

## SAFETY DATA SHEET

# Refrigerant R-134a

**SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING****1.1. Product identifier**

<i>Trade name:</i>	Refrigerant R-134a
<i>Other names / Synonyms:</i>	Norflurane
<i>UK REACH registration number:</i>	UK-20-0812279581-1-0000
<i>Other means of identification:</i>	EC No.: 212-377-0 CAS No.: 811-97-2

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

*Relevant identified uses of the substance or mixture:* Refrigerant  
Restricted to professional users.

*Use descriptors (UK REACH):*

Sectors of use	Description
Refrigeration	For use as a refrigerant
Product category	Description
PC 16	Heat Transfer Fluids

*Uses advised against :* None known.

**1.3. Details of the supplier of the safety data sheet**

*Company and address:* **National Refrigerants Limited**  
4 Watling Close  
Sketchley Meadows Business Park

LE10 3EZ Hinckley  
England  
+44 (0)1455 630 790  
www.nationalref.com

*Contact person:* sds@nationalref.com

*Revision:* 28/11/2024

*SDS Version:* 1.0

**1.4. Emergency telephone number**

Healthcare professionals: Dial 0344 892 0111 to reach The National Poisons Information Service (NPIS) (24 hour service)

General public:

England - Dial 111 to reach NHS 111 (24 hour service)

Scotland - Dial 112 to reach NHS 24 (24 hour service)

Wales - Dial 111 or 0845 4647 to reach NHS Direct (24 hour service)

See section 4 "First aid measures".

Emergency Telephone: Carechem24 +44 (0)1865 407333

## SECTION 2: HAZARDS IDENTIFICATION

### 2.1. Classification of the substance or mixture

Press. Gas (Liq.) ; H280, Contains gas under pressure; may explode if heated.

### 2.2. Label elements

*Hazard pictogram(s):*



*Signal word:*

Warning

*Hazard statement(s):*

Contains gas under pressure; may explode if heated. (H280)

*Precautionary statement(s):*

*General:*

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*Prevention:*

Wear eye protection/protective gloves/protective clothing. (P280)  
[In case of inadequate ventilation] wear respiratory protection. (P284)

*Response:*

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*Storage:*

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

*Disposal:*

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*Hazardous substances:*

None known.

*Additional labelling:*

EUH044, Risk of explosion if heated under confinement.

### 2.3. Other hazards

*Additional warnings:*

In the event of leaks, high concentrations of gases can quickly form. They can be toxic, asphyxiating, or explosive. This mixture/product does not contain any substances known to fulfil the criteria for PBT and vPvB classification. This product does not contain any substances considered to be endocrine disruptors in accordance with the criteria set out in Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2023/707.

## SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

### 3.1. Substances

Product/substance	Identifiers	% w/w	Classification	Note
1,1,1,2-tetrafluoroethane (HFC-134a)	CAS No.: 811-97-2 EC No.: 212-377-0 UK-REACH: UK-20-0812279581-1-0000 Index No.:	95-100%	EUH044 Press. Gas (Liq.) , H280	

### 3.2. Mixtures

Not applicable. This product is a substance.

See full text of H-phrases in section 16. Occupational exposure limits are listed in section 8, if these are available.

## Other information

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## SECTION 4: FIRST AID MEASURES

### 4.1. Description of first aid measures

*General information:*

In the case of accident: Contact a doctor or casualty department – take the label or this safety data sheet. Contact a doctor if in doubt about the injured person's condition or if the symptoms persist. Never give an unconscious person water or other drink.

*Inhalation:*

Upon breathing difficulties or irritation of the respiratory tract: Bring the person into fresh air and stay with him/her.

*Skin contact:*

Exposure is not likely due to the physical state of the product (gas).

*Eye contact:*

If in eyes: Flush eyes with water or saline water (20-30 °C) for at least 5 minutes. Remove contact lenses. Seek medical assistance and continue flushing during transport.

