

**Section 1: Identification of the substance/mixture and of the company/undertaking****1.1. Product identifier****Product name:** REFRIGERANT R1234ZE (E)**REACH registered number(s):** 01-0000019758-54**CAS number:** 1645-83-6**EINECS number:** 471-480-0**Synonyms:** SOLSTICE ZE**INCI name:** TRANS-1,3,3,3-TETRAFLUOROPROP-1-ENE**1.2. Relevant identified uses of the substance or mixture and uses advised against****Use of substance / mixture:** Refrigerant**1.3. Details of the supplier of the safety data sheet****Company name:** National Refrigerants Ltd  
4 Watling Close  
Sketchley Meadows Business Park  
Hinckley  
Leicestershire  
LE10 3EZ  
United Kingdom**Tel:** 01455 630790**Fax:** 01455 630791**Email:** [sds@nationalref.com](mailto:sds@nationalref.com)**1.4. Emergency telephone number****Emergency tel:** Carechem24 +44 (0)1865 407333**Section 2: Hazards identification****2.1. Classification of the substance or mixture****Classification under CLP:** Press. Gas: H280**Most important adverse effects:** Contains gas under pressure; may explode if heated.**2.2. Label elements****Label elements:****Hazard statements:** H280: Contains gas under pressure; may explode if heated.**Hazard pictograms:** GHS04: Gas cylinder

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**Signal words:** Warning

**Precautionary statements:** P260: Do not breathe vapours.

P280: Wear protective gloves/protective clothing/eye protection/face protection.

P284: Wear respiratory protection.

P308+P311: IF exposed or concerned: Call a POISON CENTER or doctor.

P410+P403: Protect from sunlight. Store in a well-ventilated place.

## 2.3. Other hazards

**PBT:** This product is not identified as a PBT/vPvB substance.

## Section 3: Composition/information on ingredients

### 3.1. Substances

**Chemical identity:** REFRIGERANT R1234ZE (E)

**CAS number:** 1645-83-6

**EINECS number:** 471-480-0

**REACH registered number(s):** 01-0000019758-54

## Section 4: First aid measures

### 4.1. Description of first aid measures

**Skin contact:** Rapid evaporation of liquid may cause frostbite. If frostbite has occurred call a physician.

Remove all contaminated clothes and footwear immediately unless stuck to skin.

Drench the affected skin with running water for 10 minutes or longer if substance is still on skin. Consult a doctor.

**Eye contact:** Bathe the eye with running water for 15 minutes. Transfer to hospital for specialist examination.

**Ingestion:** \* Ingestion is unlikely due to its physical properties and is not expected to be dangerous.

Since this product is a gas, refer to the inhalation section.

**Inhalation:** \* Remove casualty from exposure ensuring one's own safety whilst doing so. Get medical attention if irritation develops and persists. In high concentrations may cause asphyxiation.

### 4.2. Most important symptoms and effects, both acute and delayed

**Skin contact:** There may be irritation and redness at the site of contact. Frost-bite may occur causing the affected area to become white and numb.

**Eye contact:** There may be severe pain. Corneal burns may occur. May cause permanent damage.

**Ingestion:** Not applicable.

**Inhalation:** Inhalation may produce the following symptoms: Shortness of breath, dizziness, weakness, nausea, headache, narcosis, irregular cardiac activity. Causes asphyxiation in high concentrations. May cause cardiac arrhythmia. The victim will not realize that he/she is suffocating.

**Delayed / immediate effects:** No data available.

[cont...]

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## 4.3. Indication of any immediate medical attention and special treatment needed

**Immediate / special treatment:** \* No data available.

## Section 5: Fire-fighting measures

### 5.1. Extinguishing media

**Extinguishing media:** \* Suitable extinguishing media for the surrounding fire should be used. Water fog. Dry chemical powder. Alcohol resistant foam. Carbon dioxide. Cool cylinders with water spray.

### 5.2. Special hazards arising from the substance or mixture

**Exposure hazards:** \* Non flammable gas. Pressure build up. Fire or intense heat may cause violent rupture of packages. In combustion emits toxic fumes of hydrogen fluoride.

