1. Identification of the substance / preparation and company / undertaking

Product name    HFO-1234ze, trans-1,3,3,3-Tetrafluoroprop-1-ene
REACH registration number 01-0000019758-54
Company    Harp International Ltd
Gellihirion Industrial Estate
Pontypridd
Rhondda Cynon Taff
CF37 5SX
Tel: +44 (0) 1443 842255
Fax: +44 (0) 1443 841805
Email: harp@harpintl.com

Emergency phone number +44 (0) 1270 502891 (24 hour)

Use    Refrigerant, propellant, foam blowing agent

2. Hazards identification

Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008/EC (CLP/GHS)
Gases under pressure, Liquefied gas
H280 Contains gas under pressure; may explode if heated

Label elements
Labelling Pictograms

Signal word    Warning

Hazard statements
H280    Contains gas under pressure; may explode if heated

Precautionary statements
P281    Use personal protective equipment as required
P260    Do not breathe dust/fumes/gas/mist/vapours/spray
P308 + P313    If exposed or concerned: Get medical advice/attention
P410 + P403    Protect from sunlight. Store in a well-ventilated place

Potential health effects
Skin    Rapid evaporation of the liquid may cause frostbite
Eyes    May irritate eyes
Ingestion    Unlikely route of exposure
Inhalation    Inhalation may cause central nervous system effects. Vapours may cause dizziness and drowsiness.
Chronic exposure    None known
General advice    Warning. Container under pressure
Potential environmental effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal

3. Composition / information on ingredients

Substance / mixture: Substance
CAS number 29118-24-9
EC No (from EINECS) 471-480-0

4. First aid measures

Description of first aid measures
General advice Show this safety data sheet to the doctor in attendance. Keep warm and in a quiet place.
Inhalation If inhaled, move to fresh air. Seek medical attention if irritation develops and persists.
Skin contact Rapid evaporation of the liquid may cause frostbite. If there is evidence of frostbite, bathe (do not rub) with lukewarm (not hot) water. If water is not available, cover with a clean, soft cloth or similar covering. Call a physician if irritation develops or persists.
Eye contact If eye irritation persists, consult a specialist.

5. Fire-fighting measures

Extinguishing media
Suitable extinguishing media Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Water mist, dry powder, foam or carbon dioxide.

Special hazards arising from the substance or mixture
Specific hazards Heating will cause pressure rise with risk of bursting. Some risk may be expected of corrosive and toxic decomposition products. Fire may cause evolution of hydrogen fluoride. However, this material can ignite when mixed with air under pressure and exposed to strong ignition sources.

Advice for fire fighters
Special protective equipment Wear full protective clothing and self-contained breathing apparatus. Exposure to decomposition products may be a hazard to health.

Further information In the event of fire, cool tanks with water spray.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures
Provide adequate ventilation. Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing. Avoid skin contact with leaking liquid (danger of frostbite). Use personal protective equipment. Keep people away from and upwind of spill/leak.
Environmental precautions
Prevent further leakage or spillage if safe to do so. The product evaporates readily. Prevent spreading over a wide area e.g. by containment or oil barriers.

Methods for cleaning up
Do not direct water spray at the point of leakage. Allow to evaporate.

### 7. Handling and storage

#### Advice for safe handling
Pressurized container: protect from sunlight and do not expose to temperatures exceeding 50°C. Do not pierce or burn, even after use. Do not burn. Exhaust ventilation at the object is necessary.

#### Advice on protection against fire and explosion
Do not spray on a naked flame or any incandescent material. Keep away from direct sunlight. Fire or intense heat may cause violent rupture of packages. Vapours may form explosive mixtures with air. The product is not easily combustible.

#### Hygiene measures
Avoid breathing vapours, mist or gas. Keep working clothes separately. Do not smoke.

#### Further information on storage conditions
Keep containers tightly closed in a cool, well-ventilated place. Keep only in the original container at temperatures not exceeding 50°C. Keep away from direct sunlight.

#### Advice on common storage
Do not store together with: Oxidising agents

### 8. Exposure controls / personal protection

#### Occupational exposure limits

<table>
<thead>
<tr>
<th>Components</th>
<th>Basis</th>
<th>Value type</th>
<th>Control parameters</th>
<th>Exceeding factor</th>
<th>Form of exposure</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trans-1,3,3,3-Tetrafluoroprop-1-ene</td>
<td>Honeywell</td>
<td>Time weighted average</td>
<td>800 ppm</td>
<td></td>
<td></td>
<td>We are not aware of any national exposure limit</td>
</tr>
</tbody>
</table>

#### Occupational exposure controls
The Personal Protective Equipment must be in accordance with EN standards: respirator EN 136, 140, 149; safety glasses EN 166; protective suit EN 340,463, 468, 943-1, 943-2; gloves EN 374; safety shoes EN-ISO 20345. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace. Avoid inhalation of vapour or mist.

#### Environmental exposure controls
Handle in accordance with local environmental regulations and good industrial practices.