*Ingestion:*

Exposure is not likely due to the physical state of the product (gas).

*Burns:*

Rinse with water until pain stops then continue to rinse for 30 minutes.

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

None known.

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

Treat symptomatically.

### Information to medics

Bring this safety data sheet or the label from this product.

## SECTION 5: FIREFIGHTING MEASURES

### 5.1. Extinguishing media

Suitable extinguishing media: Alcohol-resistant foam, carbon dioxide, powder, water mist.

Unsuitable extinguishing media: Waterjets should not be used, since they can spread the fire.

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

Contains gas under pressure; may explode if heated.

Given that it does not present a risk gas supplies shall be disrupted immediately. Removal of pressurized containers or attempting to cool with water shall be entrusted the fire brigade.

If the product is exposed to high temperatures, e.g. in the event of fire, dangerous decomposition compounds are produced. These are:

Halogenated compounds

Carbon oxides (CO / CO<sub>2</sub>)

**5.3. Advice for firefighters**

Wear self-contained breathing apparatus and protective clothing to prevent contact. Upon direct exposure contact The National Poisons Information Service (dial 111, 24 h service) in order to obtain further advice.

Hazchem Code: 2TE

**SECTION 6: ACCIDENTAL RELEASE MEASURES****6.1. Personal precautions, protective equipment and emergency procedures**

Accidental releases always pose a serious risk of fire or explosion.

Storages not yet ignited must be cooled by water mist. Remove flammable materials if conditions allow it. Ensure sufficient ventilation.

Disconnect the gas supply provided it does not present a risk. Avoid breathing fumes. Make sure to have a self-contained breathing apparatus available and ready-to-use in the event of an emergency.

Ensure adequate ventilation, especially in confined areas.

**6.2. Environmental precautions**

In the event of leakage to the surroundings, contact local environmental authorities.

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

Disconnect the gas supply. Allow liquefied gas to evaporate and dilute into safe concentration levels in the surrounding atmosphere. If necessary control the dilution of the gas with a mist of water. Ventilate rooms in order to remove the gas.

**6.4. Reference to other sections**

See section 13 "Disposal considerations" on handling of waste.

See section 8 "Exposure controls/personal protection" for protective measures.

**SECTION 7: HANDLING AND STORAGE****7.1. Precautions for safe handling**

Smoking, drinking and consumption of food is not allowed in the work area.

See section 8 "Exposure controls/personal protection" for information on personal protection.

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

Vapours may propagate along the floor. Prevent the forming of flammable or explosive vapour concentrations by applying sufficient ventilation. Do not use this product in close proximity to sources of ignition.

Protect electrical equipment in accordance with current standards. To divert static electricity during transmission, containers must be grounded and connected by wire with the receiving containers. Do not use spark-forming tools.

Pressurized gas packs (spray cans, aerosol cans) must be stored behind a wire mesh, which allows gases to escape and holds back packs flying around.

*Recommended storage material:* Keep only in original packaging.

*Storage conditions:* < 50°C  
Dry, cool and well ventilated  
Store in shade

*Incompatible materials:* Strong acids  
Finely divided metals, alkali metals (sodium, potassium),  
alkaline earth metals (barium, magnesium), alloys  
containing more than 2% magnesium.

**7.3. Specific end use(s)**

This product should only be used for applications quoted in section 1.2.

## SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

### 8.1. Control parameters

1,1,1,2-tetrafluoroethane (HFC-134a)

Long term exposure limit (8 hours) (ppm): 1000

Long term exposure limit (8 hours) (mg/m<sup>3</sup>): 4240

The Control of Substances Hazardous to Health Regulations 2002. SI 2002/2677 The Stationery Office 2002.

EH40/2005 Workplace exposure limits (Fourth Edition 2020).

