R-134a

SAFETY DATA SHEET

1) CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME	:	R-134a
OTHER NAME	:	1,1,1,2-Tetrafluoroethane
USE	:	Refrigerant Gas
SUPPLIER	:	KALTECH ENGINEERING & REFRIGERATION PTE. LTD. 9 TUAS LINK 1, SINGAPORE 638587

2) HAZARDS IDENTIFICATION



CLASSIFICATION	:	Gases under pressure, Liquefied Gas
SIGNAL WORD	:	WARNING
HAZARD STATEMENT	:	Contains gas under pressure, may explode if heated
SYMBOL	:	Gas Cylinder
PRECAUTION	:	Protect from sunlight, store in a well-ventilated place

EMERGENCY OVERVIEW: Colourless, volatile liquid with ethereal and faint sweetish odour. Non-flammable material. Overexposure may cause dizziness and loss of concentration. At higher levels, CNS depression and cardiac arrhythmia may result from exposure. Vapors displace air and can cause asphyxiation in confined spaces. At higher temperatures, (>250°C), decomposition products may include Hydrofluoric Acid (HF) and carbonyl halides.

POTENTIAL HEALTH HAZARDS

SKIN : Irritation would result from a defatting action on tissue. Liquid contact could cause frostbite.

EYES: Liquid contact can cause severe irritation and frostbite. Mist may irritate.

INHALATION : R-134a is low in acute toxicity in animals. When oxygen levels in air are reduced to 12-14% by displacement, symptoms of asphyxiation, loss of coordination, increased pulse rate and deeper respiration will occur. At high levels, cardiac arrhythmia may occur.

INGESTION: Ingestion is unlikely because of the low boiling point of the material. Should it occur, discomfort in the gastrointestinal tract from rapid evaporation of the material and consequent evolution of gas would result. Some effects of inhalation and skin exposure would be expected.

DELAYED EFFECTS : None (not known)

3) COMPOSITION / INFORMATION ON INGREDIENTS

INGREDIENT NAME	CAS NUMBER	WEIGHT %
1,1,1,2-Tetrafluoroethane	811-97-2	100

There are no impurities or stabilizers that contribute to the classification of the material identified in Section 2

4) FIRST AID MEASURES

SKIN: Promptly flush skin with water until all chemical is removed. 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. Get medical attention if symptoms persist.

EYES: Immediately flush eyes with large amounts of water for at least 15 minutes (in case of frostbite, water should be lukewarm, not hot) lifting eyelids occasionally to facilitate irrigation. Get medical attention if symptoms persist.

INHALATION: Immediately move to fresh air. If breathing has stopped, give artificial respiration. Use oxygen as required, provided a qualified operator is available. Get medical attention immediately. DO NOT give epinephrine (adrenaline).

INGESTION: Ingestion is unlikely because of the physical properties and is not expected to be hazardous. DO NOT induce vomiting unless instructed to do so by a physician.

ADVICE TO PHYSICIAN: 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.

5) FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES

FLASH POINT	:	Gas, not applicable per DOT regulations
FLASH POINT METHOD	:	Not applicable
AUTOIGNITION TEMPERATURE	:	>750°C
UPPER FLAME LIMIT (volume % in air)	:	None*
LOWER FLAME LIMIT (volume % in air)	:	None*

*Based on ASHRAE Standard 34 with match ignition

FLAME PROPAGATION RATE (solids)	:	Not applicable
OSHA FLAMMABILITY CLASS	:	Not applicable

EXTINGUISHING MEDIA

Use any standard agent – choose the one most appropriate for type of surrounding fire (material itself is not flammable)

UNUSUAL FIRE AND EXPLOSION HAZARDS:

R-134a is not flammable at ambient temperatures and atmospheric pressure. However, this material will become combustible when mixed with air under pressure and exposed to strong ignition sources. Contact with certain reactive metals may result in formation of explosive or exothermic reactions under specific conditions (e.g. very high temperatures and/or appropriate pressures).

SPECIAL FIRE FIGHTING PRECAUTIONS/INSTRUCTIONS:

Firefighters should wear self-contained, NIOSH-approved breathing apparatus for protection against possible toxic decomposition products. Proper eye and skin protection should be provided. Use water spray to keep fire-exposed containers cool.

6) ACCIDENTAL RELEASE MEASURES

IN CASE OF SPILL OR OTHER RELEASE:

(Always wear recommended personal protective equipment.) Evacuate unprotected personnel. Product dissipates upon release. Protected personnel should remove ignition sources and shut off leak, if without risk, and provide ventilation. Unprotected personnel should not return to the affected area until air has been tested and determined safe, including low-lying areas.

