

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

Product form	: Substance
Substance name	: NAF S 227 (HFC-227ea)
Chemical name	: 1,1,1,2,3,3,3-heptafluoropropane: 207-079-2
EC no	: 207-079-2
CAS No	: 431-89-0
REACH registration No	: 01-2119485489-18

**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

**1.2.2. Uses advised against**

No additional information available

**1.3 Details of the supplier of the safety data sheet**

**SAFETY HI-TECH GLOBAL LLC**  
1000 N West Street, Suite 1200  
Wilmington, DE 1980 – USA  
T +1 302 295 48 08 – E [mail@sht-global.com](mailto:mail@sht-global.com)

**1.4 Emergency telephone number**

Emergency number : +1 302 295 48 08

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

Liquefied gas : H280  
Full text of hazard classes and H-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) : P410+P403-Protect from sunlight. Store in a well-ventilated place  
Extra phrases : Greenhouse fluorinated gas falling within Kyoto Protocol (GWP=3220)



### 2.3. Other hazards

Other hazards not contributing to the classification

: May cause suffocation by reducing oxygen available for breathing.  
Contact with the liquid may cause cold burns/frostbite.

## SECTION 3: Composition/Information on Ingredients

### 3.1. Substance

Name : NAF S 227 (HFC-227ea)  
CAS No : 431-89-0  
EC No : 207-079-2

Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008
1,1,1,2,3,3,3-heptafluoropropane	(CAS No) 431-89-0 (EC no) 207-079-2 (REACH-no) 01-2119485489-18	> 99	Liquefied gas, H280

Full text of H-statements: see section 16

### 3.2. Mixture

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/injuries : 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: Fire-fighting 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 vapors including Hydrogen fluoride. Carbon oxides (CO, CO<sub>2</sub>).

### 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

#### 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, Aluminum.

### 7.3. Specific end use(s)



No additional information available

## SECTION 8: Exposure Controls/Personal Protection and Storage

### 8.1. Control parameters

#### NAF S 227 - HFC 227ea (431-89-0)

EU : No specific limit

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

DNEL/DMEL (Workers)	
Long-term - systemic effects, inhalation	36767 - 61279 mg/m3
DNEL/DMEL (General population)	
Long-term - systemic effects, inhalation	6355 mg/m3
PNEC (Water)	
PNEC aqua (freshwater)	0.1 mg/l
PNEC (Sediment)	
PNEC sediment (freshwater)	1.3 mg/kg dwt
PNEC (STP)	
PNEC sewage treatment plant	1.73 mg/l

### 8.2. Exposure controls

Hand protection	: Leather protective gloves. Nitrile-rubber protective gloves. VITON gloves
Eye protection	: Safety glasses with side shields
Skin and body protection	: Majority cotton protective clothing
Respiratory protection	: In the event of insufficient ventilation: Gas mask with filter type AX. In a confined area: Self-Contained breathing apparatus

## SECTION 9: Physical and Chemical Properties

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

Physical state	: Gas
Appearance	: Liquefied gas
Color	: Colorless
Odor	: Citrus
Odor threshold	: No data available
pH	: Not applicable
Relative evaporation rate (butyl acetate=1)	: No data available
Melting point	: No data available
Freezing point	: -131 °C
Boiling point	: -17 °C
Flash point	: None
Auto-ignition temperature	: 532 °C
Decomposition temperature	: No data available
Flammability (solid, gas)	: Not flammable
Vapor pressure	: 3.9 bars (20°C)
Vapor pressure at 50 °C	: 9,6 bars (50°C)
Relative vapor density at 20 °C	: 4.2
Relative density	: No data available
Density	: 1.41 g/cm3 (20°C)
Solubility	: Insoluble in water. Water: 0,23 g/l (25°C)
Log Pow	: 2.11
Viscosity, kinematic	: No data available
Viscosity, dynamic	: No data available
Explosive properties	: Not explosive material according to EC criteria
Oxidizing properties	: Non-oxidizing material according to EC criteria
Explosive limits	: No data available

## 9.2. Other information

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, CO<sub>2</sub>), Hydrogen fluoride.

## SECTION 11: Toxicological Information

### 11.1. Information on toxicological effects

Acute toxicity	: Not classified
Additional information	: Asphyxiating
<b>1,1,1,2,3,3,3-heptafluoropropane (431-89-0)</b>	
LC50 inhalation rat (ppm)	> 788696 ppm/4h
Skin corrosion/irritation	: Not classified - pH: Not applicable
Additional information	: Contact with the liquid 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 sensitization	: Not classified
Germ cell mutagenicity	: Not classified
Carcinogenicity	: Not classified
Reproductive toxicity	: Not classified
Specific target organ toxicity (single exposure)	: Not classified
Specific target organ toxicity (repeated exposure)	: Not classified
Aspiration hazard	: Not classified