### DNEL

1,1,1,2-tetrafluoroethane (HFC-134a)

Duration:	Route of exposure:	DNEL:
Long term – Systemic effects - General population	Inhalation	2476 mg/m <sup>3</sup>
Long term – Systemic effects - Workers	Inhalation	13936 mg/m <sup>3</sup>

### PNEC

1,1,1,2-tetrafluoroethane (HFC-134a)

Route of exposure:	Duration of Exposure:	PNEC:
Freshwater		100 µg/L
Freshwater sediment		750 µg/kg
Intermittent release (freshwater)		1 mg/L
Marine water		10 µg/L
Sewage treatment plant		73 mg/L

### 8.2. Exposure controls

Compliance with the given occupational exposure limits values should be controlled on a regular basis.

*General recommendations:*

Smoking, drinking and consumption of food is not allowed in the work area.

*Exposure scenarios:*

There are no exposure scenarios implemented for this product.

*Exposure limits:*

Professional users are subjected to the legally set maximum concentrations for occupational exposure. See occupational hygiene limit values above.

*Appropriate technical measures:*

Adequate ventilation must be ensured for all gases. Where natural ventilation is not possible (cellar rooms), artificial ventilation must be installed. It is advantageous to store it in a lattice shed outdoors, as ventilation is no longer necessary in this case.

*Hygiene measures:*

In between use of the product and at the end of the working day all exposed areas of the body must be washed thoroughly. Pay special attention to hands, forearms and face.


*Measures to avoid environmental exposure:*

No special when used as intended.



## Individual protection measures, such as personal protective equipment

*Generally:* Use only UKCA marked protective equipment.


### *Respiratory Equipment:*

Work situation	Type	Class	Colour	Standards	
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.	Full mask			EN136	



### *Skin protection:*

Recommended	Type/Category	Standards	
Dedicated work clothing should be worn. Wear a protective suit in the event of prolonged periods of work with the product.	-	-	
Safety shoes	II	EN ISO 20345 / EN ISO 20347	

### *Hand protection:*

Material	Glove thickness (mm)	Breakthrough time (min.)	Standards	
Vinyl/PVC	-	-	EN388, EN511	

### *Eye protection:*

Type	Standards	
Safety glasses with side shields.	EN166	
In the likelihood of direct or incidental exposure, use face protection.	EN166	

## SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

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

*Physical state:* Gas  
Liquefied Gas

<i>Colour:</i>	Colourless
<i>Odour / Odour threshold:</i>	Slight, ether-like
<i>pH:</i>	Neutral
<i>Density (g/cm<sup>3</sup>):</i>	1.2
<i>Relative density:</i>	Does not apply to gases.
<i>Kinematic viscosity:</i>	No data available
<i>Particle characteristics:</i>	Not applicable - product is a gas

**Phase changes**

<i>Melting point/Freezing point (°C):</i>	-101
<i>Softening point/range (°C):</i>	Does not apply to gases.
<i>Boiling point (°C):</i>	-26.2
<i>Vapour pressure:</i>	5.915 hPa (21.1 °C)
<i>Relative vapour density:</i>	3.5 (Air=1)
<i>Decomposition temperature (°C):</i>	250

**Data on fire and explosion hazards**

<i>Flash point (°C):</i>	Not applicable - product is a gas
<i>Flammability (°C):</i>	Non-flammable
<i>Auto-ignition temperature (°C):</i>	>750
<i>Lower and upper explosion limit (% v/v):</i>	Not explosive

**Solubility**

<i>Solubility in water:</i>	1.5 g/l
<i>n-octanol/water coefficient (LogKow):</i>	1.06
<i>Solubility in fat (g/L):</i>	No relevant or available data due to the nature of the product.

**9.2. Other information**

<i>Critical temperature (pure gas) (°C):</i>	101.1
<i>Evaporation rate (n-butylacetate = 100):</i>	>1
<i>Molecular Weight (g/mol):</i>	102.02
<i>Oxidizing properties:</i>	No data available
<i>Other physical and chemical parameters:</i>	No data available.