#### Engineering measures
Local exhaust

#### Personal protective equipment

<table>
<thead>
<tr>
<th>Protection Type</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respiratory protection</td>
<td>Remarks: In case of insufficient ventilation, wear suitable respiratory equipment. Wear a positive-pressure supplied-air respirator.</td>
</tr>
<tr>
<td>Eye protection</td>
<td>Goggles</td>
</tr>
<tr>
<td>Skin and body protection</td>
<td>Wear suitable protective equipment. Protective footwear.</td>
</tr>
</tbody>
</table>
9. Physical and chemical properties

Form: Liquefied gas
Appearance/colour: Colourless
Odour: Slight, ether-like
Boiling point: -19°C
Flash point: Does not flash
Auto-ignition temperature: 368°C
Lower explosion limit: No LEL and UEL was assigned at standard testing conditions, 20°C
          Exhibits flame limits at temperatures in excess of 28°C
Upper explosion limit: No LEL and UEL was assigned at standard testing conditions, 20°C
          Exhibits flame limits at temperatures in excess of 28°C
Vapour pressure: 4.271 hPa at 20°C
Vapour pressure: 11.152 hPa at 54.4°C
Density: 1.17 g/cm³ at 21.1°C
pH: Neutral
Solubility in water: 0.373 g/l
Partition coefficient (n-octanol/water): log Pow 1.6
Relative vapour density: 4 (Air = 1.0)

10. Stability and reactivity

Conditions to avoid: Some risk may be expected of corrosive and toxic decomposition products. Avoid heat, flames and sparks.
Materials to avoid: Reactions with alkali metals.
Stability and reactivity: Stable under normal conditions. Hazardous decomposition products formed under fire conditions. To avoid thermal decomposition, do not over heat.

11. Toxicological information

Information on toxicological effects
Acute oral toxicity: Not applicable
Acute dermal toxicity: No data available
Acute inhalation toxicity: LC50/rat, value: >207000 ppm, >965 mg/l. Exposure time: 4 h
Skin irritation: Species: rabbit, result: no skin irritation. Method: OECD Test guideline 404
Eye irritation: No data available
Sensitisation: Species: human, classification: non-sensitizing
Further information: Not mutagenic in Ames Test. May cause headache and dizziness. No experimental indications on genotoxicity in vivo found. Detailed toxicological data and examinations, exceeding the data set in the MSDS are available for professional users on request.
12. Ecological information

Persistence and degradability
Biodegradability Aerobic. Result: Not readily biodegradable

Ecotoxicity effects

<table>
<thead>
<tr>
<th></th>
<th>Species</th>
<th>Value</th>
<th>Exposure time</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toxicity to fish</td>
<td>NOEC</td>
<td>Cyprinus carpio (Carp)</td>
<td>&gt;117 mg/l 96 h</td>
<td></td>
</tr>
<tr>
<td>Toxicity to aquatic plants</td>
<td>NOEC</td>
<td>Algae</td>
<td>&gt;170 mg/l 72 h</td>
<td>Growth inhibition</td>
</tr>
<tr>
<td>Acute toxicity to aquatic invertebrates</td>
<td>EC50</td>
<td>Daphnia magna (water flea)</td>
<td>&gt;160 mg/l 48 h</td>
<td></td>
</tr>
</tbody>
</table>

13. Disposal considerations

Product Dispose according to legal requirements. Contact manufacturer.

Packaging Legal requirements are to be considered in regard of reuse or disposal of used packaging materials


14. Transport information

ADR/RID
Class 2
Classification code 2A
UN number 3163
Labels 2.2
Proper shipping name LIQUIFIED GAS, N.O.S. (TRANS-1,3,3,3-TETRAFLUOROPROP-1-ENE)
Hazard number 20
Environmentally hazardous No

IATA
Class 2.2
UN number 3163
Hazard labels 2.2
Proper shipping name LIQUIFIED GAS, N.O.S. (TRANS-1,3,3,3-TETRAFLUOROPROP-1-ENE)

IMDG
Class 2.2
UN number 3163
Hazard labels 2.2
Proper shipping name LIQUIFIED GAS, N.O.S. (TRANS-1,3,3,3-TETRAFLUOROPROP-1-ENE)
EmS number F-C,S-V
Marine pollutant No
15. Regulatory information

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

Other inventory information

<table>
<thead>
<tr>
<th>Country</th>
<th>Legislation</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>US</td>
<td>Toxic Substances Control Act</td>
<td>On TSCA inventory</td>
</tr>
<tr>
<td>Australia</td>
<td>Industrial Chemical (Notification &amp; Assessment) Act</td>
<td>Not in compliance with inventory</td>
</tr>
<tr>
<td>Canada</td>
<td>Canadian Environmental Protection Act (CEPA)</td>
<td>Not in compliance with inventory</td>
</tr>
<tr>
<td></td>
<td>Domestic Substances List (DSL)</td>
<td></td>
</tr>
<tr>
<td>Japan</td>
<td>Kashin-Hou Law List</td>
<td>On the inventory or in compliance with the inventory</td>
</tr>
<tr>
<td>Korea</td>
<td>Existing Chemicals Inventory (KECI)</td>
<td>Not in compliance with inventory</td>
</tr>
<tr>
<td>Philippines</td>
<td>The Toxic Substances and Hazardous and Nuclear Waste Control Act</td>
<td>Not in compliance with inventory</td>
</tr>
<tr>
<td>China</td>
<td>Inventory of Existing Chemical Substances</td>
<td>On the inventory or in compliance with the inventory</td>
</tr>
<tr>
<td>New Zealand</td>
<td>Inventory of Chemicals (NZIoC), as published by ERMA</td>
<td>Not in compliance with inventory</td>
</tr>
</tbody>
</table>

16. Other information

Abbreviations
EC European Community
CAS Chemical Abstract Service
WEL Workplace Exposure Limit
MAK Maximale Arbeitsplatz-Konzentration
AGW Arbeitsplatzgrenzwert
STEL Short Term Exposure Limit

Note
When using this document care should be taken as the decimal sign and its position complies with rules for the structure and drafting of international standards and is a comma on the line. As an example 2,000 is two (to three decimal places) and not two thousand, whilst 1.000 is one thousand and not one (to three decimal places).

This data sheet contains changes from the previous version, CLP03 dated January 2018. Sections 1 and 9 have been updated.

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

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