

! SECTION 1: Identification of the substance/mixture and of the company/undertaking**1.1. Product identifier**

Name of product	HFC 227 Art-Nr(n): 0007, 0027
Name of substance	1,1,1,2,3,3,3-Heptafluoropropane
EC No	207-079-2
REACH registration number	01-2119485489-18
CAS No	431-89-0

1.2. Relevant identified uses of the substance or mixture and uses advised against**Identified uses****Remark**

Restricted to professional users.

Recommended intended purpose(s)

Refrigerant.

Fire extinguishing agent.

1.3. Details of the supplier of the safety data sheet**Manufacturer/distributor**

S. Zukausko str. 11, Ramuciai, Kaunas district,
LT - 54464, Lithuania
Phone + 370 37 373248
Fax. + 370 37 373198
E-mail: info@brgroup.eu
www.brgroup.eu

1.4. Emergency telephone number**Emergency advice**

The Poison Information Bureau
Siltnamiy str. 29, LT-2043 Vilnius
Phone +370 5 2362052;
Fax. +370 5 236 21 42,
E-mail.: info@tox.lt

SECTION 2: Hazards identification**2.1. Classification of the substance or mixture****Classification according to Regulation (EC) No 1272/2008 [CLP/GHS]**

Hazard classes and Hazard categories	Hazard Statements	Classification procedure
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Liquef. Gas	H280	On basis of test data.
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Hazard statements for physical hazards

H280	Contains gas under pressure; may explode if heated.
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2.2. Label elements

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



GHS04

Signal word

Warning

Hazard statements for physical hazards

H280 Contains gas under pressure; may explode if heated.

Precautionary Statements

Storage

P403 Store in a well-ventilated place.

Hazardous ingredients for labeling

1,1,1,2,3,3,3-Heptafluoropropane

Supplemental Hazard information (EU)

Health properties

Asphyxiant in high concentrations.

! Environmental properties

Contains fluorinated greenhouse gases.

2.3. Other hazards

Adverse human health effects and symptoms

Contact with liquid may cause cold burns/frostbite.

The inhalation of gas / vapour in high concentrations may cause cardiac arrhythmia.

Misuse or intentional inhalation abuse may cause death without warning symptoms, due to cardiac effects.

Information pertaining to special dangers for human and environment

Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.

Receptacle under pressure.

Results of PBT and vPvB assessment

This substance does not meet the PBT/vPvB criteria of REACH, annex XIII.

SECTION 3: Composition/ information on ingredients

3.1. Substances

Description

Content: > 99 %

CAS No 431-89-0

1,1,1,2,3,3,3-Heptafluoropropane

EC No 207-079-2

REACH registration number 01-2119485489-18

3.2. Mixtures

not applicable

! SECTION 4: First aid measures**4.1. Description of first aid measures****! General information**

Remove contaminated soaked clothing immediately.

If threatening unconsciousness, position and transport in recovery position

Adhere to personal protective measures when giving first aid.

Seek medical advice immediately.

In case of inhalation

Remove the casualty into fresh air and keep him immobile.

Seek medical treatment immediately.

In case of respiratory standstill give artificial respiration by respiratory bag (Ambu bag) or respirator. Send for a doctor.

! In case of skin contact

In case of contact with skin wash off with warm water.

In case of frostbite rinse with plenty of water. Don't remove clothing.

In case of frostbite spray with lukewarm (not hot) water for at least 15 minutes. Do not remove clothing frozen to the skin. Thaw it with lukewarm water. Apply a sterile dressing. Obtain medical assistance.

In case of eye contact

Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

Call for a doctor immediately.

In case of ingestion

Ingestion is not considered a potential route of exposure.

4.2. Most important symptoms and effects, both acute and delayed**Physician's information / possible symptoms**

The following symptoms may occur in case of strong exposition:

Unconsciousness

Cardiac arrhythmia (disordered cardiac rhythm).

Anaesthetic state

Headache

Nausea

Confusion

Dizziness

Contact with liquid may cause cold burns/frostbite.

Physician's information / possible dangers

Long-term inhaling of separation products may cause pulmonary oedema.

In case of strong exposition risk of cardiac rhythm disturbances.

4.3. Indication of any immediate medical attention and special treatment needed**Treatment (Advice to doctor)**

Treat symptoms.

Do not give any preparations of the adrenalin-ephedrine group.

SECTION 5: Firefighting measures**5.1. Extinguishing media****Suitable extinguishing media**

Product does not burn, fire-extinguishing activities according to surrounding.

Alcohol-resistant foam

Dry fire-extinguishing substance

Carbon dioxide

Water spray jet

Unsuitable extinguishing media

Full water jet

5.2. Special hazards arising from the substance or mixture

In case of fire formation of dangerous gases possible.

