Material Safety Data Sheet

R134 a

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	R134a
Product Use Description	:	Refrigerant, Propellant
Company	:	M/s Refex Industries Limited,
		1/171,Old Mahabalipuram Road,Thiruporur
		Kancheepuram District
Post Code	:	603110
Telephone	:	+91 44 27445295

SECTION 2. HAZARDS IDENTIFICATION Emergency

Overview

Form	:	Liquefied gas
Color	:	Colorless
Odor	:	weak
Hazard Summary	:	Warning! Container under pressure. This product is not flammable at ambient temperatures and atmospheric Pressure. Gas reduces oxygen available for breathing. Causes asphyxiation in high concentrations. The victim will not realize that he/she is suffocating. Excessive exposure may cause central nervous system effects including drowsiness and dizziness. Excessive exposure may also cause cardiac arrhythmia. Do not breathe vapour. Rapid evaporation of the liquid may cause frostbite. Avoid contact with skin, eyes and

Clothing. At higher temperatures, (>250 C), decomposition products may include hydrofluoric acid (HF) and carbonyl halides. The ACGIH Threshold Limit Values (2007) for Hydrogen Fluoride are TLV-TWA 0.5 ppm and Ceiling Exposure Limit 2 ppm.

Potential Health Effects

Skin : Avoid skin contact with leaking liquid (danger of frostbite).
May cause frostbite. Irritating to skin.

Eyes : Causes serious eye irritation.
May cause frostbite.

Ingestion : Unlikely route of exposure.
Effects due to ingestion may include:
Gastrointestinal discomfort

Inhalation : Gas reduces oxygen available for breathing.
Causes asphyxiation in high concentrations. The victim will not realize that he/she is suffocating.
Excessive exposure may cause central nervous system effects including drowsiness and dizziness. Excessive exposure may also cause cardiac arrhythmia.

Chronic Exposure : None known.

Carcinogenicity: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP, IARC, or OSHA.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : CF3CH2F

Chemical nature : Substance

Chemical Name	CAS-No.	Concentration

1,1,1,2-Tetrafluoroethane	811-97-2	100 %

SECTION 4. FIRST AID MEASURES

Inhalation : Move to fresh air. If breathing is irregular or stopped, administer artificial respiration. Use oxygen as required, provided a qualified operator is present. Call a physician. Do not give drugs from adrenaline-ephedrine group.

Skin contact : After contact with skin, wash immediately with plenty of water. If there is evidence of frostbite, bathe (do not rub) with lukewarm (not hot) water. If water is not available, cover with a clean, soft cloth or similar covering. If symptoms persist, call a physician.

Eye contact : Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. In case of frostbite water should be lukewarm, not hot. If symptoms persist, call a physician.

Ingestion : Unlikely route of exposure. As this product is a gas, refer to the inhalation section. Do not induce vomiting without medical advice. Call a physician immediately.

Notes to physician

Treatment : Because of the possible disturbances of cardiac rhythm, catecholamine drugs, such as epinephrine, should be used with special caution and only in situations of emergency life support. Treatment of overexposure should be directed at the control of symptoms and the clinical conditions. Treat frostbitten areas as needed.

SECTION 5. FIREFIGHTING MEASURES

Suitable extinguishing media : The product is not flammable. Use water spray, alcohol-resistant foam, dry Chemical or carbon dioxide.

Use extinguishing measures that are appropriate to

local circumstances and the surrounding environment.

Specific hazards during : Contents under pressure.

fire fighting	This product is not flammable at ambient temperatures and atmospheric pressure. However, this material can ignite when mixed with air under pressure and exposed to strong ignition sources. Container may rupture on heating. Cool closed containers exposed to fire with water spray. Do not allow run-off from fire fighting to enter drains or water courses. Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing. In case of fire hazardous decomposition products may be produced such as: Hydrogen halides Hydrogen fluoride Carbon monoxide Carbon dioxide (CO2) Carbonyl halides
Special protective equipment: For fire-fighters	In the event of fire and/or explosion do not breathe fumes. Wear self-contained breathing apparatus and protective suit. No unprotected exposed skin areas.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions	:	Immediately evacuate personnel to safe areas. Keep people away from and upwind of spill/leak. Wear personal protective equipment. Unprotected persons must be kept away. Remove all sources of ignition. Avoid skin contact with leaking liquid (danger of frostbite). Ventilate the area. After release, disperses into the air. Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing. Avoid accumulation of vapours in low areas. Unprotected personnel should not return until air has been tested and determined safe. Ensure that the oxygen content is >= 19.5 %.
Environmental precautions	:	Prevent further leakage or spillage if safe to do so. The product evaporates readily.

