

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

1.1. Product identifier

Product form	: Substance
Name	: R-227ea
Chemical name	: 1,1,1,2,3,3,3-heptafluoropropane
EC-No.	: 207-079-2
CAS-No.	: 431-89-0
REACH registration No.	: 01-2119485489-18
Product code	: 100022700
Synonyms	: HFC 227ea / NOVASPRAY HFC 227ea / NOVEXPANS HFC 227ea

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	: Extinguishing/inerting agent Aerosol applications Blowing agent
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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

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

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

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

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

Other

Climalife Hongrie Kft
 Villányi út 47
 1118 Budaörs
 Hungary
 T (36) 23 431 660 - F (36) 23 431 661
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
ContactFDS@climalife.dehon.com

Other

Dehon nordic service
 Östra Hamngatan 50B 3tr
 41109 GÖTEBORG
 Sweden
 T 00 46 735 01 90 50
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

Other

Galco s.a/n.v.
 Avenue Carton de Wiart, 79
 1090 BRUSSELS
 Belgium
 T 00 32 2 421 01 84 - F 00 32 2 421 01 84 / 00 32 2 425 38 12
ContactFDS@climalife.dehon.com

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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

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

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

No additional information available

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) :

P403 - Store in a well-ventilated place.

Extra phrases :

Greenhouse fluorinated gas falling within Kyoto Protocol (GWP=3220).

2.3. Other hazards

Other hazards which do not result in classification : May cause suffocation by reducing oxygen available for breathing. Contact with the liquid the may cause cold burns/frostbite.

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

Component	
1,1,1,2,3,3,3-heptafluoropropane (431-89-0)	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

SECTION 3: Composition/information on ingredients

3.1. Substances

Name : R-227ea
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Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
1,1,1,2,3,3,3-heptafluoropropane	CAS-No.: 431-89-0 EC-No.: 207-079-2 REACH-no: 01-2119485489-18	> 99	Press. Gas (Liq.), H280

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

3.2. Mixtures

Not applicable

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.

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 : Water spray. Foam. Carbon dioxide. Chemical powder.

5.2. Special hazards arising from the substance or mixture

- Explosion hazard : Heating will cause a rise in pressure with a risk of bursting. Thermal decomposition can lead to the release of irritating gases and vapours : . Hydrogen fluoride. Carbon oxides (CO, CO2).

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.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

- General measures : Avoid contact with skin and eyes. Evacuate the danger area. Do not breathe smoke. Stop the leak. In closed premises : Ventilate or wear self-contained breathing apparatus (risk of asphyxia). Remove all sources of ignition. Do not smoke.

6.1.1. For non-emergency personnel

No additional information available

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6.1.2. For emergency responders

No additional information available

6.2. Environmental precautions

Avoid release to the environment.

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 : Ventilation. Remove all sources of ignition. Use personal protective equipment as required.
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 dry, well ventilated place away from sources of heat, ignition and direct sunlight.
Store in original container.
Incompatible materials : alkali metals. Alkaline earth metals. Strong oxidizing agents.
Storage temperature : < 52 °C
Packaging materials : Recommended materials Carbon steel, Aluminium.

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

1,1,1,2,3,3,3-heptafluoropropane (431-89-0)	
EU - Indicative Occupational Exposure Limit (IOEL)	
	No specific limit

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

1,1,1,2,3,3,3-heptafluoropropane (431-89-0)	
DNEL/DMEL (Workers)	
Long-term - systemic effects, inhalation	61279 mg/m ³
DNEL/DMEL (General population)	
Long-term - systemic effects, inhalation	6533 mg/m ³
PNEC (Water)	
PNEC aqua (freshwater)	0.1 mg/l

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1,1,1,2,3,3,3-heptafluoropropane (431-89-0)	
PNEC aqua (intermittent, freshwater)	1 mg/l
PNEC (Sediment)	
PNEC sediment (freshwater)	1.3 mg/kg dwt
PNEC (STP)	
PNEC sewage treatment plant	1.73 mg/l

8.1.5. Control banding

No additional information available

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.).
Molecular mass	: 170.03 g/mol
Odour	: Not available
Odour threshold	: Not available
Melting point	: -126.8 °C
Freezing point	: Not applicable
Boiling point	: -16.5 °C
Flammability	: Non flammable.
Explosive properties	: Not explosive material according to EC criteria.
Oxidising properties	: Non oxidizing material according to EC criteria.
Lower explosion limit	: Not available
Upper explosion limit	: Not available
Flash point	: None
Auto-ignition temperature	: > 650 °C
Decomposition temperature	: Not available
pH	: Not applicable

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Viscosity, kinematic	: Not applicable
Solubility	: Water: 0.06 %
Partition coefficient n-octanol/water (Log Kow)	: Not available
Vapour pressure	: 3 bar (20°C)
Vapour pressure at 50°C	: 8.6 bar (50°C)
Critical pressure	: 29.25
Density	: 1.41 g/cm ³ (20°C)
Relative density	: Not applicable
Relative vapour density at 20°C	: Not available
Particle characteristics	: Not applicable

9.2. Other information

9.2.1. Information with regard to physical hazard classes

Critical temperature : 101.8 °C

9.2.2. Other safety characteristics

No additional information available

SECTION 10: Stability and reactivity

10.1. Reactivity

Contains gas under pressure; may explode if heated.

