MATERIAL SAFETY DATA SHEET

(REFRIGERANT GAS R134A)

1. CHEMICAL PRODUCT/COMPANY IDENTIFICATION

Product Identification:

Product Name	R134a
Product Synonym(s)	A list of applicable products can be found in Section 16
Chemical Family	Hydrofluorocarbon
Chemical Formula	CF_3CH_2F
Chemical Name	1,1,1,2-tetrafluoroethane (HFC - 134a)
Product Use	Refrigerant

MANUFACTURER:

Quzhou Qfreon Chemical Co.,Ltd.
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2. COMPOSITION/INFORMATION ON INGREDIENTS

Ingredient Name	CAS RegistryNumber	Typical Wt. %	OSHA
1,1,1,2-Tetrafluoroethane (HFC-134a)	811-97-2	100%	Y

The substance(s) marked with a "Y" in the OSHA column, are identified as hazardous chemicals according to the criteria of the OSHA Communication Standard (29 CFR 1910.1200)

This material is classified as hazardous under Federal OSHA regulation.

The components of this product are all on the TSCA inventory list.

3. PHYSICAL AND CHEMICAL PROPERTIES

Appearance/Odor	Clear, colorless liquified gas with faint etheral (ether like) odor.
PH	NA

Specific Gravity	1.21 @ 4 C
Vapor Pressure	0.665 MPa (6.66 bar) (25 C)
Vapor Density	3.25
Melting Point	NE
Freezing Point	-101 C (-149.8 F)
Boiling Point	-26.4 C/ -15.5 F
Solubility In Water	(25 C): 0.9 g/lMolecular Weight 102.03
Bulk Density	1.21 @ 25 C (g/cm3)
n-Octanol/Water Partition Coefficient	log Pow: 1.06
Other Physical Data	Decomposition temperature: >370 C (700 F)
	Critical temperature: 101 C
	Critical pressure: 4.07 MPa (40.7 bar)

4. FIRE FIGHTING MEASURES

Fire and Explosive Properties

Auto-Ignition Temperature:	743 C (1 bar)
Flash Point:	NA - GAS

Flash Point Method

Flammable Limits- Upper:	NA
Lower:	NA

Extinguishing Media

Use extinguishing media appropriate to surrounding fire conditions.

Fire Fighting Instructions

Stop the flow of gas if possible. Use water spray on person making shut-off. Fire fighters and others who maybe exposed to products of combustion should wear full fire fighting turn out gear (full Bunker Gear) and self-contained breathing apparatus (pressure demand NIOSH approved or equivalent). Fire fighting equipmentshould be thoroughly decontaminated after use.

Fire and Explosion Hazards

May decompose on contact with flames or extremely hot metal surfaces to produce toxic and corrosiveproducts. Liquid and gas under pressure, overheating or overpressurizing may cause gas release and/or violentcylinder bursting. Container may explode if heated due to resulting pressure rise. Some mixtures of HCFCsand/or HFCs, and air or oxygen may be combustible if pressurized and exposed to extreme heat or flame.

5. HAZARDS IDENTIFICATION

Emergency Overview

Clear, colorless liquefied gas with faint ethereal (ether like) odor.

WARNING!

LIQUID AND GAS UNDER PRESSURE, OVERHEATING AND OVERPRESSURIZING MAY CAUSE GAS RELEASE OR VIOLENT CYLINDER BURSTING. MAY DECOMPOSE ON CONTACT WITH FLAMES OR EXTREMELY HOT METAL SURFACES TO PRODUCE TOXIC AND CORROSIVE PRODUCTS. VAPOR REDUCES OXYGEN AVAILABLE FOR BREATHING AND IS HEAVIER THAN AIR. HARMFUL IF INHALED AND MAY CAUSE HEART IRREGULARITIES, UNCONSCIOUSNESS OR DEATH. LIQUID CONTACT WITH EYES OR SKIN MAY CAUSE FROSTBITE.

