SAFETY HI-TECH

MATERIAL SAFETY DATA SHEET

NAF S 227®

UN 1058

(According to Regulation EC 1907/2006 and Directive 98/24/EC)

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY

1.1. Identification of the substance or preparation

Product name	NAF S 227
Chemical name	1,1,1,2,3,3,3-Heptafluoropropane
Synonym	R 227, HFC-227ea
Formula	C_3HF_7
Molecular Weight	170
EC number (EINECS)	207-079-2

1.2. Use of the substance/preparation

Recommended uses	Fire extinguisher

1.3. Company/undertaking identification

Manager	Mr Gianluca Indovino
Address	**Safety Hi-Tech S.r.l.** Via Cavour, 96 - ZI 67051 Avezzano (AQ) – Italy
e-mail	mail@safetyhitech.com
Web site	www.safetyhitech.com
Phone	++39 0863 1940720
Fax	++39 0863 1940724
Advice	Mr Gianluca Indovino
E-mail	gia.indovino@safetyhitech.com

1.4. Emergency telephone

Phone	++39 0863 1940720
Hours of operation	Monday-Friday, 9.00 a.m. – 17.30 p.m.

2. HAZARDS IDENTIFICATION

- Preparation not classified as dangerous according to Directive 67/548/EC & Directive 1999/45/EC
- Gas (liquefied). Dermal contact with rapidly evaporating liquid could result in freezing of the tissues or frostbite.
- High vapor concentrations can cause headaches, dizziness, drowsiness, and nausea.
- Heartbeat irregularity (arrhythmia).
  Preparation smells lightly lemon.
- In case of thermal decomposition, it releases hydrogen fluoride.
- ODP (Ozone Depletion Potential) = 0
- GWP (Global Warming Potential) = 2900 (Kyoto Protocol), 3600 (IPCC Third Assessment Report)
- ALT (Atmospheric Lifetime) = 33 years (Kyoto Protocol), 36.5 years (IPCC Third Assessment Report)
- POCP (Photochemical Ozone Creation Potential): preparation decomposes slowly in the troposphere.

(According to Regulation EC 1907/2006 and Directive 98/24/EC)

2. COMPOSITION/INFORMATION ON INGREDIENTS

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

REACH Registration Number

IUPAC Name	1,1,1,2,3,3,3-Heptafluoropropane
CAS Number	431-89-0
EC Number (EINECS)	207-079-2
Concentration	>= 99,80 % by mass
R phrases	

D-Limonene

REACH Registration Number

IUPAC Name	(R)-(+)-para-Mentha-1,8-diene
CAS Number	5989-27-5
EC Number (EINECS)	227-813-5
Concentration	= 0,10% - 0,20% by mass
R phrases	R10, R38, R43, R50/53

See Section 16 for the full text of the R Phrases declared above.
Occupational Exposure Limit(s), if available, are listed in Section 8.

4. FIRST-AID MEASURES


In case of doubt or if symptom persists, get medical attention.

4.1. Inhalation

- Remove the subject from the contaminated area
- Oxygen or cardiopulmonary resuscitation if necessary
- Consult with a physician in case of respiratory and nervous symptoms

4.2. Eyes Contact

- Keep eyelids open to allow evaporation of product
- Flush eyes with running water for several minutes, while keeping the eyelids wide open
- Consult with an ophthalmologists in case of persistent pain

4.3. Skin contact

- Allow product to evaporate
- Rinse with lukewarm running water
- Consult with a physician in case of persistent pain or redness

4.4. Ingestion

- Risk not possible (gas).

5. FIRE-FIGHTING MEASURES

5.1. Suitable extinguishing media

- In case of fire in close proximity, all means of extinguishing are acceptable

5.2. Unsuitable extinguishing media

- No restriction

5.3. Special exposure hazards

- Not flammable (see section 9).
- Formation of dangerous gas/vapours in case of decomposition (see section 10)

5.4. Special protective equipment for fire-fighters

- Evacuate all non-essential personnel.
- Wear self contained breathing apparatus when in close proximity or in confined spaces
- Protect fire-fighters using spray water.
- After intervention, proceed to clean the equipment (remove clothing carefully, take a shower, clean and check).

5.5. Other precautions

- Approach from upwind
- Stay at safe distance in a protected location sheltered from possible projections
- Never approach containers which have been exposed to fire, without cooling them sufficiently
- After the fire, proceed rapidly to clean the surfaces exposed to the fumes in order to limit the damage to the equipment
- If safe to do so, remove the exposed containers, or cool with large quantities of water
- As for any fire, ventilate and clean the rooms before re-entry

See section 10, Stability and Reactivity

6. ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions

- Follow the protective measures given in section 8.
- If safe to do so, without over exposing anyone, try to stop the leak.
- Keep away materials and products which are incompatible with the product (see section 10).
- In case of leaking container, try to reposition it to get the leak in gaseous phase.
- Gas/vapors heavier than air may accumulate in confined spaces, causing possible oxygen depletion..