Spills and releases may have to be reported to local authorities. See also Section 15 regarding reporting requirements.

7) HANDLING AND STORAGE

NORMAL HANDLING:

(Always wear recommended personal protective equipment.) Avoid breathing vapours and liquid contact with eyes, skin or clothing. Do not puncture or drop cylinders, expose them to open flame or excessive heat. Use authorized cylinders only. Follow standard safety precautions for handling and use of compressed gas cylinders.

R-134a should not be mixed with air above atmospheric pressure for leak testing or any other purpose.

STORAGE RECOMMENDATIONS:

Store in a cool, well-ventilated area of low fire risk and out of direct sunlight. Protect cylinder and its fittings from physical damage. Storage in subsurface locations should be avoided. Close valve tightly after use and when empty.

INCOMPATIBILITIES:

Freshly abraded aluminium surfaces at specific temperatures and pressures may cause a strong exothermic reaction. Chemically reactive metals: potassium, calcium, powdered aluminium, magnesium, and zinc.

8) EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS:

Provide local ventilation at filling zones and areas where leakage is probable. Mechanical (general) ventilation may be adequate for other operating and storage areas.

PERSONAL PROTECTIVE EQUIPMENT

SKIN PROTECTION: Skin contact with refrigerant may cause frostbite. General work clothing and gloves (leather) should provide adequate protection. If prolonged contact with liquid or gas is anticipated, insulated gloves constructed of PVA, neoprene or butyl rubber should be used. Any contaminated clothing should be promptly removed and washed before reuse.

EYE PROTECTION: For normal conditions, wear safety glasses. Where there is reasonable probability of liquid contact, wear chemical safety goggles.

RESPIRATORY PROTECTION: None generally required for adequately ventilated work situations. For accidental release or non-ventilated situations, or release into confined space, where the concentration may be above the PEL of 1,000 ppm, use a self- contained, NIOSH approved breathing apparatus or supplied air respirator. For escape: use the former or a NIOSH approved gas mask with organic vapor canister.

ADDITIONAL RECOMMENDATIONS: Where contact with liquid is likely, such as in a spill or leak, impervious boots and clothing should be worn. High dose-level warning signs are recommended for areas of principle exposure. Provide eyewash stations and quick drench shower facilities at convenient locations.

EXPOSURE GUIDELINES :

INGREDIENT NAME	ACGIH TLV	OSHA PEL	OTHER LIMIT
1,1,1,2-Tetrafluoroethane	None	None	*1000 ppm TWA (8hr)

* = Workplace Environmental Exposure Level (AIHA)

OTHER EXPOSURE LIMITS FOR POTENTIAL DECOMPOSITION PRODUCTS:

Hydrogen Fluoride: ACGIH TLV: 2 ppm ceiling, 0.5 ppm TLV-TWA

9) PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE	:	Clear, colorless liquid and vapor
PHYSICAL STATE	:	Gas at ambient temperatures
MOLECULAR WEIGHT	:	102
CHEMICAL FORMULA	:	CH_2FCF_3
ODOR	:	Faint ethereal odor
SPECIFIC GRAVITY (water = 1.0)	:	<1.22
SOLUBILITY IN WATER (weight %)	:	0.15 wt%
pH	:	Neutral
BOILING POINT	:	-26.2°C (-15.1°F)
FREEZING POINT	:	-92.5°C (-141.9°F)
VAPOR PRESSURE	:	85.8 psia @ 70°F 213.4 psia @ 130°F
VAPOR DENSITY (air = 1.0)	:	3.5
EVAPORATION RATE	:	>1 COMPARED TO: CCl_4 = 1
% VOLATILES	:	100
ODOR THRESHHOLD	:	Not established

FLAMMABILITY	:	Not applicable
LEL/UEL	:	None/None
RELATIVE DENSITY	:	1.21g/cm^3 at 25˚C
PARTITION COEFF (n-octanol/water)	:	Log Pow: 1.06
AUTO IGNITION TEMP	:	>750˚C
DECOMPOSITION TEMPERATURE	:	>250˚C
VISCOSITY	:	Not applicable
FLASH POINT	:	Not applicable

10) STABILITY AND REACTIVITY

NORMALLY STABLE (CONDITIONS TO AVOID): The product is stable. Do not mix with oxygen or air above atmospheric pressure. Any source of high temperatures, such as lighted cigarettes, flames, hot spots or welding may yield toxic and/or corrosive decomposition products.

INCOMPATIBILITIES: (Under specific conditions: e.g. very high temperatures and/or appropriate pressures) – Freshly abraded aluminium surfaces (may cause strong exothermic reaction). Chemically reactive metals: potassium, calcium, powdered aluminium, magnesium, and zinc.

