

## 1. IDENTIFICATION

<b>Product identifier used on the label:</b>	<b>ZEPHEX®227EA</b>
<b>Other means of identification:</b>	Fluorocarbon 227ea, R-227ea, HFC-227ea, HFA-227ea
<b>Recommended use of the chemical and restrictions on use</b>	Medical aerosol propellant
<b>Name, address, and telephone number of the chemical manufacturer, importer, or other responsible party:</b>	
<b>United States, Mexico &amp; South America</b>	<b>Canada</b>
Mexichem Fluor Inc. 4990B ICI Rd. / P.O. Box 30 St. Gabriel, LA 70776 800-424-5532 (US) (81) 8156-1711 or 1712 (Mexico)	Mexichem Fluor Inc. 5000 Yonge Street, Suite 1901 Toronto, Ontario, M2N 7E9 800-275-5532 Ext. 384 or 383
<b>Emergency telephone numbers:</b>	
<b>Medical:</b>	800-298-9164 or 303-389-1418
<b>Transportation:</b>	In US, Canada, or South America, call Chemtrec @ 800-424-9300 or 703-527-3887 (call collect)  In Mexico, call SETIQ @ 01-800-00-214-00 (call free from any place in Mexico) or 01-55-59-15-88 (in Mexico City)

## 2. HAZARDS IDENTIFICATION

<b>Classification of the chemical</b>	Gases Under Pressure - Liquefied Gas
<b>Signal Word(s)</b>	Warning
<b>Hazard Statement(s)</b>	Contains gas under pressure; may explode if heated. May displace oxygen and cause rapid suffocation.
<b>Precautionary Statement(s)</b>	Protect from sunlight. Store in a well-ventilated place.
<b>Hazard Pictogram(s)</b>	
<b>Hazards not otherwise classified</b>	May cause frostbite.  Exposure to high concentrations may cause an abnormal heart rhythm which can be fatal. Very high atmospheric concentrations may cause anesthetic effects such as dizziness, drowsiness, headaches, and unconsciousness.

## 3. COMPOSITION / INFORMATION ON INGREDIENTS

Chemical Name, Common Name, and Synonyms	CAS #	Concentration
1,1,1,2,3,3,3-heptafluoropropane (Zephex®227ea, Fluorocarbon 227ea, R-227ea, HFC-227ea, HFA-227ea)	431-89-0	100%

## 4. FIRST AID MEASURES

### Description of first aid measures

#### Skin Contact

Immediately wash with plenty of warm water (do not rub).  
Thaw affected area with water. Remove contaminated clothing.  
Caution: clothing may adhere to the skin in case of freeze burns.  
If symptoms (irritation or blistering) develop, get medical attention.

#### Eye Contact

Immediately flush with plenty of water.  
After initial flushing, remove any contact lenses and continue flushing for at least 15 minutes.  
Hold eyelids open during flushing.  
Have eyes examined and treated by medical personnel.

#### Inhalation

Move victim to fresh air. Keep warm and at rest. If breathing is labored, give oxygen. If only breathing has stopped, give artificial respiration with a pocket mask equipped with a one-way valve to prevent exposure to product or body fluids. If breathing has stopped AND there is no pulse, give cardiopulmonary resuscitation (CPR). Get immediate medical attention.

#### Ingestion

If swallowed, seek medical attention. Do not induce vomiting unless directed to do so by medical personnel. In case of frostbite, immediately rinse lips and mouth with tepid water for at least 15 minutes. Obtain medical attention promptly.

#### Note to physician:

Provide symptomatic and supportive therapy, as indicated.  
Administration of epinephrine or similar sympathomimetic drugs should be with special caution and only in situations of emergency life support as cardiac arrhythmia may result.

## 5. FIREFIGHTING MEASURES

### Fire and explosion hazards:

HFC-227ea is not flammable in air under ambient conditions of temperature and pressure. Under conditions of high temperature and pressure mixtures of HFC-227ea and air may be flammable. Certain mixtures of HFC-227ea and chlorine may be flammable under some conditions.