## SECTION 12: Ecological Information

### 12.1. Toxicity



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

LC50 fish 1 > 100 mg/l (brachydanio rerio)  
EC50 Daphnia 1 > 200 mg/l  
EC50 72h algae (1) > 114 mg/l (Scenedesmus capricornutum)

**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.

**12.3. Bio accumulative potential**

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

Log Pow 2.11

**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 and vPvB criteria of REACH regulation, annex XIII

**12.6. Other adverse effects**

Other adverse effects : Ozone depletion factor ODP (R-11=1) = 0. Total global warming potential (GWP): 3220

**SECTION 13: Disposal Considerations**

**13.1. Waste treatment methods**

Waste disposal recommendations : Methods of disposal of packaging. Reuse or recycle following decontamination. Destroy at an authorized 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 / RID / IMDG / IATA / ADN

ADR	IMDG	IATA
<b>14.1. UN number</b> 3296	3296	3296
<b>14.2. UN proper shipping name</b> Heptafluoropropane (Refrigerant Gas R 227)	Heptafluoropropane (Refrigerant Gas R 227)	Heptafluoropropane
<b>Transport Document Description</b> 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
<b>14.3. Transport hazard class(es)</b> 2.2	2.2	2.2


**14.4. Packing group**

Not applicable

**14.5. Environmental hazards**

Dangerous for the environment : No

No supplementary information available

**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. Transport in bulk according to Annex II of MARPOL and the IBC Code**

Not applicable

20
3296

**SECTION 15: Regulatory Information**
**15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture**
**15.1.1. EU-Regulations**

No REACH Annex XVII restrictions  
 HFC 227ea FE is not on the REACH Candidate List  
 HFC 227ea FE is not on the REACH Annex XIV List

Other information, restriction and prohibition regulations	: Regulation (EC) No 517/2014
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**15.1.2. National regulations**

Ensure all national/local regulations are observed

**15.2. Chemical safety assessment**



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# NAF<sup>®</sup> S 227 (HFC-227ea) Material Safety Data Sheet

Made in accordance with according to Regulation (EC) No. 1907/2006 (REACH)  
with its amendment Regulation (EU) 2015/830

Date of issue: 12/23/2018 - Version: 1.1 - Supersedes: Version 1.0

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:

Liquefied gas  
H280

Gases under pressure: Liquefied gas  
Contains gas under pressure; may explode if heated



INNOVEX<sup>®</sup> 227  
(HFC-227ea)  
Material Safety  
Data Sheet

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

Product form	: Substance
Substance name	: INNOVEX 227 (HFC-227ea)
Chemical name	: 1,1,1,2,3,3,3-heptafluoropropane: 207-079-2
EC no	: 207-079-2
CAS No	: 431-89-0
REACH registration No	: 01-2119485489-18

**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

**1.2.2. Uses advised against**

No additional information available

**1.3 Details of the supplier of the safety data sheet**

**SAFETY HI-TECH GLOBAL LLC**  
1000 N West Street, Suite 1200  
Wilmington, DE 1980 – USA  
T +1 302 295 48 08 – E [mail@sht-global.com](mailto:mail@sht-global.com)

**1.4 Emergency telephone number**

Emergency number : +1 302 295 48 08

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

Liquefied gas	: H280
Full text of hazard classes and H-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)	: P410+P403-Protect from sunlight. Store in a well-ventilated place
Extra phrases	: Greenhouse fluorinated gas falling within Kyoto Protocol (GWP=3220)

### 2.3. Other hazards

Other hazards not contributing to the classification

: May cause suffocation by reducing oxygen available for breathing.  
Contact with the liquid may cause cold burns/frostbite.

## SECTION 3: Composition/Information on Ingredients

### 3.1. Substance

Name : INNOVEX 227 (HFC-227ea)  
CAS No : 431-89-0  
EC No : 207-079-2

Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008
1,1,1,2,3,3,3-heptafluoropropane	(CAS No) 431-89-0 (EC no) 207-079-2 (REACH-no) 01-2119485489-18	> 99	Liquefied gas, H280

Full text of H-statements: see section 16

### 3.2. Mixture

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/injuries : 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: Fire-fighting 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 vapors including Hydrogen fluoride. Carbon oxides (CO, CO<sub>2</sub>).

### 5.3. Advice for firefighters

Firefighting instructions  
Protection during firefighting: Use water spray or fog for cooling exposed containers.  
: 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

#### 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

: &lt;52°C

Packaging materials

: Recommended materials: Carbon steel, Aluminum.

