

# SAFETY DATA SHEET

## Refrigerant Gas R134a

Version 2

Revision Date: 20.02.12



## SAFETY DATA SHEET

### REFRIGERANT R134A

#### SECTION 1: IDENTIFICATION OF THE SUBSTANCE / PREPARATION AND OF THE COMPANY / UNDERTAKING

##### 1.1. Product Identifier

**Product Name:** REFRIGERANT R134a

**Synonyms:** 1,1,1,2 Tetrafluoroethane  
HFC-134a  
Norflurane

**EC Number:** 212-337-0

**CAS Number:** 811-97-2

**REACH Registration Number:** 01-2119459374-33-0002

If REACH registration numbers do not appear the substance is either exempt from registration, does not meet the minimum volume threshold for registration or the registration has not yet come due.

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

**Use:** Refrigerant

**Advised Against:** No specific uses advised again have been identified, other than restrictions in the F-Gas Regulations.

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

**Company name:**

National Refrigerants Ltd.  
4 Watling Close  
Sketchley Meadows Business Park  
Hinckley LE10 3EZ  
Tel: +44(0)1455 630790  
Fax: +44(0) 1455 630791  
Email: [sds@nationalref.com](mailto:sds@nationalref.com)

##### 1.4. Emergency telephone number

Emergency Tel: +44(0) 1865 407333

#### SECTION 2: HAZARDS IDENTIFICATION

##### 2.1. Classification of the substance of mixture

**Regulation (EC) No. 1272/2008**



Warning

H280 Contains gas under pressure; may explode if heated  
P410+P403 Protect from sunlight. Store in a well-ventilated place.

**Directives 67/458/EEC or**

This substance is not classified as dangerous according to Directive 67/548/EEC.

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1999/45/EC:

**Most important adverse effect:** Rapid evaporation of the liquid may cause frostbite.  
Vapour is heavier than air and can cause suffocation.

### 2.2. Label elements

**Label elements under CHIP:**

**Risk phrases** R58: May cause long-term adverse effects in the environment  
**Safety phrases** None

### 2.3. Other hazards

**Directives 67/548/EEC or 1999/45/EC:** Not a hazardous substance according to EC directives 67/548/EEC or 1999/45/EC.

**Special labelling of certain mixtures:** Contains fluorinated greenhouse gases covered by the Kyoto Protocol

## SECTION 3: COMPOSITION / INFORMATION ON INGREDIENTS

### 3.1. Substances

**Hazardous Ingredients:** 1,1,1,2-tetrafluoroethane 99.9%

### 3.2 Mixtures

## SECTION 4: FIRST AID MEASURES

### 4.1. Description of first aid measures

**Skin contact:** Rapid evaporation of liquid may cause frostbite. Take off all contaminated clothing immediately if not stuck to the skin. Flush area with lukewarm water. Do not use hot water. If frostbite has occurred call a physician.

**Eye contact:** Rapid evaporation of liquid in contact with the eye will damage it. Hold eyelids apart and flush eyes with plenty of water for at least 15 minutes. Get medical attention.

**Ingestion:** This is not considered a potential route of exposure.

**Inhalation:** Remove from exposure, move to fresh air, and lie down. Keep patient warm and at rest. Artificial respiration and/or oxygen may be necessary. Consult a physician.

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

**Skin contact:** Low exposure to liquid will cause redness and pain. High exposure to liquid will cause frostbite, blisters and severe pain.

**Eye contact:** Exposure to liquid will cause severe pain and cornea damage.

**Ingestion:** Not a route of exposure.

**Inhalation:** High vapour concentrations cause severe headache, dizziness and unconsciousness.

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

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

**Immediate/special treatment:** Burns pack should be available on the premises.

## SECTION 5: FIRE-FIGHTING MEASURES

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### 5.1. Extinguishing media

**Extinguishing media:** This product is not flammable. (ASHRAE 34) All extinguishing agents are suitable. Use measures that are appropriate to local and surrounding environment. Cool cylinders/tanks with water spray.

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

**Special hazards arising from the mixture** Pressure build-up in cylinders/tanks.  
Hazardous thermal decomposition products: carbon oxides, hydrogen fluoride, carbonyl fluoride.

### 5.3. Advice for fire-fighters

**Advice for fire-fighters:** In the event of fire wear self-contained breathing apparatus.  
Wear neoprene gloves during cleaning work after a fire.

