Revision Date: 09/25/2014

SOLKANE ® 227, SOLKAFLAM ® 227

1. PRODUCT AND COMPANY IDENTIFICATION

1.1. Identification of the substance or mixture

Product name	:	SOLKANE ® 227, SOLKAFLAM ® 227
Chemical Name	:	1,1,1,2,3,3,3-heptafluoropropane
Synonyms	:	HFC-227, R 227, HFA 227
Molecular formula	:	C3HF7
Molecular weight	:	170 g/mol

1.2. Use of the Substance/Mixture

Recommended use :
- Refrigerant
- Foaming agent
- Fire extinguishing agent

1.3. Company/Undertaking Identification

Address : SOLVAY FLUORIDES, LLC
3333 RICHMOND AVENUE
HOUSTON TX 77098-3099
USA

1.4. Emergency and contact telephone numbers

Emergency telephone number	:	**1 (800) 424-9300 CHEMTREC ® (USA & Canada)** **01-800-00-214-00 (MEX. REPUBLIC)**
Contact telephone number (product information):	:	**US: +1-800-765-8292 (Product information)** **US: +1-713-525-6500 (Product information)**

2. HAZARDS IDENTIFICATION

2.1. Emergency Overview:

NFPA	:	H= 0 F= 0 I= 0 S= None
HMIS	:	H= 0 F= 0 R= 0 PPE = Supplied by User; dependent on local conditions

General Information

Appearance	:	compressed liquefied gas
Colour	:	colourless
Odour	:	odourless

Main effects
- Liquefied gas
- Hazardous decomposition products formed under fire conditions.
- Gaseous hydrogen fluoride (HF).

2.2. Potential Health Effects:

Inhalation
- (in case of higher concentration): narcosis, Asphyxia, May cause cardiac arrhythmia..

Eye contact
- Causes frostbite burns to eyes.
- Symptoms: Lachrymation, Redness, Swelling of tissue, Frostbite, Burn.

Skin contact
- Contact with liquid or refrigerated gas can cause cold burns and frostbite.
- Prolonged skin contact may defat the skin and produce dermatitis.

Ingestion
- gas
- Not applicable

Other toxicity effects
- See section 11: Toxicological Information

2.3. Environmental Effects:
- See section 12: Ecological Information

3. COMPOSITION/INFORMATION ON INGREDIENTS

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

CAS-No.	:	431-89-0
Concentration	:	**> 99.0 %**

4. FIRST AID MEASURES

4.1. Inhalation
- Remove to fresh air.
- Oxygen or artificial respiration if needed.
- If symptoms persist, call a physician.

4.2. Eye contact
- Allow to evapourate.
- Rinse thoroughly with plenty of water, also under the eyelids.
- If eye irritation persists, consult a specialist.

4.3. Skin contact
- Allow to evapourate.
- Wash off with warm water.
- If symptoms persist, call a physician.

4.4. Ingestion
- Not applicable

4.5. Notes to physician

Exposure to decomposition products :

- Immediate medical attention is not required.
- When symptoms persist or in all cases of doubt seek medical advice.

5. FIREFIGHTING MEASURES

5.1. Suitable extinguishing media

- Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

5.2. Extinguishing media which shall not be used for safety reasons

- None.

5.3. Special exposure hazards in a fire

- The product is not flammable.
- Hazardous decomposition products formed under fire conditions.
- Gas/vapours combustion possible in presence of air in very particular conditions (see section 9 and/or consult the producer).

5.4. Hazardous decomposition products

- Gaseous hydrogen fluoride (HF).
- Fluorophosgene
- The release of other hazardous decomposition products is possible.

5.5. Special protective equipment for firefighters

- Wear self-contained breathing apparatus and protective suit.
- Wear chemical resistant oversuit
- Special protective actions for fire-fighters
- In case of fire, use water spray.
- Keep product and empty container away from heat and sources of ignition.

6. ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures

6.1.1. Advice for non-emergency personnel

- Prevent further leakage or spillage if safe to do so.
- Keep away from Incompatible products.