6.2. Environmental precautions

- Prevent discharges into the environment (atmosphere, ...)

6.3. Methods for cleaning up

- Let the product evaporate
- Prevent the product from entering sewers or confined places

See section 8 and section 13.

7. HANDLING AND STORAGE

7.1. Handling

- Prevent product vapors decomposition from contacting hot spots
- Prevent product vapours decomposition, owed to the action of electric arc.
- Use only equipment and materials which are compatible with the product
- Keep away from heat sources
- Keep away from reactive products (see section 10)

7.2. Storage

- In a ventilated, cool area
- Keep away from heat sources
- Keep away from reactive products (see section 10)

7.3. Specific uses
- For any particular use, please contact the supplier.

7.4. Packaging
- Ordinary steel.
- Aluminium.

7.5. Other precautions
- Inform people about the hazards of the product.
- Follow the protective measures given in section 8.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Exposure limit values
1,1,1,2,3,3,3-Heptafluoropropane
- SAEL (Solvay) 2002.
- TWA = 1000 ppm.

D-Limonene
- TWA=165,6 mg/m³ (AHIA,1993).

8.2. Exposure controls
- Provide local ventilation suitable for the product decomposition risk (see section 10)
- Follow the protective measures given in section 7

8.2.1. Occupational exposure controls
8.2.1.1. Respiratory protection
- Minimum need if the local exhaust ventilation is adequate
- Self-contained breathing apparatus in medium confinement, insufficient oxygen, in case of large uncontrolled emissions in all circumstances when the mask and cartridge do not give adequate protection
- Use only respiratory protection that conforms to international/national standards

8.2.1.2. Hand protection
- Protective gloves – chemical resistant
  Recommended material: Polyvynylalcohol
  Permeation time/life: n.a.

8.2.1.3. Eye protection
- Wear protective goggles for all industrial operations
- If risk of splashing, chemical proof goggles/face shield

8.2.1.4. Skin protection
- Apron/boots of neoprene if risk of splashing

8.2.1.5. Other precautions
- Shower and eye wash stations
- Gloves, overalls and boots have to be double layered (protection against cold temperature)
- Consult safety manager in order to choose proper personal protective equipments.

8.2.2. Environmental exposure controls
- Respect local/federal and national regulations for aqueous emissions (see section 15)

(According to Regulation EC 1907/2006 and Directive 98/24/EC)

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1. General information

Appearance	Pressurized liquefied gas
Colour	Colourless
Odour	Lemon

9.2. Important health, safety and environmental information

pH	Neutral
Boiling point	Not applicable, the mixture is pressurized with nitrogen
Flash point	Not applicable
Flammability	No flammability limit in air Remark: non flammable gas
Esplosive properties	Remark: see also section 10
Oxidising properties	Non oxidizer
Vapour pressure @ 21°C	25 bar or 42 bar
Relative Density (@ 20°C), liquid	= 1,415
Solubility in water (@ 20°C)	= 0,3 – 0,6 g/l
Partition coefficient P (n-octanol/water)	log P o/w 2,5 Method: calculated value
Vapour density (air = 1)	= 4,2
Evaporation rate	n.a.

9.3. Other information

Freezing point	= - 131 °C

10. STABILITY AND REACTIVITY

10.1. Conditions to avoid

- Heat/sources of heat.

10.2. Materials to avoid

- Alkaline metals and their alloys.

10.3. Hazardous decomposition products

- Hydrofluoric acid (HF)
- Carbon monoxide (CO)

10.4. Other information

- Contact with alkaline and alkaline-earth metals may provoke violent reactions or explosions
- The vapor is heavier than air, disperses at ground level

(According to Regulation EC 1907/2006 and Directive 98/24/EC)

11. TOXICOLOGICAL INFORMATION

11.1. Toxicological data

Toxicokinetics, Metabolism and Distribution

n.a.

Acute toxicity

- Inhalation, LC 50, 4 h, rat, > 11 %.

Irritation

- Rabbit, no irritation signs (eyes.
- No significant irritation signs noted during toxicity testing.

Corrosiveness

n.a.

Chronic toxicity

- Inhalation, after a single exposure, dog, >= 10 %, cardiac sensitization following adrenergic stimulation
- Inhalation, after repeated exposure, rat, 10 %, no observed effect
- No mutagenic, teratogenic effects

CMR effects (Carcinogenicity, Genetic Toxicity, Toxicity to reproduction)

n.a.