Containers may burst under intense heat.  
Ruptured cylinders may rocket or fragment. Heavy vapor may suffocate.

### Special hazards arising from the chemical

During a fire the product can form toxic and corrosive gases such as hydrogen fluoride.

### Fire-fighting procedures:

Move containers from fire area, if it can be done without risk. Fight fire from a protected location to shield personnel from venting or ruptured containers.

### Suitable extinguishing media

As appropriate for surrounding materials/equipment.  
Water spray should be used to cool containers.

### Unsuitable extinguishing media

None known.

### Special protective equipment and precautions for fire-fighters

Use self-contained breathing apparatus with a full-face piece and special protective clothing.

### Sensitivity to mechanical impact:

Not applicable.

### Sensitivity to static discharge:

Not expected to be sensitive to static discharge.

## 6. ACCIDENTAL RELEASE MEASURES

### Personal precautions, protective equipment and emergency procedures

This product is a liquefied gas, which exits the container at temperatures capable of causing freeze burns (frostbite). Precautions should take into account the severity of the leak or spill. Move unprotected personnel upwind of leaking container. Ventilate the spill area. Use recommended personal protection and shut off the leak, if without risk. If possible, elevate leak position to highest point of container (should leak gas, not liquid). Water should never be put on leak nor should cylinder be immersed.

### Methods and materials for containment and cleaning up

If possible, dike and contain spillage. Prevent liquid from entering sewers, sumps, or pit areas since vapor is heavier than air and can create a suffocating atmosphere. Capture material for recycle or destruction if suitable equipment is available.

Notify applicable government authority if release is reportable or could adversely affect the environment.

## 7. HANDLING AND STORAGE

### Precautions for safe handling

Wear appropriate personal protective equipment. A safety shower and eyewash station should be nearby and ready for use.

This product is a liquefied gas, which exits the container at temperatures capable of causing freeze burns (frostbite). Ensure personnel are trained in handling and storing cylinders. Secure containers at all times.

Keep containers closed when not in use. Ensure there is adequate ventilation or use proper respiratory protection in poorly ventilated or confined areas. Avoid causing and inhaling high concentrations of vapor. Atmospheric levels should be controlled to below the occupational exposure limit and kept as low as practicable.

Prevent liquid or vapor from entering sumps or sewers since vapor is heavier than air and may form suffocating atmospheres.

Do not put mixtures of HFC-227ea with air or oxygen under pressure; do not use such mixtures for leak or pressure testing.

Do not heat containers.

Liquid transfers between containers may generate static electricity. Ensure adequate grounding.

Avoid trapping liquid between closed valves or overfilling containers as high pressures can develop with an increase in temperature.

Avoid HFC-227ea contact with flames or very hot surfaces.

### Conditions for safe storage, including any incompatibilities

Keep containers tightly closed, in a cool, well-ventilated place. Store at temperature not exceeding 125°F (52°C.).

Keep containers dry.

Keep away from open flames, hot surfaces, welding operations, and other heat sources.

Keep away from finely divided metals such as aluminum, zinc, magnesium, and alloys containing more than 2% magnesium. Can react violently if in contact with alkali metals and alkaline earth metals such as sodium, potassium, or barium.

## 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

**OSHA Permissible Exposure Limit (PEL):** Not established.

**American Conference of  
Governmental Industrial Hygienists (ACGIH)**

**Threshold Limit Value (TLV):** Not established.

**American Industrial Hygiene  
Association (AIHA) Workplace**

**Environmental Exposure Level (WEEL):** Not established.

**Mexichem Fluor Guideline:** 1000 ppm 8-hour TWA.

**Appropriate engineering controls:** Use ventilation to maintain safe levels. Where appropriate engineering controls are not in place or are inadequate, wear suitable respiratory equipment.

