BOC
A Member of The Linde Group

SAFETY DATA SHEET

133

Product Name **R134A**

1. IDENTIFICATION OF THE MATERIAL AND SUPPLIER

Supplier Name	**BOC LIMITED (AUSTRALIA)**
Address	10 Julius Avenue, North Ryde, NSW, AUSTRALIA, 2113
Telephone	131 262, (02) 8874 4400
Fax	132 427 (24 hours)
Emergency	1800 653 572 (24/7) (Australia only)
Web Site	http://www.boc.com.au/
Synonym(s)	1,1,1,2 TETRAFLUOROETHANE • 133 - MSDS NUMBER • FORANE 134A • HFC134A • PRODUCT CODE: 155
Use(s)	AIR CONDITIONING • REFRIGERANT • REFRIGERATION SYSTEMS
SDS Date	26 Mar 2010

2. HAZARDS IDENTIFICATION

NOT CLASSIFIED AS HAZARDOUS ACCORDING TO ASCC CRITERIA

CLASSIFIED AS A DANGEROUS GOOD BY THE CRITERIA OF THE ADG CODE

UN No.	3159	**DG Class**	2.2	**Subsidiary Risk(s)**	None Allocated
Packing Group	None Allocated	**Hazchem Code**	2TE	**EPG**	2C2

3. COMPOSITION/ INFORMATION ON INGREDIENTS

Ingredient	Formula	CAS No.	Content
1,1,1,2-TETRAFLUOROETHANE (HFC 134A)	C2-H2-F4	811-97-2	>99.9%

4. FIRST AID MEASURES

Eye	Cold burns: Immediately flush with tepid water or with sterile saline solution. Hold eyelids apart and irrigate for 15 minutes. Seek medical attention.
Inhalation	If inhaled, remove from contaminated area. To protect rescuer, use an Air-line respirator or Self Contained Breathing Apparatus (SCBA). Be aware of possible explosive atmospheres. Apply artificial respiration if not breathing. Give oxygen if available. For advice, contact a Poisons Information Centre on 13 11 26 (Australia Wide) or a doctor.
Skin	Cold burns: Remove contaminated clothing and gently flush affected areas with warm water (30°C) for 15 minutes. Apply sterile dressing and treat as for a thermal burn. For large burns, immerse in warm water for 15 minutes. DO NOT apply any form of direct heat. Seek immediate medical attention.
Ingestion	Due to product form and application, ingestion is considered unlikely.
Advice to Doctor	Treat symptomatically

5. FIRE FIGHTING MEASURES

Flammability Non flammable. May evolve toxic gases (carbon oxides, hydrogen fluoride, hydrocarbons) when heated strongly.

Fire and Explosion Temperatures in a fire may cause cylinders to rupture. Cool cylinders or containers exposed to fire by applying water from a protected location. Do not approach cylinders or containers suspected of being hot.

Extinguishing Use water fog to cool containers from protected area.

Hazchem Code 2TE

6. ACCIDENTAL RELEASE MEASURES

Spillage If the cylinder is leaking, evacuate area of personnel. Inform manufacturer/supplier of leak. Use personal protective equipment. Carefully move material to a well ventilated remote area, then allow to discharge. Do not attempt to repair leaking valve or cylinder safety devices.

7. STORAGE AND HANDLING

Storage Do not store near incompatible materials. Cylinders should be stored below 45°C in a secure area, upright and restrained to prevent cylinders from falling. Cylinders should also be stored in a dry, well ventilated area constructed of non-combustible material with firm level floor (preferably concrete), away from areas of heavy traffic and emergency exits.

Handling Use of safe work practices are recommended to avoid eye or skin contact and inhalation. Do not drag, drop, slide or roll cylinders. The uncontrolled release of a gas under pressure may cause physical harm. Use a suitable hand truck for cylinder movement.

8. EXPOSURE CONTROLS/ PERSONAL PROTECTION

Exposure Stds

Ingredient	Reference	TWA		STEL	
		ppm	mg/m3	ppm	mg/m3
1,1,1,2-Tetrafluoroethane	ASCC (AUS)	1000	4240	--	--

Biological Limits No biological limit allocated.

Engineering Controls Avoid inhalation. Use in well ventilated areas. Where an inhalation risk exists, mechanical extraction ventilation is recommended. Maintain vapour levels below the recommended exposure standard.

PPE Wear safety boots, leather gloves and safety glasses. Where an inhalation risk exists, wear: an Air-line respirator or self Contained Breathing Apparatus (SCBA).

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	CLEAR GAS (LIQUEFIED UNDER PRESSURE)	**Solubility (Water)**	0.9 g/L @ 20°C
Odour	SLIGHT ETHEREAL ODOUR	**Specific Gravity**	1.10 to 1.21
pH	NOT APPLICABLE	**% Volatiles**	100 %
Vapour Pressure	665 kPa @ 25°C	**Flammability**	NON FLAMMABLE
Vapour Density	3.5 (Air = 1)	**Flash Point**	NOT RELEVANT
Boiling Point	-26.4°C	**Upper Explosion Limit**	NOT RELEVANT
Melting Point	-101°C	**Lower Explosion Limit**	NOT RELEVANT
Evaporation Rate	NOT APPLICABLE		
Critical Pressure	4,060 kPa	**Critical Temperature**	100.6°C

10. STABILITY AND REACTIVITY

Chemical Stability	Stable under recommended conditions of storage.
Conditions to Avoid	Avoid heat, sparks, open flames and other ignition sources.
Material to Avoid	Incompatible with oxidising agents (eg. hypochlorites), alkalis/ alkali earth metals. Compounding ingredients in natural rubber can be extracted during rapid liquid withdrawal and will swell.
Decomposition	May evolve toxic gases (carbon oxides, hydrogen fluoride, hydrocarbons) when heated strongly.
Hazardous Reactions	Polymerization will not occur.