**SECTION 10: STABILITY AND REACTIVITY****10.1. Reactivity**

No data available.

**10.2. Chemical stability**

The product is stable under the conditions, noted in section 7 "Handling and storage".

**10.3. Possibility of hazardous reactions**

Risk of explosion if heated under confinement.

**10.4. Conditions to avoid**

Extremes of temperature

**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**

Under normal conditions of storage and use, hazardous decomposition products should not be produced

Halogenated compounds

Hydrogen fluoride

Carbonyl halides

Carbon oxides

**SECTION 11: TOXICOLOGICAL INFORMATION****11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008 as retained and amended in UK law****Acute toxicity**

Product/substance: Refrigerant R-134a  
Route of exposure: Oral  
Other information: The substance or mixture has no acute oral toxicity.

Product/substance: Refrigerant R-134a  
Route of exposure: Dermal  
Other information: No data available

Product/substance: Refrigerant R-134a  
Species: Rat  
Route of exposure: Inhalation  
Test: LC50 (4 hours)  
Result: 567000 ppm

Product/substance: 1,1,1,2-tetrafluoroethane (HFC-134a)  
Species: Rat  
Route of exposure: Inhalation  
Test: LC50 (4 hours)  
Result: 567000 ppmV

**Skin corrosion/irritation**

Product/substance: Refrigerant R-134a  
Other information: No data available

Product/substance: 1,1,1,2-tetrafluoroethane (HFC-134a)  
Other information: No data available

**Serious eye damage/irritation**

Product/substance: 1,1,1,2-tetrafluoroethane (HFC-134a)  
Other information: No data available

**Respiratory sensitisation**

Product/substance: 1,1,1,2-tetrafluoroethane (HFC-134a)  
Other information: No data available

**Skin sensitisation**

Product/substance 1,1,1,2-tetrafluoroethane (HFC-134a)  
Other information: No data available

**Germ cell mutagenicity**

Product/substance 1,1,1,2-tetrafluoroethane (HFC-134a)  
Test method: OECD 471  
Conclusion: No adverse effect observed

**Carcinogenicity**

Product/substance 1,1,1,2-tetrafluoroethane (HFC-134a)  
Other information: Not classified based on available information.

**Reproductive toxicity**

Product/substance 1,1,1,2-tetrafluoroethane (HFC-134a)  
Species: Rabbit  
Test: General Toxicity - Maternal: NOEL:  
Result: 2,500 ppm

Product/substance 1,1,1,2-tetrafluoroethane (HFC-134a)  
Species: Rabbit  
Test: Embryo-foetal Toxicity: NOEL:  
Result: 40,000 ppm

**STOT-single exposure**

Product/substance 1,1,1,2-tetrafluoroethane (HFC-134a)  
Other information: No data available

**STOT-repeated exposure**

Product/substance 1,1,1,2-tetrafluoroethane (HFC-134a)  
Other information: No data available

**Aspiration hazard**

Product/substance 1,1,1,2-tetrafluoroethane (HFC-134a)  
Other information: No data available

**11.2. Information on other hazards****Long term effects**

None known.

**Endocrine disrupting properties**

Product/substance 1,1,1,2-tetrafluoroethane (HFC-134a)  
Other information: No data available

**Other information**

None known.

**SECTION 12: ECOLOGICAL INFORMATION****12.1. Toxicity**

Product/substance Refrigerant R-134a  
Test method: 92/69/EEC, C.1  
Species: Fish, *Oncorhynchus mykiss*  
Duration: 96 hours  
Test: LC50  
Result: 450 mg/L

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Product/substance	Refrigerant R-134a
Test method:	OECD 201
Species:	Algae, Selenastrum capricornutum
Duration:	72 hours
Result:	>118 mg/L

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Product/substance	Refrigerant R-134a
Species:	Bacteria, Pseudomonas putida
Duration:	6 Hours
Test:	EC10
Result:	>730 mg/L

