SAFETY DATA SHEET

Product Name: Zephex® 152a Revision: GHS04 Date: 08/2020 Page: 1 of 7

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® 152a
Chemical Name: 1,1-Difluoroethane (HFC 152a)
CAS No.: 75-37-6
EC No.: 200-866-1
REACH Registration No.: 01-2119474440-43-0012

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: HAZARD IDENTIFICATION

Extremely flammable liquefied gas. 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
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® 152a

Hazard Pictogram(s)
GHS02
GHS04

Signal Word(s)
Danger

Hazard Statement(s)
H220: Extremely flammable gas.
H280: Contains gas under pressure; may explode if heated.

Precautionary Statement(s)
P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P377: Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
P381: In case of leakage, eliminate all ignition sources.
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-Difluoroethane (HFC 152a)
HFA 152a

3.1 Substances

<table>
<thead>
<tr>
<th>HAZARDOUS INGREDIENT(S)</th>
<th>%W/W</th>
<th>CAS No.</th>
<th>EC No.</th>
<th>Hazard Pictogram(s) and Hazard Statement(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,1-Difluoroethane (HFC 152a)</td>
<td>100</td>
<td>75-37-6</td>
<td>200-866-1</td>
<td>GHS02 H220 GHS04 H280</td>
</tr>
</tbody>
</table>
3.2 Mixtures

Not applicable.

SECTION 4: FIRST AID MEASURES

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

Extremely flammable. Certain mixtures of HFCs and chlorine may be flammable or reactive under certain conditions.

5.1 Extinguishing media

Suitable Extinguishing media
Allow gas fires to burn until exhausted.
Keep fire exposed containers cool by spraying with water.

Unsuitable extinguishing media
None.

5.2 Special hazards arising from the substance or mixture
Combustion or 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 an explosive or suffocating atmosphere.

6.3 Methods and material for containment and cleaning up
Eliminate sources of ignition. 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 an explosive or suffocating atmosphere.

6.4 Reference to other sections
See Also Section 8, 13.
SECTION 7: HANDLING AND STORAGE

7.1 Precautions for safe handling

Keep away from sources of ignition - No smoking. Take precautionary measures against static discharges. 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 between the liquid and skin and eyes. Avoid venting to atmosphere.


Process Hazards

Liquid refrigerant transfers between refrigerant containers and to and from systems 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.

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

<table>
<thead>
<tr>
<th>SUBSTANCE</th>
<th>CAS No.</th>
<th>LTEL (8 hr TWA ppm)</th>
<th>LTEL (8 hr TWA mg/m³)</th>
<th>STEL (ppm)</th>
<th>STEL (mg/m³)</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,1-Difluoroethane (HFC 152a)</td>
<td>75-37-6</td>
<td>1000</td>
<td></td>
<td></td>
<td></td>
<td>COM</td>
</tr>
</tbody>
</table>

Source

COM: The company aims to control exposure in its workplace to this limit.

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

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.
SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

- **Appearance**: Liquefied gas.
- **Colour**: Colourless.
- **Odour**: Slight ethereal
- **pH**: Not applicable.
- **Melting point/freezing point**: -117°C
- **Initial boiling point and boiling range**: -24.8°C
- **Flash Point**: Not applicable.
- **Evaporation rate**: Not applicable.
- **Flammability (solid, gas)**: Extremely flammable gas.
- **Upper/lower flammability or explosive limits**: Flammable Limits (Upper) (%v/v): 18.0; Flammable Limits (Lower) (%v/v): 3.7
- **Vapour pressure**: 3966 mm Hg @ 20°C
- **Vapour Density (Air=1)**: 2.4
- **Density (g/ml)**: No information available.
- **Relative density**: 0.95 @ 4°C
- **Solubility(ies)**: Solubility (Water) : marginally soluble; Solubility (Other) : Soluble in: Most organic solvents
- **Partition coefficient: n-octanol/water**: Log Pow = 1.13 @ 25°C
- **Auto-ignition temperature**: 440°C
- ** Decomposition Temperature (°C)**: No information available.
- **Viscosity**: Not applicable.
- **Explosive properties**: Not explosive.
- **Oxidising properties**: Not oxidising.

9.2 Other information

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. May react violently with oxidising agents.

10.4 Conditions to avoid

Keep away from heat and sources of ignition.

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) 437500 ppm
- **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 sensitizer.
- **Respiratory sensitization data**: Not classified.
- **Germ cell mutagenicity**: No evidence of mutagenic effects.
Carcinogenicity  No evidence of carcinogenic effects. A lifetime inhalation study in animals has shown that repeated exposures produce adverse effects (25000 ppm)

Reproductive toxicity A study in animals has shown that high exposures produce no teratogenic effects. (50000 ppm)

Lactation Not classified.

STOT - single exposure Not classified.

STOT - repeated exposure Not classified.

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. (25000 ppm)

SECTION 12: ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity - Aquatic invertebrates Low toxicity to aquatic invertebrates.

Toxicity - Fish Low toxicity to fish.

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 1.4 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 124 (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 140.

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

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. 1030

14.2 UN proper shipping name

UN proper shipping name 1,1-DIFLUOROETHANE (REFRIGERANT GAS R 152a)

14.3 Transport hazard class(es)

AD/RID
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ADR/RID Class 2.1
IMDG 2.1
IMDG Class 2.1
ICAO/IATA 2.1
ICAO/IATA Class 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 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)
Flam. Gas 1
Gases under pressure - liquefied gas
Special Restrictions: The fluorinated greenhouse gas R 152a 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.

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) H220: Extremely flammable gas.
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

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