ACCORDING TO EC-REGULATIONS 1907/2006 (REACH), 1272/2008 (CLP) & 2015/830

SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Product identifier

Product Name	Zephex™ 134a
Chemical Name	1,1,1,2-tetrafluoroethane (HFC 134a)
CAS No.	811-97-2
EC No.	212-377-0
REACH Registration No.	01-2119459374-33-0

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified Use(s)	Subject to Member State regulations, applicable uses are: medical propellant
Uses Advised Against	Not known.

1.3 Details of the supplier of the safety data sheet

Manufacturer	
Company Identification	Koura
Address of Manufacturer	Mexichem UK Limited The Heath Business and Technical Park Runcorn Cheshire
Postal code	WA7 4QX
Telephone:	+44(0) 1928 518880
E-mail	info@kouraglobal.com

1.4 Emergency telephone number

Emergency Phone No.	IN AN EMERGENCY DIAL 999 (UK Only) For specialist advice in an emergency telephone +44(0) 1928 572000

SECTION 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.

2.1 Classification of the substance or mixture

Regulation (EC) No. 1272/2008 (CLP) Press. Gas (Liq.) :Contains gas under pressure; may explode if heated.

2.2 Label elements

According to Regulation (EC) No. 1272/2008 (CLP)

Product Name Zephex™ 134a

Hazard Pictogram(s)

GHS04

Signal Word(s) Warning

Hazard Statement(s) H280: Contains gas under pressure; may explode if heated.

Precautionary Statement(s) P410+P403: Protect from sunlight. Store in a well-ventilated place.

2.3 Other hazards

None known.

2.4 Additional Information

None.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

Alternative names 1,1,1,2-tetrafluoroethane (HFC 134a)
HFA 134a

3.1 Substances

HAZARDOUS INGREDIENT(S)	%W/W	CAS No.	EC No.	Hazard Pictogram(s) and Hazard Statement(s)
1,1,1,2-tetrafluoroethane (HFC 134a)	100	811-97-2	212-377-0	GHS04 H280

3.2 Mixtures

Not applicable.

SECTION 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

4.1 Description of first aid measures

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.
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.

4.2 Most important symptoms and effects, both acute and delayed

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

4.3 Indication of any immediate medical attention and special treatment needed

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.

SECTION 5: FIREFIGHTING MEASURES

HFC 134a is not flammable in air under ambient conditions of temperature and pressure. Certain mixtures of HFC 134a and air when under pressure may be flammable. Mixtures of HFC 134a and air under pressure should be avoided. Certain mixtures of HFCs and chlorine may be flammable or reactive under certain conditions.

5.1 Extinguishing media

Suitable Extinguishing media	As appropriate for surrounding fire. Keep fire exposed containers cool by spraying with water.
Unsuitable extinguishing media	None.

5.2 Special hazards arising from the substance or mixture

Thermal decomposition will evolve very toxic and corrosive vapours (hydrogen fluoride). Containers may burst if overheated.

5.3 Advice for firefighters

A self contained breathing apparatus and full protective clothing must be worn in fire conditions. See Also Section 8

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Ensure suitable personal protection (including respiratory protection) during removal of spillages. See Also Section 8

6.2 Environmental precautions

Prevent liquid from entering drains, sewers, basements and workpits since the vapour may create a suffocating atmosphere.

6.3 Methods and material for containment and cleaning up

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.

6.4 Reference to other sections

See Also Section 8, 13.

SECTION 7: HANDLING AND STORAGE

7.1 Precautions for safe 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. Avoid venting to atmosphere. The fluorinated greenhouse gas HFA 134a may be supplied in returnable containers (drums/cylinders). The container contains fluorinated greenhouse gases covered by the Kyoto Protocol. The fluorinated greenhouse gases in containers may not be vented to the atmosphere. Regulation (EU) No. 517/2014 of the European Parliament and the Council on certain fluorinated greenhouse gases.
Process Hazards	The transfer of liquid HFC134a between containers and to and from processing equipment can result in static generation. Ensure adequate earthing. 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.