6.1.2. Advice for emergency responders

- Immediately evacuate personnel to safe areas.
- Keep people away from and upwind of spill/leak.
- Wear self-contained breathing apparatus and protective suit.
- Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.
- Suppress (knock down) gases/vapours/mists with a water spray jet.
- Avoid spraying the leak source.
- Ventilate the area.

6.2. Environmental precautions

- Discharge into the environment must be avoided.
- Inform the responsible authorities in case of gas leakage, or of entry into waterways, soil or drains.

6.3. Methods and materials for containment and cleaning up

- Allow to evapourate.
- Prevent product from entering drains.

6.4. Reference to other sections

- Refer to protective measures listed in sections 7 and 8.

7. HANDLING AND STORAGE

7.1. Handling

- Use only in well-ventilated areas.
- Use only clean and dry utensils.
- Keep away from water.
- Preferably transfer by pump or gravity.
- Keep away from Incompatible products.

7.2. Storage

- Keep only in the original container.
- Store in a receptacle equipped with a vent.
- Keep containers tightly closed in a cool, well-ventilated place.
- Keep in properly labelled containers.
- Keep in a bunded area.
- Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
- Keep away from Incompatible products.

7.3. Packaging material

- Steel drum

7.4. Other information

- Refer to protective measures listed in sections 7 and 8.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Exposure Limit Values

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

- SAEL (Solvay Acceptable Exposure Limit) 2008
  TWA = 1,000 ppm

8.2. Engineering controls

- Ensure adequate ventilation.
- Apply technical measures to comply with the occupational exposure limits.

8.3. Personal protective equipment

8.3.1. Respiratory protection

- Use NIOSH approved respiratory protection.
- Self-contained breathing apparatus (EN 133)
- Wear self-contained breathing apparatus in confined spaces, in cases where the oxygen level is depleted, or in case of significant emissions.
- Use only respiratory protection that conforms to international/ national standards.

8.3.2. Hand protection

- Take note of the information given by the producer concerning permeability and break through times, and of special workplace conditions (mechanical strain, duration of contact).
- Protective gloves
- Suitable material: Fluoroelastomer

8.3.3. Eye protection

- Tightly fitting safety goggles

8.3.4. Skin and body protection

- Wear suitable protective clothing.

8.3.5. Hygiene measures

- Eye wash bottles or eye wash stations in compliance with applicable standards.
- When using, do not eat, drink or smoke.
- Gloves, overalls and boots have to be double layered (protection against cold temperature).
- Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1. General Information

Appearance	:	compressed liquefied gas
Colour	:	colourless
Odour	:	odourless

9.2. Important health safety and environmental information

pH	:	*Remarks*: neutral
Boiling point/boiling range	:	-16.5 °C (2.3 °F)
Flash point	:	*Remarks*: Not applicable
Flammability	:	*Remarks*: Not applicable
Explosive properties	:	*Explosion danger*: *Remarks*: Not explosive
Oxidizing properties	:	*Remarks*: Non oxidizer
Vapour pressure	:	54 kPa *Temperature*: -30 °C (-22 °F)

	:	390 kPa *Temperature*: 20 °C (68 °F)
	:	920 kPa *Temperature*: 50 °C (122 °F)
	:	2,936 kPa *Temperature*: 123 °C (253 °F)
Relative density / Density	:	1.41 *Temperature*: 25 °C (77 °F)
Bulk density	:	*Remarks*: Not applicable
Solubility(ies)	:	Water 0.23 g/l *Temperature*: 25 °C (77 °F)
Partition coefficient: n-octanol/water	:	*log Pow*: 2.3 *Method*: calculated value
Viscosity	:	*Remarks*: Not applicable
Vapour density	:	4.2

9.3. Other data

Freezing point:	:	-129.5 °C (-201.1 °F)
Auto-flammability	:	*Remarks*: Not applicable
Remarks	:	No data available

10. STABILITY AND REACTIVITY

10.1. Stability
- Stable under recommended storage conditions.

10.2. Conditions to avoid
- Heat.

10.3. Materials to avoid
- Light and/or alkaline metals, Alkaline earth metals, Powdered metals, Oxidizing agent

10.4. Hazardous decomposition products
- Gaseous hydrogen fluoride (HF)., Fluorophosgene
- The release of other hazardous decomposition products is possible.

