

SAFETY DATA SHEET

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

Product Name	ZEPHEX™ 227ea / 134a Blend
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Emergency Phone No.	IN AN EMERGENCY DIAL 999 (UK Only) For specialist advice in an emergency telephone +44(0) 1928 572000
Use	Subject to Member State regulations, applicable uses are: medical propellant

2. HAZARDS IDENTIFICATION

Low acute toxicity. High exposures may cause an abnormal heart rhythm and prove suddenly fatal. Very high atmospheric concentrations may cause anaesthetic effects and asphyxiation.
Liquid splashes or spray may cause freeze burns to skin and eyes.

EC Classification Not classified as dangerous according to EC Directive 67/548/EEC.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Alternative names

HAZARDOUS INGREDIENT(S)

Hazardous ingredient(s)	%(w/w)	CAS No.	EC No.	EC Classification
1,1,1,2,3,3,3-Heptafluoropropane (HFC 227ea)	70	000431-89-0	207-079-2	
1,1,1,2-tetrafluoroethane (HFC 134a)	30	000811-97-2	212-377-0	

4. FIRST AID MEASURES



The first aid advice given for skin contact, eye contact, and ingestion is applicable following exposures to the liquid or spray. See also section 11.

Inhalation

Remove patient from exposure, keep warm and at rest. Administer oxygen if necessary. Apply artificial respiration if breathing has ceased or shows signs of failing. In the event of cardiac arrest apply external cardiac massage. Obtain immediate medical attention.

Skin Contact

Thaw affected areas with water. Remove contaminated clothing. Caution: clothing may adhere to the skin in the case of freeze burns. After contact with skin, wash immediately with plenty of warm water. If irritation or blistering occur obtain medical attention.

Eye Contact

Immediately irrigate with eyewash solution or clean water, holding the eyelids apart, for at least 10 minutes. Obtain immediate medical attention.

SAFETY DATA SHEET

Ingestion	Unlikely route of exposure. Do not induce vomiting. Provided the patient is conscious, wash out mouth with water and give 200-300 ml (half a pint) of water to drink. Obtain immediate medical attention.
Further Medical Treatment	Symptomatic treatment and supportive therapy as indicated. Adrenaline and similar sympathomimetic drugs should be avoided following exposure as cardiac arrhythmia may result with possible subsequent cardiac arrest.

5. FIRE-FIGHTING MEASURES

General	This product is not flammable in air under ambient conditions of temperature and pressure. Certain mixtures of this product and air when under pressure may be flammable. Mixtures of this product and air under pressure should be avoided. Certain mixtures of HFCs and chlorine may be flammable or reactive under certain conditions. Thermal decomposition will evolve very toxic and corrosive vapours. (hydrogen fluoride) Containers may burst if overheated.
Extinguishing Media	As appropriate for surrounding fire. Keep fire exposed containers cool by spraying with water.
Fire Fighting Protective Equipment	A self contained breathing apparatus and full protective clothing must be worn in fire conditions. See Also Section 8

6. ACCIDENTAL RELEASE MEASURES

Personal Protection	Ensure suitable personal protection (including respiratory protection) during removal of spillages. See Also Section 8
General	Provided it is safe to do so, isolate the source of the leak. Allow small spillages to evaporate provided there is adequate ventilation. Large spillages: Ventilate area. Contain spillages with sand, earth or any suitable adsorbent material. Prevent liquid from entering drains, sewers, basements and workpits since the vapour may create a suffocating atmosphere.

7. HANDLING AND STORAGE

Handling	Avoid inhalation of high concentrations of vapours. Atmospheric levels should be controlled in compliance with the occupational exposure limit. Atmospheric concentrations well below the occupational exposure limit can be achieved by good occupational hygiene practice. The vapour is heavier than air, high concentrations may be produced at low levels where general ventilation is poor, in such cases provide adequate ventilation or wear suitable respiratory protective equipment with positive air supply. Avoid contact with naked flames and hot surfaces as corrosive and very toxic decomposition products can be formed. Avoid contact between the liquid and skin and eyes.
Process Hazards	The transfer of liquefied gases between containers and to and from processing equipment can result in static generation. Ensure adequate earthing. Certain mixtures of HFCs and chlorine may be flammable or reactive under certain conditions. Care must be taken to mitigate the risk of developing high pressures in systems caused by a temperature rise when liquid is trapped between closed valves or in cases where containers have been overfilled.
Storage	Keep in a well ventilated place away from fire risk and avoid sources of heat such as electric or steam radiators. Avoid storing near to the intake of air conditioning units, boiler units and open drains.
Specific use	Subject to Member State regulations, applicable uses are: medical propellant

SAFETY DATA SHEET

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

General

Wear suitable protective clothing, gloves and eye/face protection. Wear thermal insulating gloves when handling liquefied gases. In cases of insufficient ventilation, where exposure to high concentrations of vapour is possible, suitable respiratory protective equipment with positive air supply should be used.