7.2 Conditions for safe storage, including any incompatibilities

	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.
Storage temperature	Avoid high temperatures.
Storage life	Stable under normal conditions.
Incompatible materials	finely divided metals, alkali metals (sodium, potassium), alkaline earth metals (barium, magnesium), alloys containing more than 2% magnesium.

7.3 Specific end use(s)

Subject to Member State regulations, applicable uses are: medical propellant

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

8.1.1 Occupational Exposure Limits

SUBSTANCE	CAS No.	LTEL (8 hr TWA ppm)	LTEL (8 hr TWA mg/m³)	STEL (ppm)	STEL (mg/m³)	Note
1,1,1,2-tetrafluoroethane (HFC 134a)	811-97-2	1000	4240			

Region	Source
EU	EU Occupational Exposure Limits
United Kingdom	UK Workplace Exposure Limits EH40/2005 (Fourth edition, published 2020)

8.2 Exposure controls

8.2.1. Appropriate engineering controls	Provide adequate ventilation. Atmospheric levels should be controlled in compliance with the occupational exposure limit.
8.2.2. Personal protection equipment	Wear suitable protective clothing and eye/face protection.
Eye Protection	Wear protective eyewear (goggles, face shield, or safety glasses).

Skin protection	Wear thermal insulating gloves when handling liquefied gases.

Respiratory protection	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.

Thermal hazards	See above - Skin protection

8.2.3. Environmental Exposure Controls	Prevent liquid from entering drains, sewers, basements and workpits since the vapour may create a suffocating atmosphere.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance	Liquefied gas. Colour: Colourless.
Odour	Slight ethereal
Odour threshold	No information available.
pH	Not applicable.
Melting point/freezing point	-101°C
Initial boiling point and boiling range	-26.2°C
Flash Point	Not applicable.
Evaporation rate	Not applicable.
Flammability (solid, gas)	Non-flammable.
Upper/lower flammability or explosive limits	Not applicable.
Vapour pressure	4270 mm Hg @ 20°C
Vapour Density (Air=1)	3.66 at normal boiling point
Density (g/ml)	No information available.
Relative density	1.22 @ 20°C
Solubility(ies)	Solubility (Water) : Slightly soluble. Solubility (Other) : Soluble in: Alcohols, Chlorinated solvents, esters, polyethylene glycol.
Partition coefficient: n-octanol/water	Log Pow = 1.06
Auto-ignition temperature	>743°C
Decomposition Temperature (°C)	No information available.
Viscosity	Not applicable.
Explosive properties	Not explosive.
Oxidising properties	Not oxidising.

9.2 Other information

None.

SECTION 10: STABILITY AND REACTIVITY

10.1 Reactivity

See Section: Possibility of hazardous reactions

10.2 Chemical Stability

Stable under normal conditions.

10.3 Possibility of 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.

10.4 Conditions to avoid

Avoid high temperatures.

10.5 Incompatible materials

finely divided metals, alkali metals (sodium, potassium), alkaline earth metals (barium, magnesium), alloys containing more than 2% magnesium.

10.6 Hazardous decomposition products

hydrogen fluoride by thermal decomposition and hydrolysis.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity - Ingestion	Highly unlikely - but should this occur freeze burns will result.
Acute toxicity - Skin Contact	Unlikely to be hazardous by skin absorption.
Acute toxicity - Inhalation	LC50 (rat) (4 hrs) > 500000 ppm (2080000 mg/m³) High exposures may cause an abnormal heart rhythm and prove suddenly fatal. Very high atmospheric concentrations may cause anaesthetic effects and asphyxiation.
Skin corrosion/irritation	Liquid splashes or spray may cause freeze burns.
Serious eye damage/irritation	Liquid splashes or spray may cause freeze burns.
Skin sensitization data	It is not a skin sensitiser.
Respiratory sensitization data	Not classified.
Germ cell mutagenicity	No evidence of mutagenic effects.
Carcinogenicity	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.
Reproductive toxicity	No evidence of reproductive effects. Studies in animals have shown that repeated exposures produce no teratogenic

	effects.
Lactation	Not classified.
STOT - single exposure	Not classified.
STOT - repeated exposure	Not classified.
Aspiration hazard	Not applicable.

11.2 Other information

Respiratory irritation	Non-irritant.
Repeated dose toxicity	An inhalation study in animals has shown that repeated exposures produce no significant effects (50000ppm in rats).