11. TOXICOLOGICAL INFORMATION

Health Hazard Summary	Asphyxiant. Symptoms of exposure are directly related to displacement of oxygen. As the amount of oxygen inhaled is reduced from 21-14% volume, the pulse rate may accelerate and the rate and volume of breathing may increase. The ability to maintain attention and think clearly is diminished, muscular co-ordination is somewhat disturbed. As oxygen decreases from 14-10% volume, judgement becomes faulty, severe injuries may result in no pain. Muscular effort may lead to rapid fatigue. Further reduction to 6% may result in nausea and vomiting. Ability to move may be lost. Permanent brain damage may result even after resuscitation from exposure to this low level of oxygen. Below 6% breathing is in gasps and convulsions may occur. Inhalation of a mixture containing no oxygen may result in unconsciousness from the first breath and death may follow in minutes. Mild narcotic properties. Induces dizziness at 1,1,1,2 tetrafluoroethane concentrations of 5 % and loss of consciousness can result at 15 %. At high levels cardiac arrhythmia may occur. Chronic exposure may result in sensitisation to the effects of adrenalins on the heart. Not carcinogenic, mutagenic and no specific reproductive effects.
Eye	Irritant vapour. Low temperature evaporating liquid can cause cold burns.
Inhalation	Asphyxiant. Effects are proportional to oxygen displacement.
Skin	Irritating vapour. Direct contact with the liquefied material or escaping compressed gas may cause frost-bite injury.
Ingestion	Ingestion is considered unlikely due to product form. However, ingestion may result in discomfort of the gastrointestinal tract from rapid evaporation of liquid and consequent evolution of gas. Some of the effects of inhalation would be expected.
Toxicity Data	1,1,1,2-TETRAFLUOROETHANE (HFC 134A) (811-97-2) LC50 (Inhalation): 1500 g/m3/4 hour (rat) TCLo (Inhalation): 5000 ppm/6 hour/2 years intermittently (rat)

12. ECOLOGICAL INFORMATION

Environment	Limited ecotoxicity data was available for this product at the time this report was prepared. Ensure appropriate measures are taken to prevent this product from entering the environment.

13. DISPOSAL CONSIDERATIONS

Waste Disposal	Cylinders should be returned to the manufacturer or supplier for disposal of contents.
Legislation	Dispose of in accordance with relevant local legislation.

14. TRANSPORT INFORMATION

Transport Ensure cylinder is separated from driver and that outlet of relief device is not obstructed. Refer to Commonwealth, State and Territory Dangerous Goods Legislation which contain requirements which affect gas storage and transport.

CLASSIFIED AS A DANGEROUS GOOD BY THE CRITERIA OF THE ADG CODE

Shipping Name	1,1,1,2-TETRAFLUOROETHANE (REFRIGERANT GAS R 134a)				
UN No.	3159	**DG Class**	2.2	**Subsidiary Risk(s)**	None Allocated
Packing Group	None Allocated	**Hazchem Code**	2TE	**EPG**	2C2

15. REGULATORY INFORMATION

Poison Schedule A poison schedule number has not been allocated to this product using the criteria in the Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP).

AICS All chemicals listed on the Australian Inventory of Chemical Substances (AICS).

16. OTHER INFORMATION

Additional Information The storage of significant quantities of gas cylinders must comply with AS4332 The storage and handling of gases in cylinders.

APPLICATION METHOD: Transferred as a liquid into and out of refrigeration equipment by controlled pressure decanting through flexible pipework.

ABBREVIATIONS:
ADB - Air-Dry Basis.
BEI - Biological Exposure Indice(s)
CAS# - Chemical Abstract Service number - used to uniquely identify chemical compounds.
CNS - Central Nervous System.
EINECS - European INventory of Existing Commercial chemical Substances.
IARC - International Agency for Research on Cancer.
M - moles per litre, a unit of concentration.
mg/m3 - Milligrams per cubic metre.
NOS - Not Otherwise Specified.
NTP - National Toxicology Program.
OSHA - Occupational Safety and Health Administration.
pH - relates to hydrogen ion concentration using a scale of 0 (high acidic) to 14 (highly alkaline).
ppm - Parts Per Million.
RTECS - Registry of Toxic Effects of Chemical Substances.
TWA/ES - Time Weighted Average or Exposure Standard.

HEALTH EFFECTS FROM EXPOSURE:
It should be noted that the effects from exposure to this product will depend on several factors including: frequency and duration of use; quantity used; effectiveness of control measures; protective equipment used and method of application. Given that it is impractical to prepare a Chem Alert report which would encompass all possible scenarios, it is anticipated that users will assess the risks and apply control methods where appropriate.

PERSONAL PROTECTIVE EQUIPMENT GUIDELINES:
The recommendation for protective equipment contained within this Chem Alert report is provided as a guide only. Factors such as method of application, working environment, quantity used, product concentration and the availability of engineering controls should be considered before final selection of personal protective equipment is made.

Report Status This document has been compiled by RMT on behalf of the manufacturer of the product and serves as the manufacturer's Safety Data Sheet ('SDS').

It is based on information concerning the product which has been provided to RMT by the manufacturer or obtained from third party sources and is believed to represent the current state of knowledge as to the appropriate safety and handling precautions for the product at the time of issue. Further clarification regarding any aspect of the product should be obtained directly from the manufacturer.

While RMT has taken all due care to include accurate and up-to-date information in this SDS, it does not provide any warranty as to accuracy or completeness. As far as lawfully possible, RMT accepts no liability for any loss, injury or damage (including consequential loss) which may be suffered or incurred by any person as a consequence of their reliance on the information contained in this SDS.

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End of Report