11. TOXICOLOGICAL INFORMATION

Toxicological data

Acute oral toxicity
- Remarks: Not applicable

Acute inhalation toxicity
- LC50, 4 h, Rat, > 788696 ppm

Acute dermal irritation/corrosion
- Remarks: Not applicable

Skin irritation
-
  Remarks: Not applicable

Eye irritation
-
  Remarks: Not applicable

Chronic toxicity
- Inhalation, after a single exposure, Dog, NOEL: >= 10 %, cardiac sensitization following adrenergic stimulation
- Inhalation, Repeated exposure, Rat, NOEL: 10 %, no observed effect

Carcinogenicity
- Remarks: No data available

Reproductive toxicity
- Inhalation, Rat, 731.690 mg/m3, NOAEC, Animal testing did not show any effects on fertility.

Teratogenicity
- Inhalation, Rat, 731,690 mg/m3, Developmental Toxicity, Remarks: NOAEC

Remarks
- No data available
- In vitro tests did not show mutagenic effects
- In vivo tests did not show mutagenic effects

12. ECOLOGICAL INFORMATION

12.1. Ecotoxicity effects

Acute toxicity
- Fishes, Brachydanio rerio, LC50, 96 h, > 200 mg/l (1,1,1,3,3-pentafluorobutane)
- Fishes, Brachydanio rerio, LC0, 96 h, ca. 200 mg/l (1,1,1,3,3-pentafluorobutane)
- Crustaceans, Daphnia magna, EC50, 48 h, > 200 mg/l (1,1,1,3,3-pentafluorobutane)
- Crustaceans, Daphnia magna, NOEC, 48 h, 200 mg/l (1,1,1,3,3-pentafluorobutane)

Chronic toxicity
- Algae, Selenastrum capricornutum, NOEC, 72 h, = 13.2 mg/l (1,1,1,3,3-pentafluorobutane)
- Algae, Selenastrum capricornutum, EC50, 72 h, > 114 mg/l (1,1,1,3,3-pentafluorobutane)

Further information on ecology
- Terrestrial plants, NOEC, growth, >= 6 g/m3 (1,1,1,3,3-pentafluorobutane)

12.2. Mobility

- Air, Henry's law constant (H) ca. 2,860 mPa.m³/mol , 20 °C
  Conditions: calculated value
  Remarks: Disperses rapidly in air.
- Soil/sediments, adsorption
  Remarks: non-significant adsorption

12.3. Persistence and degradability

Abiotic degradation

- Air, indirect photo-oxidation
  Conditions: sensitizer: OH radicals
  Degradation products: Carbon dioxide (CO2) / hydrofluoric acid
- Water
  Result: non-significant hydrolysis

Biodegradation

- aerobic, Tested according to: Closed Bottle test, 1 %, 28 d
  Result: Not readily biodegradable.

12.4. Bioaccumulative potential

- Bioaccumulative potential: log Pow 2.29
  Result: weak bioaccumulation potential
- Bioaccumulative potential: 2.29
  Result: weak bioaccumulation potential

12.5. Other adverse effects

- Ozone Depletion Potential :
  = 0
  Result: no effect on stratospheric ozone
  Remarks: Ozone depletion potential; ODP; (R-11 = 1)
- Global Warming Potential :
  = 3,500
  Remarks: Reference value for carbon dioxide: GWP = 1, GWP (ITH 100 y), Source IPCC (International Panel on Climate Change)

12.6. Remarks

- Product is persistent in air.
- Product is not significantly hazardous for the aquatic environment due to:
- Disperses rapidly in air.
- Does not bioaccumulate.
- . very low toxicity for aquatic organisms.

13. DISPOSAL CONSIDERATIONS

13.1. Waste from residues / unused products

- In accordance with local and national regulations.
- Refer to manufacturer/supplier for information on recovery/recycling.