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Product/substance	Refrigerant R-134a
Test method:	EEC 92/69/V, C2
Species:	Aquatic invertebrates., Daphnia magna
Duration:	48 hours
Test:	EC50
Result:	980 mg/L

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Product/substance	1,1,1,2-tetrafluoroethane (HFC-134a)
Species:	Daphnia, Daphnia magna
Duration:	48 hours
Test:	EC50
Result:	980 mg/L

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Product/substance	1,1,1,2-tetrafluoroethane (HFC-134a)
Species:	Fish, Oncorhynchus mykiss
Duration:	96 hours
Test:	LC50
Result:	450 mg/L

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Product/substance	1,1,1,2-tetrafluoroethane (HFC-134a)
Species:	Algae, Selenastrum capricornutum
Duration:	72 hours
Test:	ErC50
Result:	118 mg/L

## 12.2. Persistence and degradability

Based on available data, the classification criteria are not met.

## 12.3. Bioaccumulative potential

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Product/substance	Refrigerant R-134a
Conclusion:	-
Other information:	No data available

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Product/substance	1,1,1,2-tetrafluoroethane (HFC-134a)
Conclusion:	-
Other information:	No data available

## 12.4. Mobility in soil

No data available.

## 12.5. Results of PBT and vPvB assessment

This mixture/product does not contain any substances known to fulfil the criteria for PBT and vPvB classification.

## 12.6. Endocrine disrupting properties

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Product/substance	Refrigerant R-134a
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Other information: No data available

Product/substance 1,1,1,2-tetrafluoroethane (HFC-134a)  
 Other information: No data available

## 12.7. Other adverse effects

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Contains fluorinated greenhouse gases covered by the Kyoto Protocol.  
 GWP: 1430 (CO<sub>2</sub>=1), IPCC 4th Assessment.

## SECTION 13: DISPOSAL CONSIDERATIONS

### Waste treatment methods

Product is covered by the regulations on hazardous waste. (\*)  
 HP 15 – Risk of explosion if heated under confinement  
 Regulation (EU) No 1357/2014 of 18 December 2014 on waste as retained and amended in UK law.

### EWC code



14 06 01\* Chlorofluorocarbons, HCFC, HFC


### Specific labelling

### Contaminated packing

*EWC code:* 16 05 04\* Gases in pressure containers (including halons) containing dangerous substances

## SECTION 14: TRANSPORT INFORMATION

	14.1 UN / ID	14.2 UN proper shipping name	14.3 Hazard class(es)	14.4 PG*	14.5 Env**	Other informat ion:
ADR	UN3159	1,1,1,2-TETRAFLUOROETHANE (REFRIGERANT GAS R 134a)	Transport hazard class: 2 Label: 2.2 Classification code: 2A 	-	No	Limited quantities: 120 ml Tunnel restriction code: (C/E) See below for additional information.
IMDG	UN3159	1,1,1,2-TETRAFLUOROETHANE (REFRIGERANT GAS R 134a)	Transport hazard class: 2 Label: 2.2 Classification code: 2A 	-	No	Limited quantities: 120 ml EmS: F-C S-V See

	14.1 UN / ID	14.2 UN proper shipping name	14.3 Hazard class(es)	14.4 PG*	14.5 Env**	Other information:
						below for additional information.
IATA	UN3159	1,1,1,2-TETRAFLUOROETHANE (REFRIGERANT GAS R 134a)	Transport hazard class: 2 Label: 2.2 Classification code: 2A 	-	No	See below for additional information.