### 5.3. Advice for fire-fighters

**Advice for fire-fighters:** Wear protective clothing to prevent contact with skin and eyes. Wear self-contained breathing apparatus.

## Section 6: Accidental release measures

### 6.1. Personal precautions, protective equipment and emergency procedures

**Personal precautions:** Vapours heavier than air and can cause suffocation by reducing oxygen available for breathing. Ventilate the area, especially low or enclosed places where heavy vapours might collect. Avoid skin contact with leaking liquid (danger of frostbite).

### 6.2. Environmental precautions

**Environmental precautions:** Should not be released into the environment. The product evaporates readily. Prevent from entering sewers, basements and work pits, or any place where the accumulation can be dangerous. Stop release if safe to do so.

### 6.3. Methods and material for containment and cleaning up

**Clean-up procedures:** Material evaporates. Ventilate the area, especially low or enclosed places where heavy vapours might collect.

### 6.4. Reference to other sections

**Reference to other sections:** Refer to section 8 of SDS.

## Section 7: Handling and storage

### 7.1. Precautions for safe handling

**Handling requirements:** Ensure there is sufficient ventilation of the area. Ensure there is exhaust ventilation of the area. Do not handle in a confined space.

### 7.2. Conditions for safe storage, including any incompatibilities

**Storage conditions:** Keep container tightly closed. Keep away from direct sunlight. Store in a cool, well ventilated area. Store at temperatures not exceeding 45 ° C.

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**Suitable packaging:** Must only be kept in original packaging.

## 7.3. Specific end use(s)

**Specific end use(s):** \* Refrigerant PC16: Heat transfer fluids.

## Section 8: Exposure controls/personal protection

### 8.1. Control parameters

#### Workplace exposure limits:

#### Respirable dust

State	8 hour TWA	15 min. STEL	8 hour TWA	15 min. STEL
UK	800 ppm	-	-	-

### DNEL/PNEC Values

#### REFRIGERANT R1234ZE (E)

Type	Exposure	Value	Population	Effect
DNEL	Inhalation	3902 mg/m <sup>3</sup>	Workers	Systemic
DNEL	Inhalation	830 mg/m <sup>3</sup>	Consumers	Systemic
PNEC	Fresh water	0.1 mg/l	-	-

### 8.2. Exposure controls

**Engineering measures:** Ensure there is sufficient ventilation of the area. Ensure there is exhaust ventilation of the area. Use only in closed systems. Ensure all engineering measures mentioned in section 7 of SDS are in place.

**Respiratory protection:** Self-contained breathing apparatus must be available in case of emergency. Vapours are heavier than air and can cause suffocation by reducing the oxygen available for breathing.

**Hand protection:** Protective gloves. Material: Low temperature resistant gloves. The suitability for a specific workplace should be discussed with the producers of the protective gloves.

**Eye protection:** Safety glasses with side-shields. Face-shield. Ensure eye bath is to hand.

**Skin protection:** Protective clothing. Boots.

**Environmental:** \* Refer to specific Member State legislation for requirements under Community environmental legislation. Gas escapes to be kept to the minimum by engineering processes and operating methods.

## Section 9: Physical and chemical properties

### 9.1. Information on basic physical and chemical properties

**State:** Liquefied gas

**Colour:** Colourless

**Odour:** Characteristic odour

**Solubility in water:** Slightly soluble

[cont...]

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<b>Boiling point/range°C:</b> -19	<b>Flash point°C:</b> Not applicable.
<b>Part.coeff. n-octanol/water:</b> 1.6	<b>Autoflammability°C:</b> 368
<b>Vapour pressure:</b> 4271 hPa at 20oC	<b>Relative density:</b> 4 (air=1)