**Eye Protection:** Use chemical safety goggles or safety glasses and a face shield when there is potential for eye contact.

**Skin Protection:** Take all precautions to prevent skin contact. Use gloves and protective clothing made of material that has been found by user to be impervious under conditions of use to prevent the skin from becoming frozen from contact with liquid. User should verify impermeability under normal conditions of use prior to general use. Additional protection such as an apron, arm covers, or full body suit may be needed depending on conditions of use.

**Respiratory Protection:** Not normally needed if controls are adequate. If needed, use NIOSH/MSHA approved respirator for organic vapors. For high concentrations and oxygen-deficient atmospheres, use positive pressure air-supplied respirator.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Clear, colorless liquefied gas
Odor:	Faint ether-like odor
Odor threshold:	Not available
pH:	Not available
Melting point/freezing point:	-129.5°C (-201.1°F)
Boiling point:	-16.4°C (2.5°F)
Flash point:	Does not flash
Evaporation rate:	Not available
Flammability (solid, gas):	Not available
Upper/lower flammability/explosive limits:	Not applicable
Vapor pressure:	4,030 mm Hg at 21°C
Vapor density:	6.04 (air = 1)
Specific gravity (relative density):	1.46 at 20°C
Solubility(ies):	Slightly soluble in water
Partition coefficient: n- octanol/water:	2.29
Auto-ignition temperature:	Not available
Decomposition temperature:	Not available

## 10. STABILITY AND REACTIVITY

Reactivity:	Reacts with finely divided metals such as aluminium, zinc, magnesium, and alloys containing more than 2% magnesium. Can react violently if in contact with alkali metals and alkaline earth metals such as sodium, potassium, or barium.
Chemical stability:	Stable under normal conditions.
Possibility of hazardous reactions:	Hazardous polymerization will not occur.
Conditions to avoid:	Keep away from heat, sparks, and flame. Avoid high temperatures.
Incompatible materials:	Finely divided metals such as aluminium, zinc, magnesium, and alloys containing more than 2% magnesium. Alkali metals and alkaline earth metals such as sodium, potassium, or barium.
Hazardous decomposition products:	Hydrogen fluoride by thermal decomposition and hydrolysis. Oxides of carbon and fluoride may be produced by thermal decomposition.

## 11. TOXICOLOGICAL INFORMATION

**Information on the likely routes of exposure:** Inhalation, eye, and skin contact

**Symptoms related to the physical, chemical and toxicological characteristics: Delayed and immediate effects and also chronic effects from short- and long-term exposure:**

**Inhalation:** Vapor is heavier than air. May displace oxygen and cause rapid suffocation. Exposure to high concentrations may cause an abnormal heart rhythm (arrhythmia) under stressful conditions which can be fatal. Very high atmospheric concentrations may cause anesthetic effects such as dizziness, drowsiness, headaches, and unconsciousness.

**Ingestion:** Liquid will cause freeze burns.

**Eye contact:** Liquid splashes or spray may cause freeze burns.

**Skin contact:** Liquid splashes or spray may cause freeze burns.

**Other effects:** None anticipated.

**Numerical measures of toxicity:**

LC50: 4 hr. (rat) = >788,700 ppm

LD50: Not applicable.

**Animal test data:**

Acute inhalation exposures at very high concentrations of HFC-227ea have shown central nervous system depression in laboratory animals.

Cardiac arrhythmias were seen in dogs exposed to 90,000 ppm HFC-227ea and higher for 30 minutes, when followed by an injection of epinephrine.

No toxicity was seen in rats exposed up to 105,000 ppm HFC-227ea for 13 weeks.

HFC-227ea was not genotoxic when tested in a variety of in vitro and in vivo tests.

Studies in rats and rabbits showed that exposure during pregnancy did not cause any developmental toxicity.

**Carcinogenicity:**

Not classified as carcinogenic by NTP, IARC, ACGIH, or OSHA.