Comments

- No appreciable toxic effect

11.2. Health effects

Inhalation

- At high concentrations, risk of narcosis
- At high concentrations, risk of cardiac arrhythmia
- At high concentrations, risk of asphyxia by lack of oxygen

Eyes contact

- (Gas).
- No effect
- (Liquefied Gas)
- Severe eye irritation, watering, redness and swelling of the eyelids
- Risk of burns (frostbite)

Skin contact

- (Gas).
- No effect
- (Liquefied Gas)
- Cold sensation followed by redness of the skin
- Risk of frostbite.
- In case of repeated contact : dry and chapped skin, risk of chronic dermatitis.

Ingestion

- Risk not possible (gas).

(According to Regulation EC 1907/2006 and Directive 98/24/EC)

12. ECOLOGICAL INFORMATION

12.1. Ecotoxicity

Acute Ecotoxicity

- Fish, Brachydanio rerio, LC 0, 96 h, >= 30 mg/l.
- Bacteria, EC 0, activity inhibition, >= 173 mg/l.

12.2. Mobility

- Air, Henry Constant ca. 264 GPa.m3/mol.
  Result: considerable volatility.
  Conditions: 20 °C /calculated value.
- Soil/sediments, adsorption, log KOC ca. 2,2.
  Conditions: calculated value.

See section 9 for additional information on chemical and physical properties.

12.3. Persistence and degradability

Abiotic Degradability

- Air, in direct photo-oxidation, t 1/2 ca. 28.2 years
  Conditions: sensitizer, OH radical
- Air, fphotolysis, ODP = 0.
  Result: no effect on stratospheric ozone.
  Reference value for CFC 11: ODP = 1
- Air, greenhouse effect, GWP = 4.300.
  Conditions: 20 years.
  Reference value for CO2: GPW = 1.

Biotic degradation

- Aerobic Test: ready biodegradability/closed bottle, degradation = 20 %, 28 days
  Result: non-readily biodegradable.

12.4. Bioaccumulative potential

- Bioconcentration: log Po/w ca. 2,5.
  Result: non-bioaccumulable.
  Conditions: calculated value.

12.5. Other adverse effects

- Study in progress

12.6. Comments

- Product is persistent in air (atmospheric lifetime: 36.5 years)
- Product is not significantly hazardous for the environment as considerable volatility and no bioaccumulation effect.

13. DISPOSAL CONSIDERATIONS

13.1. Waste treatment

- Dispose in compliance with local/federal and national regulations
- It is recommended to contact the producer for recycling/recovery.

13.2. Packaging (Directive 94/62/EC)

- To avoid treatments, as far as possible, use dedicated containers

(According to Regulation EC 1907/2006 and Directive 98/24/EC)

14. TRANSPORT INFORMATION

	UN no.	1058
IATA-DGR		
	Class	2.2
	Hazard label:	NON FLAMMABLE GAS
	Proper Shipping Name	LIQUEFIED GAS
IMDG		
	Class	2.2
	Hazard label:	PRESSURIZED NON FLAMMABLE GAS
	HI/UN No	1058
	EMS No	F-C, S-V
	Marine adverse effect	n.a.
	Proper Shipping Name	LIQUEFIED GAS
ADR		
	Class	2
	Hazard label:	2.2
	HI/UN No	20/1058
	Proper Shipping Name	LIQUEFIED GAS
RID		
	Class	2
	Hazard label:	2.2+13
	HI/UN No	20/1058
	Proper Shipping Name	LIQUEFIED GAS

15. REGULATORY INFORMATION

15.1. EC Labeling

Not classified dangerous according to Directive 67/548/EEC & Directive 1999/45/EEC.

D.lgs 65/2003 (Directives 1999/45/EC and 2001/60/EC).
Decreto ministeriale 7 settembre 2002 (Directive 2001/58/EC).
D.lgs 52/97 (Directive 92/32/EC).
Directive 89/686/EEC

16. OTHER INFORMATION

16.1 Reason for update

- General revision according to Directive 2006/1907/EC
- Distribute new edition to clients

16.2 R phrases referring to section 3

R10 - flammable
R38 - irritating to skin
R43 - May cause sensitisation by skin contact
R50/53 – Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

(According to Regulation EC 1907/2006 and Directive 98/24/EC)

This MSDS is intended for only the selected countries to which it is applicable. The information given corresponds to the current state of our knowledge and experience of the product, and is not exhaustive. This applies to product which conforms to the specification, unless otherwise stated. In this case of combinations and mixtures one must make sure that no new dangers can arise. In any case, the user is not exempt from observing all legal, administrative and regulatory procedures relating to the product, personal hygiene, and protection of human welfare and the environment.