**9.2. Other information**

**Other information:** \* R1234ze: Dencity 1.17 g/cm3 @ 21.1degC; Vapour Pressure 11.152 hPa @ 54.4 degC.

**Section 10: Stability and reactivity**

**10.1. Reactivity**

**Reactivity:** Stable under recommended transport or storage conditions.

**10.2. Chemical stability**

**Chemical stability:** Stable under normal conditions.

**10.3. Possibility of hazardous reactions**

**Hazardous reactions:** Hazardous reactions will not occur under normal transport or storage conditions.

**10.4. Conditions to avoid**

**Conditions to avoid:** Direct sunlight. Heat. Hot surfaces. Flames.

**10.5. Incompatible materials**

**Materials to avoid:** Alkali metals. Finely powdered metals.

**10.6. Hazardous decomposition products**

**Haz. decomp. products:** In combustion emits toxic fumes of hydrogen fluoride.

**Section 11: Toxicological information**

**11.1. Information on toxicological effects**

**Toxicity values:**

Route	Species	Test	Value	Units
GASES	RAT	LC0	207000	ppmV

**Symptoms / routes of exposure**

**Skin contact:** There may be irritation and redness at the site of contact. Frost-bite may occur causing the affected area to become white and numb.

**Eye contact:** There may be severe pain. Corneal burns may occur. May cause permanent damage.

**Ingestion:** Not applicable.

**Inhalation:** Inhalation may produce the following symptoms: Shortness of breath, dizziness, weakness, nausea, headache, narcosis, irregular cardiac activity. Causes asphyxiation in high concentrations. May cause cardiac arrhythmia. The victim will not realize that he/she is suffocating.

**Delayed / immediate effects:** No data available.

[cont...]

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**Section 12: Ecological information**

**12.1. Toxicity**

**Ecotoxicity values:**

Species	Test	Value	Units
FISH	LC0	117	mg/l
ALGAE	NOEC	>170	mg/l
Daphnia magna	48H EC50	>160	mg/l

**12.2. Persistence and degradability**

**Persistence and degradability:** Not readily biodegradable.

**12.3. Bioaccumulative potential**

**Bioaccumulative potential:** \* No bioaccumulation potential.

**12.4. Mobility in soil**

**Mobility:** Not applicable.

**12.5. Results of PBT and vPvB assessment**

**PBT identification:** This product is not identified as a PBT/vPvB substance.

**12.6. Other adverse effects**

**Other adverse effects:** Ozone Depletion Potential (ODP): 0 (R11 = 1) R1234ze Global Warming Potential (GWP)=7 (CO2=1).

**Section 13: Disposal considerations**

**13.1. Waste treatment methods**

**Disposal operations:** Recover to a recovery cylinder and return to a refrigerant recovery facility. Product evaporates.

**Recovery operations:** Consult manufacturer or supplier for information regarding recovery and recycling of the product. If recovery is not possible, incinerate at a licensed installation.

**Waste code number:** 14 06 01

**Disposal of packaging:** Return to supplier.

**NB:** The user's attention is drawn to the possible existence of regional or national regulations regarding disposal.

**Section 14: Transport information**

**14.1. UN number**

**UN number:** UN3163

**14.2. UN proper shipping name**

**Shipping name:** LIQUEFIED GAS, N.O.S.

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(Trans-1,3,3,3-tetrafluoroprop-1-ene)

## 14.3. Transport hazard class(es)

Transport class: 2

## 14.4. Packing group

## 14.5. Environmental hazards

Environmentally hazardous: No

Marine pollutant: No

## 14.6. Special precautions for user

Tunnel code: C/E

Transport category: 3

## Section 15: Regulatory information

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

**Specific regulations:** \* Contains fluorinated greenhouse gases covered by the Kyoto Protocol. Pressure Equipment Directive: Group 2 (Non-flammable) (European Regulation EC 440/2008 flammability Test A11)

### 15.2. Chemical Safety Assessment

**Chemical safety assessment:** A chemical safety assessment has not been carried out for the substance or the mixture by the supplier.

## Section 16: Other information

### Other information

**Other information:** This safety data sheet is prepared in accordance with Commission Regulation (EU) No 2015/830.

\* indicates text in the SDS which has changed since the last revision.

**Phrases used in s.2 and s.3:** H280: Contains gas under pressure; may explode if heated.

**Legal disclaimer:** The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. This company shall not be held liable for any damage resulting from handling or from contact with the above product.