**Teratogenicity, mutagenicity, other reproductive effects:**

None known. For further information see animal test data above.

**Toxicologically synergistic products:**

None known. Note that administration of epinephrine or similar sympathomimetic drugs following exposure may result in cardiac arrhythmia.

## 12. ECOLOGICAL INFORMATION

<b>Ecotoxicity:</b>	No data available
<b>Persistence and degradability:</b>	This product is highly volatile and has low water solubility. It will rapidly evaporate from water. Decomposes comparatively rapidly in the lower atmosphere (troposphere). Atmospheric lifetime is 34.2 years. Products of decomposition will be highly dispersed and hence will have a very low concentration. Practically non-biodegradable.
<b>Bioaccumulative potential</b>	Low given its $\text{Log } K_{ow} = 2.29$
<b>Mobility in soil</b>	Expected to be mobile in soil.
<b>Other adverse effects:</b>	Not a significant contributor to photochemical smog and is not considered to be a VOC. Is not considered an ozone-depleting chemical.

## 13. DISPOSAL CONSIDERATIONS

<b>Disposal Method:</b>	Discarded product is not a hazardous waste under RCRA, 40 CFR 261. However, HFC-227ea should be recycled or reclaimed whenever possible.
<b>Container Disposal:</b>	Return container to supplier.

## 14. TRANSPORT INFORMATION

**Hazard label(s)**



UN number (DOT, TDG, IMDG, IATA, Mexico):	UN 3296
UN proper shipping name (DOT, TDG, IMDG, IATA, Mexico):	Heptafluoropropane or Refrigerant gas R 227ea
Hazard class (DOT, TDG, IMDG, IATA, Mexico):	2.2
Packing group (DOT, TDG, IMDG, IATA Mexico):	None
Hazardous substance (RQ):	None
Environmental hazards (e.g., Marine pollutant):	Not a Marine Pollutant
Placard/label:	Non-flammable gas
Transport in bulk (according to Annex II of MARPOL 73/78 and the IBC Code):	Not available
Special precautions which a user needs to be aware of, or needs to comply with, in connection with transport or conveyance either within or outside their premises:	Consult applicable regulations (e.g., DOT, TDG, IATA, IMDG) for special precautions applicable to transport outside of user's premises. Within user's premises transport in upright, closed, and secured containers.

## 15. REGULATORY INFORMATION

### USA Classification

This material is classified as hazardous under OSHA regulations (29 CFR 1910.1200).

**TSCA (Toxic Substances Control Act) Regulations, 40 CFR 710:**

This product is listed on the TSCA Chemical Substances Inventory.

**CERCLA and SARA Regulations:**

40 CFR 372: This product does not contain any chemicals subject to reporting requirements of SARA Section 313.

40 CFR 355: This product does not contain any "extremely hazardous chemical" subject to the requirements of SARA Section 312.

40 CFR 370: Hazardous properties as defined under the Hazard Communication Standard (29 CFR 1910.1200):

Immediate (acute) health hazard,

Sudden release of pressure.

Actions may be necessary under SARA Sections 311 and 312.

Consult regulations for applicability.

**Ozone Protection and 40 CFR 82:**

This product does not contain nor is it manufactured with ozone depleting substances.

### Canadian Classification

This product has been classified according to the hazard criteria of the Controlled Product Regulations (CPR) and the SDS contains all the information required by the CPR.

**Controlled Products Regulations (WHMIS Classification):**

Class A: Compressed Gas.

**CEPA/Canadian Domestic Substances List (DSL):**

The substance in this product is on the Canadian Domestic Substance List (CEPA DSL)

**Other regulations/legislation:**

This product contains the following substances present on the CEPA 2014 list of greenhouse gases subject to mandatory reporting: 1,1,1,2,3,3,3-heptafluoropropane.

## 16. OTHER INFORMATION

This data sheet was prepared in accordance with Regulation (EC) No. 1907/2006.

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