Methods for cleaning up : Ventilate the area.

SECTION 7. HANDLING AND STORAGE

Handling : Handle with care.

Avoid inhalation of vapour or mist.
Do not get in eyes, on skin, or on clothing.
Wear personal protective equipment.
Use only in well-ventilated areas.
Pressurized container. Protect from sunlight and do not expose to temperatures exceeding 50 °C.
Follow all standard safety precautions for handling and use of compressed gas cylinders.
Use authorized cylinders only.
Protect cylinders from physical damage.
Do not puncture or drop cylinders, expose them to open flame or excessive heat.
Do not pierce or burn, even after use. Do not spray on a naked flame or any incandescent material.
Do not remove screw cap until immediately ready for use. Always replace cap after use.

Advice on protection : The product is not flammable.
Against fire and explosion Can form a combustible mixture with air at pressures above atmospheric pressure.

Storage

Requirements for storage areas and containers : Pressurized container: protect from sunlight and do not expose to temperatures exceeding 50 °C. Do not pierce or burn, even after use.Keep containers tightly closed in a dry, cool and well- ventilated place.
Storage rooms must be properly ventilated.
Ensure adequate ventilation, especially in confined areas.
Protect cylinders from physical damage.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Protective measures	Do not breathe vapour. Avoid contact with skin, eyes and clothing. Ensure that eyewash stations and safety showers are close to the workstation location.
Engineering measures	General room ventilation is adequate for storage and handling. Perform filling operations only at stations with exhaust ventilation facilities.
Eye protection	Wear as appropriate: Safety glasses with side-shields If splashes are likely to occur, wear: Goggles or face shield, giving complete protection to eyes
Hand protection	Leather gloves In case of contact through splashing: Protective gloves Neoprene gloves Polyvinyl alcohol or nitrile- butyl-rubber gloves
Skin and body protection	Avoid skin contact with leaking liquid (danger of frostbite). Wear cold insulating gloves/ face shield/ eye protection.
Respiratory protection	In case of insufficient ventilation, wear suitable respiratory equipment. Wear a positive-pressure supplied-air res pirator. Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing. For rescue and maintenance work in storage tanks use self-contained breathing apparatus.
Hygiene measures	Handle in accordance with good industrial hygiene and safety practice. Ensure adequate ventilation, especially in confined areas. Avoid contact with skin, eyes and clothing. Remove and wash contaminated clothing before re-use. Keep working clothes separately.

Exposure Guidelines

Components	CAS-No.	Value	Control parameters	Update	Basis

	1,1,1,2-Tetrafluoroethane	811-97-2	TWA : time weighted average	(1,000 ppm)
	1,1,1,2-Tetrafluoroethane	811-97-2	TWA : time weighted average	4,240 mg/m3 (1,000 ppm)

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state : Liquefied gas

Color : Colorless

Odor : weak

pH : Note: neutral

Melting point/freezing point : -101 °C

Boiling point/boiling range : -26.2 °C

Flash point : Note: not applicable

Evaporation rate : > 1
Method: Compared to CCl4.

Lower explosion limit : Note: None

Upper explosion limit : Note: None

Vapor pressure : 5,915 hPa

		at 21.1 °C(70.0 °F) 14,713 hPa at 54.4 °C(129.9 °F)
Vapor density	:	3.5
Density	:	1.2 g/cm3
Water solubility	:	1.5 g/l
Partition coefficient: n-octanol/water	:	log Pow: 1.06 Note: The product is more soluble in octanol.
Ignition temperature	:	> 750 °C
Auto ignition temperature	:	> 750 °C
Decomposition temperature	:	> 250 °C Note: To avoid thermal decomposition, do not overheat.
Molecular Weight	:	102.02 g/mol
Global warming potential	:	1,300 (GWP)
Ozone depletion potential	:	0 (ODP)

