

Material Safety Data Sheet R-134a

SAFETY DATASHEET REFRIGERANT R134a

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

1.1. Product Identifier

Product Name: REFRIGERANT R134a

Synonyms: 1,1,1,2Tetrafluoroethane
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: Kiro Refrigerants Pvt. Ltd.
Tel: +91-120-4324234
Email: info@kirorefrigerants.com

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.

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SECTION 8: EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1. Control parameters

Hazardous ingredients:

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

Workplace exposure limits

State	8 hour TWA	15 min. STEL
UK	1000 ppm (4240 mg/m ³)	-

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/m³

Type of Application (Use): Consumers
Exposure Routes: Inhalation
Health Effects: Chronic effects, Systemic toxicity.
Value: 2476 mg/m³

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 ³ at 25°C
Vapour Density:	5.368 kg/m ³ 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. 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
Not Applicable.

Acute inhalation toxicity: 1,1,1,2-Tetrafluoroethane
LC₅₀/rat: 567000 ppm
/dog: Cardiac sensitization.

Acute Dermal toxicity: 1,1,1,2-Tetrafluoroethane
Not Applicable

Skin Irritation: 1,1,1,2-Tetrafluoroethane
Rabbit
Classification: Not classified as irritant.
Result: Slight irritation.

Eye Irritation: 1,1,1,2-Tetrafluoroethane
Rabbit
Classification: Not classified as an irritant.
Result: Slight irritation
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 on 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 ₅₀ /96 h/Oncorhynchus mykiss (rainbow trout): 450 mg/l
Toxicity to Aquatic plants:	1,1,1,2-Tetrafluoroethane EC ₅₀ /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 ₅₀ /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.
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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 (GWP) (CO₂ = 1) 1370
Ozone Depletion Potential (ODP) (R11 = 1) 0

SECTION 13. DISPOSAL CONSIDERATIONS

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.
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.

Legal disclaimer: *KIRO Refrigerants Pvt. Ltd. believes that the information and recommendations contained herein (including data and statements) are accurate as of the date hereof. NO WARRANTY OF FITNESS FOR ANY PARTICULAR PURPOSE, WARRANTY OF MERCHANTABILITY, OR ANY OTHER WARRANTY, EXPRESSED OR IMPLIED, IS MADE CONCERNING THE INFORMATION PROVIDED HEREIN. The information provided herein relates only to the specific product designated and may not be valid where such product is used in combination with any other methods of use of the product and of the information referred to herein are beyond the control of KIRO Refrigerants Pvt. Ltd. KIRO expressly disclaims any and all liability as to any results obtained or arising from any use of the product or reliance on such information.*

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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