HAZARDOUS DECOMPOSITION PRODUCTS: Halogens, halogen acids and possibly carbonyl halides.

HAZARDOUS POLYMERIZATION: Will not occur.

11) TOXICOLOGICAL INFORMATION

IMMEDIATE (ACUTE) EFFECTS: LC_{50} :Inhalation 4 hr. (rat) - > 500,000 ppm / Cardiac Sensitization threshold (dog) 80,000 ppm. NOEL – 50,000 ppm

DELAYED (SUBCHRONIC AND CHRONIC) EFFECTS: Not mutagenic in four tests Teratogenic NOEL (rat and rabbit) – 40,000 ppm Subchronic inhalation (rat) NOEL – 50,000 ppm Chronic NOEL – 10,000 ppm

REPEATED DOSE TOXICITY: Lifetime inhalation exposure of male rats was associated with a small increase in salivary gland fibrosarcomas.

FURTHER INFORMATION: Acute effects of rapid evaporation of the liquid may cause frostbite. Vapors are heavier than air and can displace oxygen causing difficulty breathing or suffocation. May cause cardiac arrhythmia.

OTHER DATA: Metabolism <0.5% as CO_2 in tests at 50,000 ppm, late developing benign tumors were found.

12) ECOLOGICAL INFORMATION

Degradability (BOD)	:	R-134a is a gas at room temperature; therefore, it is unlikely to remain In water.
Octanol Water Partition	:	See section 9

co-efficient

13) DISPOSAL CONSIDERATIONS

RCRA

Is the unused product a RCRA hazardous waste if discarded?	:	Not a hazardous waste
If yes, the RCRA ID number is	:	Not applicable

OTHER DISPOSAL CONSIDERATIONS:

Disposal must comply with local disposal or discharge laws. R-134a is subject to U.S. Environmental Protection Agency Clean Air Act Regulations Section 608 in 40 CFR Part 82 regarding refrigerant recycling.

The information offered here is for the product as shipped. Use and/or alterations to the product such as mixing with other materials may significantly change the characteristics of the material and alter the RCRA classification and the proper disposal method.

14) TRANSPORT INFORMATION

UN No.	:	UN3159
PROPER SHIPPING NAME	:	1,1,1,2-Tetrafluoroethane or Refrigerant Gas R 134a
HAZARD CLASS	:	2.2

For additional information on shipping regulations affecting this material, contact the information number found in Section 1.

15) REGULATORY INFORMATION

TOXIC SUBSTANCES CONTROL ACT (TSCA)

TSCA INVENTORY STATUS	:	Listed on the TSCA inventory
OTHER TSCA ISSUES	:	May contain 0-10 ppm Ethane, 2-chloro1,1,1-trifluoro, CAS# 75-88-7

SARA TITLE III / CERCLA

"Reportable Quantities" (RQs) and/or "Threshold Planning Quantities" (TPQs) exist for the following ingredients.

INGREDIENT NAME	SARA / CERCLA RQ (lb.)	SARA EHS TPQ (lb.)
No ingredients listed in this section		

Spills or releases resulting in the loss of any ingredient at or above its RQ requires immediate notification to your Local Emergency Planning Committee.

SECTION 311 HAZARD CLASS : IMMEDIATE PRESSURE

SARA 313 TOXIC CHEMICALS:

The following ingredients are SARA 313 "Toxic Chemicals". CAS numbers and weight percents are found in Section 2.

INGREDIENT NAME	COMMENT
No ingredients listed in this section.	

STATE RIGHT-TO-KNOW

In addition to the ingredients found in Section 2, the following are listed for state right-to-know purposes.

INGREDIENT NAME	WEIGHT %	COMMENT
No ingredients listed in this section		

ADDITIONAL REGULATORY INFORMATION:
R-134a is subject to U.S. Environmental Protection Agency Clean Air Act Regulations at 40 CFR Part 82.

WARNING: DO NOT vent to the atmosphere. To comply with provisions of the U.S. Clean Air Act, any residual must be recovered. Contains 1,1,1,2-Tetrafluoroethane (HFC-134a), a greenhouse gas which may contribute to global warming.

FOREIGN INVENTORY STATUS: EU - EINECS # 223770

16) OTHER INFORMATION

CURRENT ISSUE DATE: January 3rd 2017

OTHER INFORMATION: HMIS Classification: Health – 1, Flammability – 1, Reactivity – 0
NFPA Classification: Health – 2, Flammability – 1, Reactivity – 0
ANSI/ASHRAE 34 Safety Group – A1
UL Classified

Regulatory Standards:
1. OSHA regulations for compressed gases: 29 CFR 1910.101
2. DOT classification per 49 CFR 172.101

Toxicity information per PAFT Testing

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