SECTION 10. STABILITY AND REACTIVITY

Chemical stability	: Stable under normal conditions.
Possibility of hazardous	: Hazardous polymerisation does not occur. reactions
Conditions to avoid	: Pressurized container. Protect from sunlight and do not Expose to temperatures exceeding 50 °C. Decomposes under high temperature. Some risk may be expected of corrosive and toxic

		Decomposition products. Can form a combustible mixture with air at pressures above atmospheric pressure. Do not mix with oxygen or air above atmospheric pressure.
Incompatible materials to	:	Finely divided aluminium avoid Potassium Calcium Powdered metals Aluminium Magnesium Zinc
Hazardous decomposition products	:	Halogenated compounds Hydrogen fluoride Carbonyl halides Carbon oxides

SECTION 11. TOXICOLOGICAL INFORMATION

Acute inhalation toxicity	:	LC50: > 500000 ppm Exposure time: 4 h Species: rat
Sensitisation	:	Cardiac sensitization Species: dogs Note: No-observed-effect level 50 000 ppm Lowest observable effect level 75 000 ppm
Repeated dose toxicity	:	Species: rat NOEL: 40000 ppm
Genotoxicity in vitro	:	Note: In vitro tests did not show mutagenic effects
Further information	:	Note: Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing. Rapid evaporation of the liquid may cause frostbite. Avoid skin contact with

Leaking liquid (danger of frostbite).

SECTION 12. ECOLOGICAL INFORMATION

Further information on ecology

Additional ecological information : Accumulation in aquatic organisms is unlikely.
This product contains greenhouse gases which may Contribute to global warming. Do NOT vent to the atmosphere.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods : Observe all Federal, State, and Local Environmental regulations.

SECTION 14. TRANSPORT INFORMATION

DOT

UN/ID No.	: UN 3159
Proper shipping name	: 1,1,1,2-Tetrafluoroethane
Class	: 2.2
Packing group	: III
Hazard Labels	: 2.2
Packing	: Steel cylinder 17.1KG

IATA

UN/ID No.	: UN 3159
Description of the goods	: 1,1,1,2-Tetrafluoroethane
Class	: 2.2
Hazard Labels	: 2.2
Packing instruction (cargo aircraft)	: 200
Packing instruction (passenger aircraft)	: 200

IMDG	UN/ID No.	: UN 3159
	Description of the goods	: 1,1,1,2-Tetrafluoroethane
	Class	: 2.2
	Hazard Labels	: 2.2
	EmS Number	: F-C, S-V
	Marine pollutant	: no

SECTION 15. REGULATORY INFORMATION

Inventories

US. Toxic Substances Control Act : On TSCA Inventory

Australia. Industrial Chemical (Notification and Assessment) Act : On the inventory, or in compliance with the inventory

Canada. Canadian Environmental Protection Act (CEPA). Domestic Substances List (DSL) : All components of this product are on the Canadian DSL list.

Japan. Kashin-Hou Law List : On the inventory, or in compliance with the inventory

Korea. Existing Chemicals (KECI) : On the inventory, or in compliance with the inventory Inventory

Philippines. The Toxic Substances and Hazardous and Nuclear Waste Control Act : On the inventory, or in compliance with the inventory

China. Inventory of Existing Chemical Substances : On the inventory, or in compliance with the inventory

NZIOC - New Zealand : On the inventory, or in compliance with the inventory

National regulatory information

WARNING:DO NOT vent to the atmosphere. To comply with provision of Clean Air Act, any residual Must be recovered. Contains 1,1,1,2-Tetraflouroethane(HFC-134A),a greenhouse gas which may contribute to global warning.

Spill or releases resulting in the loss of any ingredient at or about its RQ require

immediate notification to the National Response Center and your local Emergence Planning Committee

CAS Number : 1,1,1,2-Tetrafluoroethane 811-97-2

WHMIS Classification : A: Compressed Gas

This product has been classified according to the hazard criteria of the CPR and the MSDS contains all of the information required by the CPR.

Global warming potential : 1,300

Ozone depletion potential (ODP) : 0

SECTION 16. OTHER INFORMATION

	HMIS III	**NFPA**
Health hazard	: 1	2
Flammability	: 1	1

Physical Hazard : 0
Instability : 0

Hazard rating and rating systems (e.g. HMIS® III, NFPA): This information is intended solely for the use of individuals trained in the particular system.

Further information

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Prepared by: M/s Refex Industries Limited.