SECTION 12: ECOLOGICAL INFORMATION

12.1 Toxicity

	Low toxicity to aquatic organisms.
Toxicity - Aquatic invertebrates	EC50 (Daphnia magna) (48 hour) = 980 mg/l
Toxicity - Fish	LC50 (Rainbow trout) (96 hour) = 450 mg/l
Toxicity - Algae	Low toxicity to algae.
Toxicity - Sediment Compartment	Not classified.
Toxicity - Terrestrial Compartment	Not classified.
Environmental Fate and Distribution	High tonnage material produced in wholly contained systems. High tonnage material used in open systems. Gas.

12.2 Persistence and Degradation

Decomposed comparatively rapidly in the lower atmosphere (troposphere). Atmospheric lifetime is 14 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 1430 (relative to a value of 1 for carbon dioxide at 100 years) according to Annex I of Regulation (EU) No. 517/2014 on certain fluorinated greenhouse gases. Values in Annex I are taken from the fourth assessment report (AR4) of the Intergovernmental Panel on Climate Change.
United Nations Framework Convention on Climate Change (UNFCCC) reporting GWP is 1300.

12.3 Bioaccumulative potential

The product has no potential for bioaccumulation.

12.4 Mobility in soil

Not applicable.

12.5 Results of PBT and vPvB assessment

Not classified as PBT or vPvB.

12.6 Other adverse effects

None known.

Effect on Effluent Treatment	Discharges of the product will enter the atmosphere and will not result in long term aqueous contamination.

SECTION 13: DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

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.

13.2 Additional Information

Disposal should be in accordance with local, state or national legislation.

SECTION 14: TRANSPORT INFORMATION

14.1 UN number

UN No.	3159

14.2 UN proper shipping name

UN proper shipping name	1,1,1,2-TETRAFLUOROETHANE (REFRIGERANT GAS R 134a)

14.3 Transport hazard class(es)

ADR/RID	
ADR/RID Class	2.2
IMDG	
IMDG Class	2.2
ICAO/IATA	
ICAO/IATA Class	2.2

Labels

14.4 Packing group

Packing group — Not applicable.

14.5 Environmental hazards

Environmental hazards — Not classified as a Marine Pollutant.

14.6 Special precautions for user

Special precautions for user — Not known.

14.7 Transport in bulk according to Annex II of Marpol and the IBC Code

Transport in bulk according to Annex II of Marpol and the IBC Code — Not applicable.

SECTION 15: REGULATORY INFORMATION

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

European Regulations

EC Classification — According to Regulation (EC) No. 1272/2008 (CLP)
Gases under pressure - liquefied gas

Special Restrictions: — The fluorinated greenhouse gas HFA 134a may be supplied in returnable containers (drums/cylinders). The container contains fluorinated greenhouse gases covered by the Kyoto Protocol. The fluorinated greenhouse gases in containers may not be vented to the atmosphere.

Regulation (EU) No. 517/2014 of the European Parliament and the Council on certain fluorinated greenhouse gases.

15.2 Chemical Safety Assessment

A REACH chemical safety assessment has been carried out.

SECTION 16: OTHER INFORMATION

The following sections contain revisions or new statements: 1-16

LEGEND

Hazard Statement(s) — H280: Contains gas under pressure; may explode if heated.

Acronyms

ADR : European Agreement concerning the International Carriage of Dangerous Goods by Road
CAS : Chemical Abstracts Service
CLP : Regulation (EC) No 1272/2008 on classification, labelling and packaging of substances and mixtures
EC : European Community
IATA : International Air Transport Association
IBC : Intermediate Bulk Container
ICAO : International Civil Aviation Organization
IMDG : International Maritime Dangerous Goods
LTEL : Long term exposure limit
PBT : Persistent, Bioaccumulative and Toxic
REACH : Registration, Evaluation, Authorisation and Restriction of Chemicals
RID : Regulations concerning the International Carriage of Dangerous Goods by Rail
STEL : Short term exposure limit
STOT : Specific Target Organ Toxicity
UN : United Nations
vPvB : very Persistent and very Bioaccumulative

Disclaimers