## SECTION 6: ACCIDENTAL RELEASE MEASURES

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

**Personal precautions:** Evacuate personnel to safe areas.  
Ventilate the area.

### 6.2. Environmental precautions

**Environmental precautions:** Should not be released into the atmosphere.

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

**Clean-up procedures:** Material evaporates.

### 6.4. Reference to other sections

**Reference to other sections:** For handling and protection measures refer to Section 7 of SDS. Refer to Section 8 of SDS.  
For disposal methods refer to Section 13.

## SECTION 7: HANDLING AND STORAGE

### 7.1. Precautions for safe handling

**Handling requirements:** *Advice on handling:*  
Avoid breathing vapours or mist.  
Avoid liquid contact with skin and clothing.  
Provide sufficient air exchange and/or exhaust in work rooms.  
*Advice on protection against fire and explosion:*  
No special measures against fire required.

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

**Storage conditions:** Keep valves tightly closed.  
Store in cool, dry well ventilated place.  
Temperature not to exceed 45°C.

**Suitable packaging:** Store in original cylinder only.  
Protect from contamination.

### 7.3. Specific end use(s)

**Specific end use(s)** No data available.

## SECTION 8: EXPOSURE CONTROLS / PERSONAL PROTECTION

### 8.1. Control parameters

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### Hazardous ingredients:

1,1,1,2-TETRAFLUOROETHANE (HFC134a)

Workplace exposure limits

| State | 8 hour TWA                            | 15 min. STEL |
|-------|---------------------------------------|--------------|
| UK    | 1000 ppm<br>(4240 mg/m <sup>3</sup> ) | -            |

### 8.2. Derived No Effect Level (DNEL)

#### 1,1,1,2-Tetrafluoroethane:

Type of Application (Use): Workers  
Exposure Routes: Inhalation  
Health Effects: Chronic effects, Systemic toxicity.  
Value: 2476 mg/m<sup>3</sup>

Type of Application (Use): Consumers  
Exposure Routes: Inhalation  
Health Effects: Chronic effects, Systemic toxicity.  
Value: 2476 mg/m<sup>3</sup>

### 8.3 Predicted No Effect Concentration

#### 1,1,1,2-tetrafluoroethane:

Value: 0.1 mg/l  
Compartment: Fresh water.

Value: 0.01 mg/l  
Compartment: Marine water.

Value: 1 mg/l  
Compartment: Water  
Remarks: Intermittent use/release.

Value: 0.75 mg/l  
Compartment: Fresh water sediment.

Value: 73 mg/l  
Compartment: Water  
Remarks: Sewage treatment plants.

### 8.4. Exposure Controls

#### Engineering measures:

Ensure adequate ventilation, especially in confined areas.

#### Respiratory protection:

For rescue and maintenance work in storage tanks use self-contained breathing apparatus. Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.

#### Hand protection:

Heat insulating gloves

#### Eye protection:

Safety glasses with side shields. Wear a face shield in addition where the possibility exists for face contact due to splashing, spraying or airborne contact with this material.

#### Skin protection:

Wear clothing that covers legs and arms.

#### 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:** Liquefied gas under pressure.  
**Colour:** Clear colourless liquid and vapour.  
**Odour:** Slight, ether like.  
**Molecular weight:** 102.02 g/mol  
**Boiling Point/range:** -26.2°C

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|   |                                 |
|---|---------------------------------|
| Flash Point:                                    | Non-flammable                   |
| Ignition Temperature:                           | n/a Non flammable               |
| Upper explosive limit/upper flammability limit: | n/a Non flammable               |
| Vapour pressure:                                | 4.909 Bar (4909 hPa) at 21°C    |
| Liquid Density:                                 | 1200 kg/m <sup>3</sup> at 25°C  |
| Vapour Density:                                 | 5.368 kg/m <sup>3</sup> at 21°C |
| Water solubility:                               | 1.5 g/l                         |
| Vapour Density (Air = 1)                        | 3.5                             |

### SECTION 10. STABILITY AND REACTIVITY

#### 10.1. Reactivity

|             |  |
|-------------|--|
| Reactivity: | Stable under recommended storage and transport 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 recommended storage and transport conditions.<br>May react with aluminium. |
|----------------------|---|