Carbon monoxide (CO)

Hydrogen fluoride (HF)

Carbonyl fluoride.

5.3. Advice for firefighters

Special protective equipment for fire-fighters

Use breathing apparatus with independent air supply (isolated).

Wear full protective clothing.

Additional information

Cool endangered containers with water spray jet.

Exposure to fire may cause containers to rupture / explode.

Fire residues and contaminated firefighting water must be disposed of in accordance with the local regulations.

! SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

For non-emergency personnel

Evacuate area.

Keep people away and stay on the upwind side.

! For emergency responders

Remove persons to safety.

Personal protection by wearing close-fitting protective clothing and breathing apparatus.

Pay attention to extension of gas especially at ground (heavier than air) and in direction of the wind.

6.2. Environmental precautions

If possible, stop flow of product.

Do not discharge into the drains/surface waters/groundwater.

Prevent spread over a wide area (e.g. by containment or oil barriers).

If necessary, secure leaky pressure receptacles in a salvage packaging.

Do not discharge into the subsoil/soil.

6.3. Methods and material for containment and cleaning up

Ensure adequate air ventilation.

Allow to vaporise.

6.4. Reference to other sections

Safe handling: see section 7

Disposal: see section 13

Personal protection equipment: see section 8

! SECTION 7: Handling and storage

7.1. Precautions for safe handling

! Advice on safe handling

Use only in thoroughly ventilated areas.

Transfer and handle only in enclosed systems.

Containers' temperature may not be increased above 50 °C.

Do not heat with open flames.

The working pressure in the receptacle must not exceed the saturation vapour pressure of the pure product resulting at a temperature of 50 °C.

Provide good room ventilation even at ground level (vapours are heavier than air).
Prevent cylinders from falling over.
Avoid release to the environment.
Ensure valve protection device is correctly fitted.
Ensure valve outlet cap nut or plug (where provided) is correctly fitted.
Open valve slowly to avoid pressure shock.
Do not allow backfeed into the container.
Suck back of water into the container must be prevented.
No water to valves, flanges and other fittings.
Purging of pipes and valves with inert gases - to avoid: water, solvents.

General protective measures

Do not inhale gases.

Hygiene measures

At work do not eat, drink and smoke.

Wash hands before breaks and after work.

! Advice on protection against fire and explosion

The product is not flammable in air under ambient conditions of temperature and pressure. When pressurised with air, oxygen or other oxidants, it may become flammable.

Pay attention to general rules of internal fire prevention.

7.2. Conditions for safe storage, including any incompatibilities**! Requirements for storage rooms and vessels**

Keep in closed original container.

Ventilate store-rooms thoroughly.

Only use containers that are approved specifically for the substance/product.

Suitable materials: Normalised carbon steel, tempered alloy steel, aluminium alloys, austenitic stainless steels.

Valve: Suitable materials: Brass, copper alloys, carbon steels, aluminium alloys, austenitic stainless steels.

Other material details see ISO 11114.

All regulations and local requirements for the storage of containers have to be respected.

! Advice on storage compatibility

Do not store with spontaneously flammable materials.

Do not store together with combustible liquids or combustible solids.

Do not store together with animal feedstuffs.

Do not store together with explosives.

Do not store together with infectious substances.

Do not store together with radioactive material.

Do not store together with toxic liquids or toxic solids.

Do not store together with food.

Do not store together with oxidizing liquids or oxidizing solids.

! Further information on storage conditions

Ensure valve protection device is correctly fitted.

Store closed container at cool and aired place.

Store only in original container at temperature of 50°C maximum (=122°F).

Prevent cylinders from falling over.

Protect of heat.

7.3. Specific end use(s)**! Recommendation(s) for intended use**

Use in accordance with regulation (EU) No 517/2014 on fluorinated greenhouse gases.

! SECTION 8: Exposure controls/personal protection**8.1. Control parameters****DNEL-/PNEC-values****DNEL worker**

CAS No	Substance name	Value	Code	Remark
431-89-0	1,1,1,2,3,3,3-Heptafluoropropane	61279 mg/m3	DNEL long-term inhalative (systemic)	Assessment factor 6, repeated dose toxicity.

DNEL Consumer

CAS No	Substance name	Value	Code	Remark
431-89-0	1,1,1,2,3,3,3-Heptafluoropropane	6533 mg/m3	DNEL long-term inhalative (systemic)	Assessment factor 20, repeated dose toxicity.