Eye Protection



Gloves

Occupational Exposure Limits

Occupational Exposure Limits	CAS No.	LTEL (8 hr TWA ppm)	LTEL 8 hr TWA mg/m ³	STEL (ppm)	STEL mg/m ³	Note:
1,1,1,2,3,3,3-Heptafluoropropane (HFC 227ea)	000431-89-0	1000	-	-	-	COM
1,1,1,2-Tetrafluoroethane (HFC 134a)	000811-97-2	1000	4240	-	-	WEL

9. PHYSICAL AND CHEMICAL PROPERTIES

Form	liquefied gas
Colour	colourless
Odour	slight ethereal
Solubility (Water)	slightly soluble
Solubility (Other)	Soluble in: alcohols , chlorinated solvents , polyethylene glycol
Boiling Point (° C)	
Melting Point (° C)	
Vapour Density (Air=1)	
Vapour Pressure (mm Hg)	
Specific Gravity	

10. STABILITY AND REACTIVITY

Hazardous Reactions

Certain mixtures of HFCs and chlorine may be flammable or reactive under certain conditions. Incompatible materials: finely divided metals , magnesium and alloys containing more than 2% magnesium . Can react violently if in contact with alkali metals and alkaline earth metals - sodium , potassium , barium

Hazardous Decomposition Product(s)

hydrogen fluoride by thermal decomposition and hydrolysis.

11. TOXICOLOGICAL INFORMATION

Inhalation

High exposures may cause an abnormal heart rhythm and prove suddenly fatal. Very high atmospheric concentrations may cause anaesthetic effects and asphyxiation.

Skin Contact

Liquid splashes or spray may cause freeze burns. Unlikely to be hazardous by skin absorption.

Eye Contact

Liquid splashes or spray may cause freeze burns.

SAFETY DATA SHEET

Ingestion	Highly unlikely - but should this occur freeze burns will result.
Long Term Exposure	<p>HFC 227ea : A lifetime inhalation study in rats exposed to very high concentrations of HFC 227ea did not produce any adverse effects. No adverse reproductive or developmental effects were observed in rats and rabbits exposed to very high concentrations of HFC 227ea.</p> <p>HFC 134a : A lifetime inhalation study in rats has shown that exposure to 50000ppm resulted in benign tumours of the testis. The increased tumour incidence was observed only after prolonged exposure to high levels, and is considered not to be of relevance to humans occupationally exposed to HFC 134a at or below the occupational exposure limit.</p>

12. ECOLOGICAL INFORMATION

Environmental Fate and Distribution	HFC 227ea & HFC 134a : High tonnage material produced in wholly contained systems. High tonnage material used in open systems. Vapour
Persistence and Degradation	<p>HFC 227ea : Decomposed 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. Does not influence photochemical smog (i.e. is not a VOC under the terms of the UNECE agreement). Does not deplete ozone. Has a Global Warming Potential (GWP) of 3140 (relative to a value of 1 for carbon dioxide at 100 years).</p> <p>HFC 134a : Decomposed comparatively rapidly in the lower atmosphere (troposphere). Atmospheric lifetime is 13.6 year(s) Products of decomposition will be highly dispersed and hence will have a very low concentration. Does not influence photochemical smog (i.e. is not a VOC under the terms of the UNECE agreement). Does not deplete ozone. Has a Global Warming Potential (GWP) of 1410 (relative to a value of 1 for carbon dioxide at 100 years).</p>
Effect on Effluent Treatment	Discharges of the product will enter the atmosphere and will not result in long term aqueous contamination.

13. DISPOSAL CONSIDERATIONS

Recommended:	Best to recover and recycle. If this is not possible, destruction is to be in an approved facility which is equipped to absorb and neutralise acid gases and other toxic processing products.
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14. TRANSPORT INFORMATION

Hazard Label



Road/Rail UN No.	1078
ADR/RID Class	2.2
ADR/RID Proper Shipping Name	REFRIGERANT GAS, N.O.S. (HEPTAFLUOROPROPANE / 1,1,1,2-TETRAFLUOROETHANE)
SEA IMDG Class	2.2
Marine Pollutant	Not classified as a Marine Pollutant

SAFETY DATA SHEET

AIR
ICAO/IATA

2.2

15. REGULATORY INFORMATION

European Regulations

EC Classification

Not classified as dangerous according to EC Directive 67/548/EEC.

16. OTHER INFORMATION

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

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Glossary

- WEL: Workplace Exposure Limit (UK HSE EH40)
COM: The company aims to control exposure in its workplace to this limit
TLV: The company aims to control exposure in its workplace to the ACGIH limit
TLV-C: The company aims to control exposure in its workplace to the ACGIH Ceiling limit
MAK: The company aims to control exposure in its workplace to the German limit
Sk: Can be absorbed through skin
Sen: Capable of causing respiratory sensitisation
Bmgv: Biological monitoring guidance value (UK HSE EH40)