#### 10.4. Conditions to avoid

|                      |                             |
|----------------------|-----------------------------|
| Conditions to avoid: | Heat, hot surfaces, flames. |
|----------------------|-----------------------------|

#### 10.5. Incompatible material

|                     |  |
|---------------------|--|
| Materials to avoid: | Alkali metals, alkaline earth metals, powdered metals, powdered metal salts. |
|---------------------|--|

#### 10.6. Hazardous decomposition products

|                                  |   |
|----------------------------------|---|
| Hazardous decomposition products | Thermal decomposition yields toxic products which can be corrosive in the presence of moisture. |
|----------------------------------|---|

### SECTION 11: TOXICOLOGICAL INFORMATION

#### 11.1 Information on Toxicological effects

|                            |   |
|----------------------------|---|
| Acute Oral Toxicity:       | 1,1,2-Tetrafluoroethane<br>Not Applicable.  |
| Acute inhalation toxicity: | 1,1,1,2-Tetrafluoroethane<br>LC <sub>50</sub> /rat: 567000 ppm<br>/dog: Cardiac sensitization.  |
| Acute Dermal toxicity:     | 1,1,1,2-Tetrafluoroethane<br>Not Applicable   |
| Skin Irritation:           | 1,1,1,2-Tetrafluoroethane<br>Rabbit<br>Classification: Not classified as irritant.<br>Result: Slight irritation.  |
| Eye Irritation:            | 1,1,1,2-Tetrafluoroethane<br>Rabbit<br>Classification: Not classified as an irritant.<br>Result: Slight irritation<br>Not expected to cause eye irritation based on expert review of the properties of the substance. |

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Human  
Classification: Not classified as irritant.  
Result: No eye irritation.

### Sensitization:

1,1,1,2-Tetrafluoroethane  
Guinea pig  
Classification: Not a skin sensitized.  
Result: Did not cause sensitization on laboratory animals.  
Not expected to cause sensitization based on expert review of the properties of the substance.  
  
Did not cause sensitization on laboratory animals. There are no reports of human respiratory sensitization.

### Repeated Dose Toxicity:

1,1,1,2-Tetrafluoroethane  
Inhalation rat  
No toxicologically significant effects were found.

### Mutagenicity Assessment

1,1,1,2-Tetrafluoroethane  
Animal testing did not show any mutagenic effects, Tests on bacterial or mammalian cell cultures did not show mutagenic effects.

### Carcinogenicity Assessment:

1,1,1,2-Tetrafluoroethane  
Not classified as a human carcinogen.

### Toxicity to reproduction Assessment:

1,1,1,2-Tetrafluoroethane  
No toxicity to reproduction.

### Human Experience:

Excessive exposure may affect human health as follows:

Inhalation  
Severe shortness of breath, narcosis, irregular cardiac activity.

### Other information:

May cause cardiac arrhythmia. Rapid evaporation of the liquid may cause frostbite. Inhalation of decomposition products in high concentration may cause shortness of breath (lung oedema).

## SECTION 12. ECOLOGICAL INFORMATION

Where sections are blank no data is available

### 12.1. Toxicity

#### Toxicity to fish:

1,1,1,2-Tetrafluoroethane  
LC<sub>50</sub>/96 h/Oncorhynchus mykiss (rainbow trout): 450 mg/l

#### Toxicity to Aquatic plants:

1,1,1,2-Tetrafluoroethane  
EC<sub>50</sub>/72 h/Algae: >118 mg/l  
Information given is based on data obtained from similar substances.

#### Acute Toxicity to aquatic Invertebrates:

1,1,1,2-Tetrafluoroethane  
EC<sub>50</sub>/48 h/Daphnia magna (water flea): 980 mg/l

#### Ecotoxic values:

When discharged may contribute to the greenhouse effect.

### 12.2. Persistence and degradability

#### Persistence and Degradability:

Biodegradability  
/28 d  
Biodegradation: 3%  
Method: Closed Bottle test  
Not readily biodegradable.

### 12.3. Bio accumulative potential

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**Bio-accumulative potential:** No data available.

### 12.4. Mobility in soil

**Mobility:** No data available.

### 12.5. Results of PBT and vPvB assessment

**PBT & vPvB identification:** This substance is not considered to be persistent, bio accumulating nor toxic (PBT).  
This substance is not considered to be very persistent nor very bio accumulating (vPvB).