\* Packing group

\*\* Environmental hazards

### Additional information

This product is within scope of the regulations of transport of dangerous goods.  
 ADR / See Table A, section 3.2.1 for any information on special provisions, requirements, or warnings in connection with transport. See section 5.4.3, for instructions in writing regarding mitigation of damages in relation to incidents or accidents during transport.  
 IMDG / See section 3.2.1, for any information on special provisions, requirements, or warnings in connection with transport.  
 IATA / See Table 4.2 for any information on special provisions, requirements, or warnings in connection with transport.  
 Hazchem Code: 2TE

**14.6. Special precautions for user**  
 Not applicable.

**14.7. Maritime transport in bulk according to IMO instruments**  
 No data available.

## SECTION 15: REGULATORY INFORMATION

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

<i>Restrictions for application:</i>	Restricted to professional users.
<i>Demands for specific education:</i>	No specific requirements.
<i>Control of Major Accident Hazards (COMAH) - Categories / dangerous substances:</i>	Not applicable.
<i>Additional information:</i>	Not applicable.
<i>Sources:</i>	Regulation (EU) No 1357/2014 of 18 December 2014 on waste as retained and amended in UK law. The Fluorinated Greenhouse Gases (Amendment) Regulations 2023 Regulation (EC) No 1272/2008 on classification, labelling and packaging of substances and mixtures (CLP) as

retained and amended in UK law.  
Regulation (EC) No 1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) as retained and amended in UK law.

## 15.2. Chemical safety assessment

No

## SECTION 16: OTHER INFORMATION

### Full text of H-phrases as mentioned in section 3

EUH044, Risk of explosion if heated under confinement.  
H280, Contains gas under pressure; may explode if heated.

### The full text of identified uses as mentioned in section 1

Refrigeration = For use as a refrigerant  
PC 16 = Heat Transfer Fluids

### Abbreviations and acronyms

ADN = European Provisions concerning the International Carriage of Dangerous Goods by Inland Waterway  
ADR = The European Agreement concerning the International Carriage of Dangerous Goods by Road  
ATE = Acute Toxicity Estimate  
BCF = Bioconcentration Factor  
CAS = Chemical Abstracts Service  
CE = Conformité Européenne (European conformity)  
CLP = Classification, Labelling and Packaging Regulation [Regulation (EC) No. 1272/2008]  
CSA = Chemical Safety Assessment  
CSR = Chemical Safety Report  
DMEL = Derived Minimal Effect Level  
DNEL = Derived No Effect Level  
EINECS = European Inventory of Existing Commercial chemical Substances  
ES = Exposure Scenario  
EUH statement = CLP-specific Hazard statement  
EuPCS = European Product Categorisation System  
EWC = European Waste Catalogue  
GHS = Globally Harmonized System of Classification and Labelling of Chemicals  
GWP = Global warming potential  
IARC = International Agency for Research on Cancer (IARC)  
IATA = International Air Transport Association  
IBC = Intermediate Bulk Container  
IMDG = International Maritime Dangerous Goods  
LogPow = logarithm of the octanol/water partition coefficient  
MARPOL = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)  
OECD = Organisation for Economic Co-operation and Development  
PBT = Persistent, Bioaccumulative and Toxic  
PNEC = Predicted No Effect Concentration  
RID = The Regulations concerning the International Carriage of Dangerous Goods by Rail  
RRN = REACH Registration Number  
SCL = A specific concentration limit  
SVHC = Substances of Very High Concern  
STOT-RE = Specific Target Organ Toxicity - Repeated Exposure  
STOT-SE = Specific Target Organ Toxicity - Single Exposure

TWA = Time weighted average

UN = United Nations

UVBC = Unknown or variable composition, complex reaction products or of biological materials

VOC = Volatile Organic Compound

vPvB = Very Persistent and Very Bioaccumulative

**Additional information**

The classification of the mixture in regard to physical hazards has been based on experimental data.

**The safety data sheet is validated by**

National Refrigerants Ltd

**Other**

A change (in proportion to the last essential change (first cipher in SDS version, see section 1)) is marked with a triangle.

The information in this safety data sheet applies only to this specific product (mentioned in section 1) and is not necessarily correct for use with other chemicals/products.

It is recommended to hand over this safety data sheet to the actual user of the product.

Information in this safety data sheet cannot be used as a product specification.

Country-language: GB-en