PNEC

CAS No	Substance name	Value	Code	Remark
431-89-0	1,1,1,2,3,3,3-Heptafluoropropane	0,1 mg/l	PNEC aquatic, freshwater	Assessment factor 1000, assessment factor.
		1 mg/l	PNEC aquatic, intermittent release	
		1,73 mg/l	PNEC sewage treatment plant (STP)	Assessment factor 100, assessment factor.
		1,3 mg/kg dw	PNEC sediment, freshwater	Extrapolation

8.2. Exposure controls**Respiratory protection**

Breathing apparatus in the event of high concentrations.

Keep self contained breathing apparatus readily available for emergency use.

Do not use any filter apparatus.

Respiratory protection complying with EN 137.

In case of rescue and maintenance activities in storage containers use environment-independent breathing apparatus because of risk of suffocation by edging out of air oxygen

! Hand protection

Leather gloves

Safety gloves according EN 388

Eye protection

Protective goggles according to EN 166, in case of increased risk add protective face shield.

! Other protection measures

Safety shoes with steel toe.

Body covering work clothing, or chemical resistant suit at increased risk.

Appropriate engineering controls

Transfer and handle only in enclosed systems.

! SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance

Gaseous / liquefied under pressure.

Colour

colourless

Odour

ethereal

Odour threshold

not determined

Important health, safety and environmental information

	Value	Temperature	at	Method	Remark
pH value	not applicable				
boiling point	-18 - -16 °C		1013 hPa		
melting point	-129,5 °C				
Flash point	no				
Vapourisation rate	not determined				
Flammable (solid)	not applicable				
Flammability (gas)					The product is not flammable in air under ambient conditions of temperature and pressure. When pressurised with air, oxygen or other oxidants, it may become flammable.
Ignition temperature	532 °C				
Self ignition temperature	no				
Lower explosion limit	no				
Upper explosion limit	no				
Vapour pressure	3910 hPa	20 °C			
Relative density	7,918 kg/m3	0 °C	1013 mbar		
Vapour density	6,124				air = 1

	Value	Temperature	at	Method	Remark
Solubility in water	0,23 g/l	25 °C			
Solubility/other	not determined				
Partition coefficient n-octanol/water (log P O/W)	2,11				
Decomposition temperature	not determined				
Viscosity	not applicable				

Oxidising properties

no

Explosive properties

no

9.2. Other information

Vapours are heavier than air.

SECTION 10: Stability and reactivity**10.1. Reactivity**

See section "Possibility of hazardous reactions".

10.2. Chemical stability

Stable under recommended conditions of use and storage (see section 7).

10.3. Possibility of hazardous reactions

May react violently with oxidants.

When pressurised with air, oxygen or other oxidants, the substance may become flammable.

Reactions with alkali metals.

Reactions with earth alkali metals.

Reactions with metals in powder form.

Reactions with metal salts in powder form.

10.4. Conditions to avoid

May form a flammable mixture with air, oxygen or other oxidants at high pressure.

Heat sources / heat - risk of bursting.

Avoid contact with open flames, glowing metal surfaces, etc..

10.5. Incompatible materials**Substances to avoid**

Alkali metals

Alkaline earth metal

Powdered metals

Metallic salts in powder form.

Oxidants.

10.6. Hazardous decomposition products

Carbon monoxide
 Carbon dioxide
 Fluorophosgene on contact open flame or glowing objects
 Hydrogen fluoride
 Carbonyl fluoride

Thermal decomposition

Remark No decomposition if used as directed.

! SECTION 11: Toxicological information**11.1. Information on toxicological effects****Acute toxicity/Irritation/Sensitization**

	Value/Validation	Species	Method	Remark
LD50 acute oral	not applicable			
LD50 acute dermal	not applicable			
LC50 acute inhalation	> 788696 ppm (4 h)	rat (male / female)	OECD 403	
Skin irritation	Study technically not feasible.			
Eye irritation	Study technically not feasible.			
Skin sensitization	non-sensitizing			
Sensitization respiratory system	non-sensitizing			

Subacute Toxicity - Carcinogenicity

	Value	Species	Method	Validation
Subchronic Toxicity	NOAEC 731690 mg/m ³ (90 d) Inhalation 6 h/d, 5 d/w	Rat (male / female)	OECD 413	No effects of toxicological significance.
Mutagenicity				No mutagenity, after different in-vitro studies.
Reproduction-Toxicity	NOAEL \geq 30000 ppm Inhalation. 6 h/d for 5 d	Rat (male / female)	OECD 415	No reproductive toxicity.
Carcinogenicity				The existing data do not justify a classification as a carcinogen.

! Specific target organ toxicity (single exposure)

Substance or mixture is not classified in GHS-criteria as specific target organ toxic with single exposure.