### 12.6. Other adverse effects

**Other adverse effects:**  
**Global Warming Potential** 1370  
(GWP) (CO<sub>2</sub> = 1)

**Ozone Depletion Potential** 0  
(ODP) (R11 = 1)

## SECTION 13. DISPOSAL CONSIDERATIONS

### 13.1. Waste treatment methods

**Disposal operations:** Do not allow product to be released into the environment.  
**Recovery Operations:** Consult the manufacturer or supplier for information regarding recovery and recycling of the product. If recovery is not possible, incinerate at a licensed installation.  
**Disposal of packaging:** De-gas and return cylinders to suppliers.  
**N.B.** The user's attention is drawn to the possible existence of regional or national regulations regarding disposal.

## SECTION 14. TRANSPORT INFORMATION

### 14.1. ADR

**Proper Shipping Name:** Refrigerant R134a or 1,1,1,2-Tetrafluoroethane  
**UN Number:** 3159  
**Class:** 2  
**Classification Code:** 2A  
**Labelling No.:** 2.2  
**HI Number:** 20  
**Tunnel Code:** (C/E)

### 14.2. IATA\_C

**Proper Shipping Name:** Refrigerant R134a or 1,1,1,2-Tetrafluoroethane  
**UN Number:** 3159  
**Labelling No.:** 2.2

### 14.3. IMDG

**Proper Shipping Name:** Refrigerant R134a or 1,1,1,2-Tetrafluoroethane  
**UN Number:** 3159  
**Class:** 2.2  
**Labelling Number:** 2.2

## SECTION 15. REGULATORY INFORMATION

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

**Special labelling of certain mixtures:** Contains fluorinated greenhouse gases covered by the Kyoto Protocol.

### 15.2. Chemical Safety Assessment

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**Chemical safety assessment:** A chemical safety assessment has been carried out by the supplier of this mixture.

### 16. OTHER INFORMATION

**Other information:** This safety sheet is prepared in accordance with Commission Regulation (EU) No. 453/2010.  
\* Indicates text in SDS which has changed since the last revision.

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### GENERAL SAFETY & HANDLING DATA

#### 1. GENERAL

Only trained persons should handle compressed gases. Observe all regulations and local requirements regarding the storage of Cylinders. Do not remove or deface labels provided by the supplier for the identification of the Cylinder contents. Ascertain the identity of the gas before using it. Know and understand the properties and hazards associated with each gas before using it. When doubt exists as to the correct handling procedure for a particular gas contact the supplier.

#### HANDLING AND USE

Wear stout gloves. Never lift a Cylinder by the cap or guard unless the supplier states it is designed for that purpose. Use trolley or other suitable device or technique for transporting heavy Cylinders, even for a short distance. Where necessary wear suitable eye and face protection. The choice between safety glasses, chemical goggles, or full face shield will depend on the pressure and nature of the gas being used,

Where necessary for toxic gases see that self-contained positive pressure breathing apparatus or full face airline respirator is available in the vicinity of the working area. Employ suitable pressure regulating device on all Cylinders when gas is being emitted to systems with lower pressure rating than that of the Cylinder. Ascertain that all electrical systems in the area are suitable for service with each gas.

Never use direct flame or electrical heating devices to raise the pressure of a Cylinder, Cylinders should not be subjected to temperatures above 45°C. Never re-compress a gas mixture without consulting the supplier. Never attempt to transfer gases from one Cylinder to another. Do not use Cylinders as rollers or supports, or for any other purpose other than to contain the gas as supplied. Never permit oil, grease or other readily combustible substances to come into contact with valves of Cylinders containing oxygen or other oxidants. Keep Cylinder valves clean and free from contaminants particularly oil and water.

Do not subject Cylinders to mechanical shocks which may cause damage to their valves or safety devices.

Never attempt to repair or modify Cylinder valves or safety relief devices. Damaged valves should be reported immediately to the supplier. Close the Cylinder valve whenever gas is not required even if the Cylinder is still connected to the equipment.

#### 2. STORAGE

Cylinders should be stored in a well-ventilated area. Some gases will require a purpose built area. Store Cylinders in a location free from fire risk and away from sources of heat and ignition. Designate as a no smoking area.

Gas Cylinders should be segregated in the storage according to the various categories.

