetrafluoroprop-1-ene (754-12-1)	
Persistence and degradability	Not readily biodegradable.

### 12.3. Bioaccumulative potential

Pentafluoroethane (354-33-6)	
Partition coefficient n-octanol/water (Log Pow)	1.48

2,3,3,3-Tetrafluoroprop-1-ene (754-12-1)	
Partition coefficient n-octanol/water (Log Pow)	2.15

Difluoromethane (75-10-5)	
Partition coefficient n-octanol/water (Log Pow)	0.21

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### 12.4. Mobility in soil

#### Pentafluoroethane (354-33-6)

Organic Carbon Normalized Adsorption Coefficient (Log K <sub>oc</sub> )	1.3 – 1.7
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### 12.5. Results of PBT and vPvB assessment

#### Component

Pentafluoroethane (354-33-6)	This substance/mixture does not meet the PBT criteria of REACH regulation, annex XIII This substance/mixture does not meet the vPvB criteria of REACH regulation, annex XIII
2,3,3,3-Tetrafluoroprop-1-ene (754-12-1)	This substance/mixture does not meet the PBT criteria of REACH regulation, annex XIII This substance/mixture does not meet the vPvB criteria of REACH regulation, annex XIII

### 12.6. Endocrine disrupting properties

No additional information available

### 12.7. Other adverse effects

Other adverse effects	: Ozone depletion factor.
Additional information	: Global warming potential (GWP) GWP = 2140

## SECTION 13: Disposal considerations

### 13.1. Waste treatment methods

Product/Packaging disposal recommendations	: Methods of disposal of packaging. Reuse or recycle following decontamination. Destroy at an authorised site.
Additional information	: The user's attention is drawn to the possible existence of specific european, national or local regulations regarding disposal.

## SECTION 14: Transport information




In accordance with ADR / IMDG / IATA

ADR	IMDG	IATA
<b>14.1. UN number or ID number</b>		
UN 1078	UN 1078	UN 1078
<b>14.2. UN proper shipping name</b>		
REFRIGERANT GAS, N.O.S. (Pentafluoroethane ; 2,3,3,3-Tetrafluoroprop-1-ene ; Difluoromethane)	REFRIGERANT GAS, N.O.S. (Pentafluoroethane ; 2,3,3,3-Tetrafluoroprop-1-ene ; Difluoromethane)	Refrigerant gas, n.o.s. (Pentafluoroethane ; 2,3,3,3-Tetrafluoroprop-1-ene ; Difluoromethane)
<b>Transport document description</b>		
UN 1078 REFRIGERANT GAS, N.O.S. (Pentafluoroethane ; 2,3,3,3-Tetrafluoroprop-1-ene ; Difluoromethane), 2.2, (C/E)	UN 1078 REFRIGERANT GAS, N.O.S. (Pentafluoroethane ; 2,3,3,3-Tetrafluoroprop-1-ene ; Difluoromethane), 2.2	UN 1078 Refrigerant gas, n.o.s. (Pentafluoroethane ; 2,3,3,3-Tetrafluoroprop-1-ene ; Difluoromethane), 2.2
<b>14.3. Transport hazard class(es)</b>		
2.2	2.2	2.2

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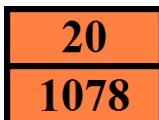
according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2020/878

ADR	IMDG	IATA
		
<b>14.4. Packing group</b>		
Not applicable	Not applicable	Not applicable
<b>14.5. Environmental hazards</b>		
Dangerous for the environment: No	Dangerous for the environment: No Marine pollutant: No	Dangerous for the environment: No
No supplementary information available		

### 14.6. Special precautions for user

#### Overland transport

Classification code (ADR)	: 2A
Special provisions (ADR)	: 274, 582, 662
Limited quantities (ADR)	: 120ml
Tank code (ADR)	: PxBN(M)
Transport category (ADR)	: 3
Hazard identification number (Kemler No.)	: 20
Orange plates	:



Tunnel restriction code (ADR)	: C/E
EAC code	: 2TE

#### Transport by sea

Special provisions (IMDG)	: 274
Limited quantities (IMDG)	: 120 ml
EmS-No. (Fire)	: F-C
EmS-No. (Spillage)	: S-V

#### Air transport

PCA Limited quantities (IATA)	: Forbidden
PCA limited quantity max net quantity (IATA)	: Forbidden
PCA packing instructions (IATA)	: 200
PCA max net quantity (IATA)	: 75kg
CAO packing instructions (IATA)	: 200
CAO max net quantity (IATA)	: 150kg

### 14.7. Maritime transport in bulk according to IMO instruments

Not applicable

## SECTION 15: Regulatory information

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

#### 15.1.1. EU-Regulations

Other information, restriction and prohibition regulations : \* Regulation (EC) No 517/2014 : Greenhouse fluorinated gas falling within Kyoto Protocol.

#### REACH Annex XVII (Restriction List)

Contains no substance(s) listed on REACH Annex XVII (Restriction Conditions)

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### REACH Annex XIV (Authorisation List)

Contains no substance(s) listed on REACH Annex XIV (Authorisation List)

### REACH Candidate List (SVHC)

Contains no substance(s) listed on the REACH Candidate List

### PIC Regulation (Prior Informed Consent)

Contains no substance(s) listed on the PIC list (Regulation EU 649/2012 concerning the export and import of hazardous chemicals)

### POP Regulation (Persistent Organic Pollutants)

Contains no substance(s) listed on the POP list (Regulation EU 2019/1021 on persistent organic pollutants)

### Ozone Regulation (1005/2009)

Contains no substance(s) listed on the Ozone Depletion list (Regulation EU 1005/2009 on substances that deplete the ozone layer)

### Explosives Precursors Regulation (2019/1148)

Contains no substance(s) listed on the Explosives Precursors list (Regulation EU 2019/1148 on the marketing and use of explosives precursors)

### Drug Precursors Regulation (273/2004)

Contains no substance(s) listed on the Drug Precursors list (Regulation EC 273/2004 on the manufacture and the placing on market of certain substances used in the illicit manufacture of narcotic drugs and psychotropic substances)

### 15.1.2. National regulations

Ensure all national/local regulations are observed.

## 15.2. Chemical safety assessment

No additional information available

## SECTION 16: Other information

### Indication of changes:

All chapters have been modified since the previous version.

Other information : For more information regarding the use of this product, please refer to our technical information or contact the sales department in your region.

Full text of H- and EUH-statements:	
Flam. Gas 1B	Flammable gases, Category 1B
H221	Flammable gas.
H280	Contains gas under pressure; may explode if heated.
Press. Gas (Liq.)	Gases under pressure : Liquefied gas

Safety Data Sheet (SDS), EU

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.