Potential Health Effects

Inhalation and skin contact are expected to be the primary routes of occupational exposure to this material. As with most liquified gases, contact with the rapidly volatilizing liquid or cold vapor can cause frostbite to any tissue. Highvapor concentrations are irritating to the eyes and respiratory tract and may result in central nervous system (CNS)effects such as headache, dizziness, anesthesia, drowsiness and, in severe exposure, loss of consciousness anddeath. The dense vapor of this material may reduce the available oxygen for breathing and produce symptoms such asheadache, dizziness, drowsiness, cyanosis and lack of muscle control followed by collapse. Prolonged exposure to anoxygen-deficient atmosphere may be fatal. Inhalation of this material may cause an increase in the sensitivity of the heart to adrenaline, which could result in irregular or rapid heartbeats and reduced heart function. Workers with heart disease or compromised heart function should limit exposure to this material.

6. FIRST AID MEASURES

First Aid

INHALATION

If high concentrations are inhaled, immediately remove to fresh air. Keep person calm. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

SKIN CONTACT

Flush skin with water for at least 15 minutes after excessive contact. Seek medical assistance if irritation is present. Wash contaminated clothing before reuse. Treat for frostbite if necessary by gently warming affected area.

EYE CONTACT

In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Call a physician.

INGESTION

Ingestion is not considered a potential route of exposure.

Notes to Physicians

Because of possible disturbances of cardiac rhythm, catecholamine drugs, such as epinephrine, should only be used with special caution in situations of emergency life support.

7. ACCIDENTAL RELEASE MEASURES

In Case of Spill or Leak

Use Halogen leak detector or other suitable means to locate leaks or check atmosphere. Keep upwind. Evacuate enclosed spaces and disperse gas with floor-level forced-air ventilation. Exhaust vapors outdoors. Do not smoke or operate internal combustion engines. Remove flames and heating elements.

8. HANDLING AND STORAGE

Handling

Avoid breathing gas. Avoid contact with eyes, skin and clothing. Keep container closed. Use only with adequate ventilation. Do not enter confined spaces unless adequately ventilated.

Storage

Do not apply direct flame to cylinder. Do not store cylinder in direct sun or expose it to heat above 120 F. Do not drop or refill this cylinder. Keep away from heat, sparks and flames.

9. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls

Investigate engineering techniques to reduce exposures below airborne exposure limits. Provide ventilation if necessary to control exposure levels below airborne exposure limits (see below). If practical, use local mechanical exhaust ventilation at sources of air contamination such as open process equipment.

Eye / Face Protection

Where there is potential for eye contact, wear chemical goggles and have eye flushing equipment available.

Skin Protection

Wear appropriate chemical resistant protective clothing and chemical resistant gloves to prevent skin contact.Consult glove manufacturer to determine appropriate type glove material for given

application. Rinse contaminated skin promptly. Wash contaminated clothing and clean protective equipment before reuse. Wash skin thoroughly after handling.

Respiratory Protection

Avoid breathing gas. When airborne exposure limits are exceeded (see below), use NIOSH approve drespiratory protection equipment appropriate to the material and/or its components (full face piece recommended). Consult respirator manufacturer to determine appropriate type equipment for a given application. Observe respirator use limitations specified by NIOSH or the manufacturer. For emergency and other conditions where exposure limit may be significantly exceeded, use an approved full face positive-pressure, self-contained breathing apparatus or positive-pressure airline with auxiliary self-contained air supply.

Airborne Exposure Guidelines for Ingredients

Exposure Limit	Value
1,1,1,2-Tetrafluoroethane (HFC-134a)	
WEEL TWA	1000 ppm 4240 mg/m3

-Only those components with exposure limits are printed in this section.

-Skin contact limits designated with a "Y" above have skin contact effect. Air sampling alone is insufficient to accurately quantitative exposure. Measures to prevent significant coetaneous absorption may be required.