The storage area should be kept clear and access should be restricted to authorized persons only, the area should be clearly marked as a storage area and appropriate hazard warning signs displayed (Flammable, Toxic etc.).

The amount of flammable or toxic gases should be kept to a minimum.

Flammable gases should be stored away from other combustible materials.

Cylinders held in storage should be periodically checked for general condition and leakage.

Cylinders in storage should be properly secured to prevent toppling or rolling.

Vertical storage is recommended where the Cylinder is designed for this.

Cylinder valves should be tightly closed and, where appropriate, valves should be capped or plugged. Protect Cylinders stored in the open against rusting and extremes of weather.

Cylinders should not be stored in conditions likely to encourage corrosion.

Store full and empty Cylinders separately and arrange full Cylinders so that the oldest stock is used first.


FOR FURTHER INFORMATION CONTACT YOUR NEAREST DISTRIBUTION CENTRE

## INITIAL SUBSTANCE COSHH ASSESSMENT

|                            |                           |                           |                |              |
|----------------------------|---------------------------|---------------------------|----------------|--------------|
| Department                 | MSDS Ref No               | N/A                       | Assessment Ref | N/A          |
| Site Wide                  |                           |                           |                |              |
| Chemical Name              | Risk Phrases              |                           |                |              |
| Refrigerant R134a          | R20 Harmful by inhalation |                           |                |              |
|                            | R34 Causes burns          |                           |                |              |
|                            | R36 Irritating to eyes    |                           |                |              |
|                            | R38 Irritating to skin    |                           |                |              |
|                            |                           |                           |                |              |
| Classification             | Warning                   |                           |                |              |
| Hazard Group               | A                         |                           |                |              |
|                            |                           | Exposure Limits - Dusts   | N/A            |              |
|                            |                           | Exposure Limits - Liquid  | >50 to 500 ppm |              |
| Least Hazardous Substances |                           | More Hazardous Substances |                | Special Case |
| A                          | B                         | C                         | D              | E            |

|  |  |
|--|--|
| Exposure Potential                         |  |
| Frequency of Use                           | Infrequently, minutes                    |
| Physical Properties                        | Low Volatility Liquid                    |
| Max Amount Used                            | Small - Millilitres                      |
| Exposure Predictor                         | 1 – Millilitres of low volatility liquid |
| Control Measures                           | 1 – General                              |
| Predicted Concentration (COSHH ESSENTIALS) |  |
| Dust mg.m <sup>-3</sup>                    | Liquid ppm                               |
| N/A  | <5                                       |

|                               |  |        |         |
|-------------------------------|--|--------|---------|
| Personal Protective Equipment |  | Answer | Type    |
| 1                             | Are gloves required to be worn                           | Yes    | Nitrile |
| 2                             | Is protective clothing required                          | Yes    | Cotton  |
| 3                             | Is safety eyewear required                               | Yes    | Goggles |
| 4                             | Is safety footwear required                              | Yes    |         |
| 5                             | Is head protection required                              | No     |         |
| 6                             | Is hearing protection required when working in this area | Yes    |         |
| 7                             | Is respiratory protective equipment worn currently       | No     |         |

|   |   |                      |                          |                  |
|---|---|----------------------|--------------------------|------------------|
| Initial Substance Assessment Conclusion   |   |                      |                          | Answer           |
| The hazards associated with this material, the amount of material used and the frequency and duration of the activity result an extremely low likelihood that a risk to health exists when using this material under open conditions or on the open bench and using good work practice. |   |                      |                          | ✓                |
| The amount being used and the frequency and duration of exposure indicate that if used under the control of local exhaust ventilation the risks to health would be reduced to well below the exposure limits and that the potential risks to health would be low.                       |   |                      |                          |                  |
| Due to the hazards associated with this material the PPE identified above must be worn when handling this material in order to prevent direct skin contact. If PPE is worn in accordance with manufacturers recommendations the risks to health will be adequately controlled.          |   |                      |                          | ✓                |
| The hazards associated with this material indicate that a detailed risk assessment must be completed.   |   |                      |                          |                  |
| <b>Do not use this material unless a detailed COSHH Assessment has been completed</b>   |   |                      |                          |                  |
| Assessor Name   | Signature   | Last Assessment Date | Assessment Reviewed Date | Next Review Date |
| D. Cuthbert   |  | 24/05/2017           | N/A                      | 24/05/2022       |