### 7.3. Specific end use(s)



No additional information available

## SECTION 8: Exposure Controls/Personal Protection and Storage

### 8.1. Control parameters

**INNOVEX 227 - HFC 227ea (431-89-0)**  
EU

: No specific limit

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

DNEL/DMEL (Workers)

Long-term - systemic effects, inhalation

36767 - 61279 mg/m3

DNEL/DMEL (General population)

Long-term - systemic effects, inhalation

6355 mg/m3

PNEC (Water)

PNEC aqua (freshwater)

0.1 mg/l

PNEC (Sediment)

PNEC sediment (freshwater)

1.3 mg/kg dwt

PNEC (STP)

PNEC sewage treatment plant

1.73 mg/l

### 8.2. Exposure controls

Hand protection

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

Eye protection

: Safety glasses with side shields

Skin and body protection

: Majority cotton protective clothing

Respiratory protection

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

## SECTION 9: Physical and Chemical Properties

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

Physical state

: Gas

Appearance

: Liquefied gas

Color

: Colorless

Odor

: No data available

Odor threshold

: No data available

pH

: Not applicable

Relative evaporation rate (butyl acetate=1)

: No data available

Melting point

: No data available

Freezing point

: -131 °C

Boiling point

: -17 °C

Flash point

: None

Auto-ignition temperature

: 532 °C

Decomposition temperature

: No data available

Flammability (solid, gas)

: Not flammable

Vapor pressure

: 3.9 bars (20°C)

Vapor pressure at 50 °C

: 9,6 bars (50°C)

Relative vapor density at 20 °C

: 4.2

Relative density

: No data available

Density

: 1.41 g/cm3 (20°C)

Solubility

: Insoluble in water. Water: 0,23 g/l (25°C)

Log Pow

: 2.11

Viscosity, kinematic

: No data available

Viscosity, dynamic

: No data available

Explosive properties

: Not explosive material according to EC criteria

Oxidizing properties

: Non-oxidizing material according to EC criteria

Explosive limits

: No data available

## 9.2. Other information

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, CO<sub>2</sub>), Hydrogen fluoride.

## SECTION 11: Toxicological Information

### 11.1. Information on toxicological effects

Acute toxicity	: Not classified
Additional information	: Asphyxiating
<b>1,1,1,2,3,3,3-heptafluoropropane (431-89-0)</b>	
LC50 inhalation rat (ppm)	> 788696 ppm/4h
Skin corrosion/irritation	: Not classified - pH: Not applicable
Additional information	: Contact with the liquid 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 sensitization	: Not classified
Germ cell mutagenicity	: Not classified
Carcinogenicity	: Not classified
Reproductive toxicity	: Not classified
Specific target organ toxicity (single exposure)	: Not classified
Specific target organ toxicity (repeated exposure)	: Not classified
Aspiration hazard	: Not classified

## SECTION 12: Ecological Information

### 12.1. Toxicity

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

 LC50 fish 1  
 EC50 Daphnia 1  
 EC50 72h algae (1)

 > 100 mg/l (brachydanio rerio)  
 > 200 mg/l  
 > 114 mg/l (Scenedesmus capricornutum)

**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.

**12.3. Bio accumulative potential**
**1,1,1,2,3,3,3-heptafluoropropane (431-89-0)**

Log Pow

2.11

**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 and vPvB criteria of REACH regulation, annex XIII

**12.6. Other adverse effects**

Other adverse effects

: Ozone depletion factor ODP (R-11=1) = 0. Total global warming potential (GWP): 3220

**SECTION 13: Disposal Considerations**
**13.1. Waste treatment methods**

Waste disposal recommendations

: Methods of disposal of packaging. Reuse or recycle following decontamination. Destroy at an authorized 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 / RID / IMDG / IATA / ADN

ADR	IMDG	IATA
<b>14.1. UN number</b>		
3296	3296	3296
<b>14.2. UN proper shipping name</b>		
Heptafluoropropane (Refrigerant Gas R 227)	Heptafluoropropane (Refrigerant Gas R 227)	Heptafluoropropane
<b>Transport Document Description</b>		
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
<b>14.3. Transport hazard class(es)</b>		
2.2	2.2	2.2


**14.4. Packing group**

Not applicable

**14.5. Environmental hazards**

Dangerous for the environment : No

No supplementary information available

**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. Transport in bulk according to Annex II of MARPOL and the IBC Code**

Not applicable

<b>20</b>
<b>3296</b>

**SECTION 15: Regulatory Information**
**15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture**
**15.1.1. EU-Regulations**

No REACH Annex XVII restrictions  
 HFC 227ea FE is not on the REACH Candidate List  
 HFC 227ea FE is not on the REACH Annex XIV List

Other information, restriction and prohibition regulations	: Regulation (EC) No 517/2014
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**15.1.2. National regulations**

Ensure all national/local regulations are observed

**15.2. Chemical safety assessment**





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# **INNOVEX® 227 (HFC-227ea) Material Safety Data Sheet**

Made in accordance with according to Regulation (EC) No. 1907/2006 (REACH)  
with its amendment Regulation (EU) 2015/830

Date of issue: 12/23/2018 - Version: 1.1 - Supersedes: Version 1.0

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:

Liquefied gas  
H280

Gases under pressure: Liquefied gas  
Contains gas under pressure; may explode if heated