-ACGIH Sensitizer designator with a value of "Y" above means that exposure to this material may cause allergic reactions.

-WEEL-AIHA Sensitizer designator with a value of "Y" above means that exposure to this material may cause allergic skin reactions.

10. STABILITY AND REACTIVITY

Stability

This material is chemically stable under specified conditions or storage, shipment and/or use. See HANDLING AND STORAGE section of this MSDS for specified conditions.

Incompatibility

Avoid contact with strong alkalis or alkaline earth metals, finely powdered metals such as aluminum, magnesiumor zinc and strong oxidizers, since they may react or accelerate decomposition.

Hazardous Decomposition Products

Thermal decomposition products include hydrogen fluoride, hydrogen chloride,
carbon monoxide, carbon dioxide and chlorine.

11. TOXICOLOGICAL INFORMATION

Toxicological Information

1,1,1,2-Tetrafluoroethane (HFC-134a)

No skin allergy was observed in guinea pigs following repeated exposure. Acute inhalation exposure produced anesthetic effects in mice, dogs, cats and monkeys. Repeated inhalation exposure produced no adverse effects in rats. Inhalation of this material, followed by intravenous injection of epinephrine to simulate stress reactions, resulted in cardiac sensitization in dogs. Following long-term inhalation studies in rats, an increased incidence of benign tumors (at high concentrations) in the testes were the only tumors observed. No birth defects were noted in the offspring of rats exposed to this material by inhalation during pregnancy, even at dosages which produced significant adverse effects in the mother. This material produced no genetic change sin standard tests using bacterial or animal cells and whole animals. Single exposure (acute) studies indicate: Inhalation - Practically Non-toxic to Rats (4-hr LC50 >500,000 ppm; 30-min LC50

~750,000 ppm)

Eye Irritation - Slightly Irritating to Rabbits Skin Irritation - Slightly Irritating to Rabbits (24-hr exposure)

12. ECOLOGICAL INFORMATION

Ecotoxicological Information

Based on its low n-octanol/water partition coefficient (log Pow of 1.06), bioaccumulation of this material is considered unlikely.

Chemical Fate Information

Based on its low n-octanol/water partition coefficient (log Pow 1.06), bioaccumulation of this material is considered unlikely. When evaluated in a 28 day activated sludge test, 3% degradation of this material was observed.

13. DISPOSAL CONSIDERATIONS

Waste Disposal

Recover, reclaim or recycle when practical. Dispose of in accordance with federal, state and local regulations.

Note: Chemical additions to, processing of, or otherwise altering this material may make this waste management information incomplete, inaccurate, or otherwise inappropriate. Furthermore, state and

local waste disposal requirements may be more restrictive or otherwise different from federal laws and regulations.

14. TRANSPORTATION INFORMATION

IMO Name: 1,1,1,2-tetrafluoroethane
HAZARD CLASS: 2.2
UN NO.: 3159
Packing Group: Not applicable

15. REGULATORY INFORMATION

Hazard Categories Under Criteria of SARA Title III Rules (40 CFR Part 370)

Immediate (Acute) Health	Y	Fire	N
Delayed (Chronic) Health	N	Reactive	N
Sudden Release of Pressure	Y		

The components of this product are all on the TSCA inventory list.

Ingredient Related Regulatory Information:

SARA Reportable Quantities	CERCLA RQ	SARA TPQ
1,1,1,2-Tetrafluoroethane (HFC-134a)	NE	

16. OTHER INFORMATION

Key

NE= Not Established NA= Not Applicable (R) = Registered Trademark

The information given correspond to the current state of our knowledge and experience of the product, and is not exhaustive. This applies to product that confirms to the specification, unless otherwise stated. In the case of combinations and mixtures one must make that no new dangers can arise. In any case, the user is not exempt from observing all legal, administrative and regulatory procedures relating to the product, personal hygiene, and protection of human welfare and environment.

Responsibility for MSDS: MSDS Coordinator

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Indicates updated section.

End of MSDS