Specific target organ toxicity (repeated exposure)

Substance or mixture is not classified in GHS-criteria as specific target organ toxic with repeated exposure.

Experiences made from practice

The inhalation of gas / vapour in high concentrations may cause cardiac arrhythmia.

Inhalation causes shortness of breath.

Gases have a suffocating effect.

Inhalation causes narcotic effect/intoxication.

! SECTION 12: Ecological information**12.1. Toxicity****Ecotoxicological effects**

	Value	Species	Method	Validation
Fish	NOEC 150 mg/l (96 h)	zebra fish	OECD 203	Analogous to a similar product.
Daphnia	EC50 > 200 mg/l (48 h)	Daphnia magna	OECD 202	Analogous to a similar product.
Algae	EC50 114 mg/l (72 h)	Pseudokirchneriella subcapitata	OECD 201	Analogous to a similar product.
Bacteria	EC50 >= 173 mg/l (3 h)	activated sludge	OECD 209	Analogous to a similar product.

12.2. Persistence and degradability

	Elimination rate	Method of analysis	Method	Validation
Physico-chemical degradability	At normal temperature very highly volatile or gaseous product that can be released to atmosphere. Elimination test cannot be employed.			
Biological degradability	1 % (28 d)		OECD 301 D	not degradable

12.3. Bioaccumulative potential

No high bioaccumulation potential (estimated).

12.4. Mobility in soil

not determined

Adsorption in the soil is not likely.

12.5. Results of PBT and vPvB assessment

This substance does not meet the PBT/vPvB criteria of REACH, annex XIII.

12.6. Other adverse effects

ODP: 0

GWP: 3220

General regulation

Avoid release to the environment.

! SECTION 13: Disposal considerations**13.1. Waste treatment methods****Waste code No.**

14 06 01*

Name of waste

chlorofluorocarbons, HCFC, HFC

Wastes marked with an asterisk are considered to be hazardous waste pursuant to Directive 2008/98/EC on hazardous waste.

Recommendations for the product

Dispose of as hazardous waste.

Return to manufacturer.

Recommendations for packaging

Transportable pressure equipment (empty, residual pressure): Return to supplier / manufacturer.

! General information

Operators of stationary equipment shall be responsible for putting in place arrangements for the proper recovery.

SECTION 14: Transport information

	ADR/RID	IMDG	IATA-DGR
14.1. UN number	3296	3296	3296
14.2. UN proper shipping name	REFRIGERANT GAS R 227 (1,1,1,2,3,3,3- Heptafluoropropane)	HEPTAFLUOROPROPANE (1,1,1,2,3,3,3- Heptafluoropropane)	Heptafluoropropane (1,1, 1,2,3,3,3- Heptafluoropropane)
14.3. Transport hazard class(es)	2.2	2.2	2.2
14.4. Packing group	-	-	-
14.5. Environmental hazards	No	No	No

14.6. Special precautions for user

The protective measures listed in Sections 6, 7 and 8 of the Safety Data Sheet have to be considered.

14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

not applicable

No transport as bulk according IBC - Code.

Land and inland navigation transport ADR/RID

Hazard label(s) 2.2

tunnel restriction code C/E

Classification code 2A

! SECTION 15: Regulatory information**15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture****! Other regulations (EU)**

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

Regulation (EU) 2015/2068 establishing, pursuant to Regulation (EU) No 517/2014, the format of labels for products and equipment containing fluorinated greenhouse gases.

Regulation (EU) 2015/2067 establishing, pursuant to Regulation (EU) No 517/2014, ~ certification ~ as regards stationary refrigeration, air conditioning and heat pump equipment, and ~ containing fluorinated greenhouse gases.

VOC standard

VOC content <=100 % 20 °C 3910 hPa

152 Chemical Safety Assessment

For this substance a chemical safety assessment is not required according to Article 14 (4) of the REACH-regulation (EC) No 1907/2006 since it neither meets the classification criteria for health and the environment nor represents a PBT- or vPvB-substance

The protective measures listed in Sections 6, 7 and 8 of the Safety Data Sheet have to be considered.

! SECTION 16: Other information

! Recommended uses and restrictions

Use in accordance with regulation (EU) No 517/2014 on fluorinated greenhouse gases.
National and local regulations concerning chemicals shall be observed.

Further information

All declarations of safety-data-sheet refer to pure substance.

The information contained herein is based on the state of our knowledge. It characterizes the product with regard to the appropriate safety precautions. It does not represent a guarantee of the properties of the product.

Indication of changes: "!" = Data changed compared with the previous version. Previous version: 9.2

! Sources of key data used

For the preparation of this safety data sheet, information from our suppliers as well as data from the "database of registered substances" of the European Chemicals Agency (ECHA) were used.