13.2. Packaging treatment

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

- Where possible recycling is preferred to disposal or incineration.

13.3. RCRA Hazardous Waste

- Listed RCRA Hazardous Waste (40 CFR 302) - No
- Unlisted RCRA Hazardous Waste (40 CFR 302) - No

14. TRANSPORT INFORMATION

IATA-DGR

UN number	UN 3296
Class	2.2
ICAO-Labels	2.2 - Non-flammable, non toxic gas,

Proper shipping name: HEPTAFLUOROPROPANE

IMDG

UN number	UN 3296
Class	2.2
IMDG-Labels	2.2 - Non-flammable, non-toxic gasses
EmS	F-C S-V

Proper shipping name: HEPTAFLUOROPROPANE

U.S. Dept of Transportation

UN number	UN 3296
Class	2.2
Label	2.2 - Non-flammable, non toxic gas,
EmS	126

Proper shipping name: HEPTAFLUOROPROPANE

Canada (TDG)

UN number	UN 3296
Class	2.2
Label	2.2 - Non-flammable, non toxic gas,
EmS	126

Proper shipping name: HEPTAFLUOROPROPANE

15. REGULATORY INFORMATION

15.1. Inventory Information

Australia. Inventory of Chemical Substances (AICS)	: -	In compliance with inventory.

USA. Toxic Substances Control Act (TSCA)	: -	In compliance with inventory.
Canada. Domestic Substances List (DSL)	: -	In compliance with inventory.
EU list of existing chemical substances (EINECS)	: -	In compliance with inventory.
Korea. Existing Chemicals Inventory (KECI (KR))	: -	In compliance with inventory.
Japan. Inventory of Existing & New Chemical Substances (ENCS)	: -	In compliance with inventory.
Inventory of Existing Chemical Substances (China) (IECS)	: -	In compliance with inventory.
New Zealand. Inventory of Chemicals (NZIOC)	: -	In compliance with inventory.
Philippine. Inventory of Chemicals and Chemical Substances (PICCS)	: -	One or more components not listed on inventory.
Mexico INSQ (INSQ)	: -	In compliance with inventory.

15.2. Other regulations

US. EPA Emergency Planning and Community Right-To-Know Act (EPCRA) SARA Title III Section 302 Extremely Hazardous Substance (40 CFR 355, Appendix A)

- not regulated.

US. EPA Emergency Planning and Community Right-To-Know Act (EPCRA) SARA Title III Section 313 Toxic Chemicals (40 CFR 372.65) - Supplier Notification Required

- not regulated.

US. EPA CERCLA Hazardous Substances (40 CFR 302)

- not regulated.

US. New Jersey Worker and Community Right-to-Know Act (New Jersey Statute Annotated Section 34:5A-5)

- not regulated.

US. Pennsylvania Worker and Community Right-to-Know Law (34 Pa. Code Chap. 301-323)

- not regulated.

US. California Safe Drinking Water & Toxic Enforcement Act (Proposition 65)

- not regulated.

15.3. Classification and labelling

16. OTHER INFORMATION

Ratings :

NFPA (National Fire Protection Association)
Health = 0 Flammability = 0 Instability = 0 Special =None

HMIS (Hazardous Material Information System)
Health = 0 Fire = 0 Reactivity = 0 PPE : Supplied by User; dependent on local conditions

Further information

- Update
  This data sheet contains changes from the previous version in section(s): 4.3, 8.1.2, 15.2

Material Safety Data Sheets contain country specific regulatory information; therefore, the MSDS's provided are for use only by customers of the company mentioned in section 1 in North America. If you are located in a country other than Canada, Mexico or the United States, please contact the Solvay Group company in your country for MSDS information applicable to your location.

The previous information is based upon our current knowledge and experience of our product and is not exhaustive. It applies to the product as defined by the specifications. In case of combinations or mixtures, one must confirm that no new hazards are likely to exist. In any case, the user is not exempt from observing all legal, administrative and regulatory procedures relating to the product, personal hygiene, and integrity of the work environment. (Unless noted to the contrary, the technical information applies only to pure product).

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