

## Section 1: Identification of the substance/mixture and of the company/undertaking

### 1.1. Product identifier

**Product name:** REFRIGERANT R438A

**Product code:** R438A

**Synonyms:** ISCEON MO99

FREON MO99

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

**Use of substance / mixture:** \*Refrigerant \*Industrial and Professional use.

### 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



**Signal words:** Warning

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**Precautionary statements:** P410+403: 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

### 3.2. Mixtures

#### Hazardous ingredients:

PENTAFLUOROETHANE - REACH registered number(s): 01-2119485636-25

EINECS	CAS	PBT / WEL	CLP Classification	Percent
206-557-8	354-33-6	Substance with a Community workplace exposure limit.	Press. Gas: H280	45.000%

REFRIGERANT R134A - REACH registered number(s): 01-2119459374-33

212-377-0	811-97-2	Substance with a Community workplace exposure limit.	Press. Gas: H280	44.200%
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DIFLUOROMETHANE - REACH registered number(s): 01-2119471312-47

200-839-4	75-10-5	Substance with a Community workplace exposure limit.	Flam. Gas 1: H220; Press. Gas: H280	8.500%
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BUTANE

203-448-7	106-97-8	Substance with a Community workplace exposure limit.	Flam. Gas 1: H220; Press. Gas: H280	1.700%
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#### Non-classified ingredients:

ISOPENTANE

EINECS	CAS	PBT / WEL	CLP Classification	Percent
201-142-8	78-78-4	-	Flam. Liq. 1: H224; Asp. Tox. 1: H304; STOT SE 3: H336; Aquatic Chronic 2: H411; -: EUH066	0.600%

## Section 4: First aid measures

### 4.1. Description of first aid measures

**Skin contact:** 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. Do not use hot water. If frostbite has occurred call a physician.

**Eye contact:** Bathe the eye with running water for 15 minutes. Consult a doctor.

**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. If unconscious, check for breathing and apply artificial respiration if necessary. Consult a doctor.

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

**Skin contact:** There may be redness or whiteness of the skin in the area of exposure. 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:** Ingestion is unlikely due to the physical properties of the product. As product is a gas refer to inhalation section.

**Inhalation:** Inhalation may produce the following symptoms: Shortness of breath, dizziness, weakness, nausea, headache, narcosis, irregular cardiac activity. asphyxia May cause cardiac arrhythmia.

**Delayed / immediate effects:** May cause cardiac arrhythmia.

## 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:** The product is not flammable. Suitable extinguishing media for the surrounding fire should be used. Alcohol resistant foam. Water spray. Carbon dioxide. Dry chemical powder. Use water spray to cool containers. \*Do not use water stream.

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

**Exposure hazards:** In combustion emits toxic fumes of hydrogen fluoride. In combustion emits toxic fumes of carbon dioxide / carbon monoxide. Non flammable gas.

### 5.3. Advice for fire-fighters

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

## Section 6: Accidental release measures

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

**Personal precautions:** Evacuate the area immediately. If outside keep bystanders upwind and away from danger point. Vapours heavier than air and can cause suffocation by reducing oxygen available for breathing.

### 6.2. Environmental precautions

**Environmental precautions:** Stop release if safe to do so. Prevent from entering sewers, basements and work pits, or any place where the accumulation can be dangerous.

### 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.

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## 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. Do not handle in a confined space. Avoid direct contact with the substance.

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

**Storage conditions:** Store in a cool, well ventilated area. Keep container tightly closed. Store at a temperature not exceeding 45°C.

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

### 7.3. Specific end use(s)

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

## Section 8: Exposure controls/personal protection

### 8.1. Control parameters

**Hazardous ingredients:**

#### PENTAFLUOROETHANE

**Workplace exposure limits:**

**Respirable dust**

State	8 hour TWA	15 min. STEL	8 hour TWA	15 min. STEL
EU	1000 ppm	-	-	-

#### REFRIGERANT R134A

EU	4240 mg/m <sup>3</sup>	-	-	-
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#### DIFLUOROMETHANE

UK	1000 ppm	-	-	-
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#### BUTANE

UK	1450 mg/m <sup>3</sup>	1810 mg/m <sup>3</sup>	-	-
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### DNEL/PNEC Values

**Hazardous ingredients:**

#### PENTAFLUOROETHANE

Type	Exposure	Value	Population	Effect
DNEL	Inhalation	16444 mg/m <sup>3</sup>	Workers	Systemic
DNEL	Inhalation	1753 mg/m <sup>3</sup>	Consumers	Systemic

[cont...]