10.2. Chemical stability

Stable at ambient temperature and under normal conditions of use.

10.3. Possibility of hazardous reactions

No dangerous polymerization.

10.4. Conditions to avoid

Ignition sources. Heat or source of heat. Avoid contact with hot surfaces.

10.5. Incompatible materials

Strong oxidizing agents. alkali metals. Alkaline earth metals.

10.6. Hazardous decomposition products

On thermal decomposition (pyrolysis), releases : Carbon oxides (CO, CO₂), Hydrogen fluoride.

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
Additional information	: Asphyxiating

1,1,1,2,3,3,3-heptafluoropropane (431-89-0)

LC50 Inhalation - Rat [ppm]	> 788696 ppm/4h
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Skin corrosion/irritation	: Not classified pH: Not applicable
Additional information	: Contact with the liquid the may cause cold burns/frostbite
Serious eye damage/irritation	: Not classified pH: Not applicable
Additional information	: Contact with the liquefied gas may cause severe ocular lesions
Respiratory or skin sensitisation	: Not classified
Germ cell mutagenicity	: Not classified

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Carcinogenicity	: Not classified
Reproductive toxicity	: Not classified
STOT-single exposure	: Not classified
STOT-repeated exposure	: Not classified
Aspiration hazard	: Not classified

11.2. Information on other hazards

11.2.1. Endocrine disrupting properties

Adverse health effects caused by endocrine disrupting properties : The substance is not 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

11.2.2. Other information

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

1,1,1,2,3,3,3-heptafluoropropane (431-89-0)

LC50 - Fish [1]	> 100 mg/l (brachydanio rerio)
LC50 - Fish [2]	> 81.8
EC50 - Crustacea [1]	> 200 mg/l (Daphnia magna)
EC50 72h - Algae [1]	> 114 mg/l (Pseudokirchnerella subcapitata)
NOEC chronic fish	10 mg/l

12.2. Persistence and degradability

1,1,1,2,3,3,3-heptafluoropropane (431-89-0)

Persistence and degradability	Not readily biodegradable. 1 % biodegradation after 28 days. Half-life in air : 25 y.
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12.3. Bioaccumulative potential

1,1,1,2,3,3,3-heptafluoropropane (431-89-0)

Partition coefficient n-octanol/water (Log Pow)	2.11
Partition coefficient n-octanol/water (Log Kow)	0.83

12.4. Mobility in soil

No additional information available

12.5. Results of PBT and vPvB assessment

Component

1,1,1,2,3,3,3-heptafluoropropane (431-89-0)	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
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12.6. Endocrine disrupting properties

Adverse effects on the environment caused by endocrine disrupting properties : The substance is not 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.

12.7. Other adverse effects

Other adverse effects : ODP (R-11=1)=0.
Additional information : GWP (CO2=1/100 years) = 3220




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
14.1. UN number or ID number		
UN 3296	UN 3296	UN 3296
14.2. UN proper shipping name		
HEPTAFLUOROPROPANE (REFRIGERANT GAS R 227)	HEPTAFLUOROPROPANE (REFRIGERANT GAS R 227)	Heptafluoropropane
Transport document description		
UN 3296 HEPTAFLUOROPROPANE (REFRIGERANT GAS R 227), 2.2, (C/E)	UN 3296 HEPTAFLUOROPROPANE (REFRIGERANT GAS R 227), 2.2	UN 3296 Heptafluoropropane, 2.2
14.3. Transport hazard class(es)		
2.2	2.2	2.2
		
14.4. Packing group		
Not applicable	Not applicable	Not applicable
14.5. Environmental hazards		
Dangerous for the environment: No	Dangerous for the environment: No Marine pollutant: No	Dangerous for the environment: No
No supplementary information available		

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14.6. Special precautions for user

Overland transport

Classification code (ADR)	: 2A
Special provisions (ADR)	: 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	: 2T

Transport by sea

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)

Not listed on REACH Annex XVII

REACH Annex XIV (Authorisation List)

Not listed on REACH Annex XIV (Authorisation List)

REACH Candidate List (SVHC)

Not listed on the REACH Candidate List

PIC Regulation (Prior Informed Consent)

Not listed on the PIC list (Regulation EU 649/2012)

POP Regulation (Persistent Organic Pollutants)

Not listed on the POP list (Regulation EU 2019/1021)

Ozone Regulation (1005/2009)

Not listed on the Ozone Depletion list (Regulation EU 1005/2009)

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)

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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

Not applicable.

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:

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.