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PNEC	Fresh water	0.1 mg/l	-	-
PNEC	Fresh water sediments	0.6 mg/kg	-	-

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Type	Exposure	Value	Population	Effect
DNEL	Inhalation	2476 mg/m <sup>3</sup>	Workers	Systemic
DNEL	Inhalation	2476 mg/m <sup>3</sup>	Consumers	Systemic
PNEC	Fresh water	0.01 mg/l	-	-
PNEC	Marine water	0.75 mg/l	-	-
PNEC	Microorganisms in sewage treatment	73 mg/l	-	-
DNEL	Inhalation	13936 mg/m <sup>3</sup>	Workers	Systemic
PNEC	Fresh water sediments	0.75 mg/kg	-	-

## DIFLUOROMETHANE

Type	Exposure	Value	Population	Effect
DNEL	Inhalation (developmental tox)	13936 mg/m <sup>3</sup>	Workers	Systemic
DNEL	Inhalation (developmental tox)	2476 mg/m <sup>3</sup>	Consumers	Systemic
PNEC	Fresh water	0.142 mg/l	-	-
PNEC	Fresh water sediments	0.534 mg/kg	-	-

## 8.2. Exposure controls

**Engineering measures:** Ensure there is sufficient ventilation of the area.

**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. The suitability for a specific workplace should be discussed with the producers of the protective gloves.

**Eye protection:** Safety glasses with side-shields. Safety goggles. Face-shield. Safety glasses.

**Skin protection:** Protective clothing.

**Environmental:** 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:** Liquified gas

**Colour:** Colourless

**Odour:** Barely perceptible odour

**Evaporation rate:** Not applicable.

**Oxidising:** Non-oxidising (by EC criteria)

**Solubility in water:** No data available.

**Viscosity:** Not applicable.

**Boiling point/range°C:** -42.3

**Melting point/range°C:** No data available.

**Flammability limits %: lower:** Not applicable.

**upper:** Not applicable.

**Flash point°C:** Not applicable.

**Part.coeff. n-octanol/water:** Not applicable.

**Autoflammability°C:** No data available.

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Relative density: 3.5 (Air=1)

VOC g/l: Not applicable.

Vapour pressure: 11171 hPa at 25°C

pH: Not applicable.

## 9.2. Other information

Other information: R438A Liquid density: 1.14 g/cm<sup>3</sup> at 25 deg. C.

## 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. Stable at room temperature.

### 10.3. Possibility of hazardous reactions

Hazardous reactions: Hazardous reactions will not occur under normal transport or storage conditions.  
Decomposition may occur on exposure to conditions or materials listed below.

### 10.4. Conditions to avoid

Conditions to avoid: Heat. Hot surfaces. Flames.

### 10.5. Incompatible materials

Materials to avoid: Strong oxidising agents.

### 10.6. Hazardous decomposition products

Haz. decomp. products: In combustion emits toxic fumes of hydrogen fluoride. In combustion emits toxic fumes of carbon dioxide / carbon monoxide.

## Section 11: Toxicological information

### 11.1. Information on toxicological effects

Hazardous ingredients:

#### PENTAFLUOROETHANE

GASES	RAT	4H LC50	800000	ppmV
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#### REFRIGERANT R134A

GASES	RAT	4H LC50	567000	ppmV
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#### DIFLUOROMETHANE

GASES	RAT	LD50	520000	ppmV
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Toxicity values: No data available.

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## Symptoms / routes of exposure

**Skin contact:** There may be redness or whiteness of the skin in the area of exposure. 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:** Ingestion is unlikely due to the physical properties of the product. As product is a gas refer to inhalation section.

**Inhalation:** Inhalation may produce the following symptoms: Shortness of breath, dizziness, weakness, nausea, headache, narcosis, irregular cardiac activity. asphyxia May cause cardiac arrhythmia.

**Delayed / immediate effects:** May cause cardiac arrhythmia.

## Section 12: Ecological information

### 12.1. Toxicity

**Hazardous ingredients:**

#### REFRIGERANT R134A

Daphnia magna	48H EC50	980	mg/l
GREEN ALGA (Selenastrum capricornutum)	72H ErC50	118	mg/l
RAINBOW TROUT (Oncorhynchus mykiss)	96H LC50	450	mg/l

#### DIFLUOROMETHANE

ALGAE	96H ErC50	142	mg/l
Daphnia magna	48H EC50	652	mg/l
FISH	96H LC50	1.057	mg/l

### 12.2. Persistence and degradability

**Persistence and degradability:** Not biodegradable.

### 12.3. Bioaccumulative potential

**Bioaccumulative potential:** No bioaccumulation potential.

### 12.4. Mobility in soil

**Mobility:** No data available.

### 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) R438A Global Warming Potential (GWP): 2264 (CO2=1) Contains fluoronated greenhouse gases covered by the Kyoto Protocol.

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## Section 13: Disposal considerations

### 13.1. Waste treatment methods

**Disposal operations:** 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.  
(PENTAFLUOROETHANE; REFRIGERANT R134A)

### 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

**Special precautions:** No special precautions.

**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.

### 15.2. Chemical Safety Assessment

## 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.

[cont...]



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**Phrases used in s.2 and s.3:** EUH066: Repeated exposure may cause skin dryness or cracking.

H220: Extremely flammable gas.

H224: Extremely flammable liquid and vapour.

H280: Contains gas under pressure; may explode if heated.

H304: May be fatal if swallowed and enters airways.

H336: May cause drowsiness or dizziness.

H411: Toxic to aquatic life with long lasting effects.

**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.