



from dizziness, weakness, nausea, to unconsciousness. It can act as an asphyxiant by limiting available oxygen. Very high doses can cause abnormal heart rhythm which is potentially fatal.

OTHER EFFECTS OF OVEREXPOSURE: None expected

4. FIRST AID MEASURES

SKIN: In case of contact, take off the polluted clothes, flush area with suds water and clean water at least 15 minutes, do not use hot water, call a physician.

EYES: Immediately flush with plenty of water. After initial flushing, remove any contact lenses and continue flushing for at least 15 minutes. Have eyes examined and treated by medical personnel.

INHALATION: Remove victim to fresh air. Keep warm and at rest. If not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is labored, give oxygen. In the event of a cardiac arrest, apply external cardiac massage. Do not administer adrenaline or similar sympathomimetic drugs as cardiac arrhythmias may result. Get immediate medical attention..

INGESTION: Not a probable route, however in case of accident ingestion, drink plenty of lukewarm water, make emetic action, call a physician.

5. FIRE FIGHTING MEASURES

FLAMMABLE CHARACTERISTICS: It is not flammable and explosive in the air. In case of pyrolytic decomposition, it will form toxic materials like hydrochloric, hydrofluoric acid and carbonyl halides. In case of meeting high temperature, the inner pressure of the container strengthens and may cause craze and explosion.

FIREFIGHTING EQUIPMENT: Self-contained breathing apparatus with full facepiece and protective clothing.

HAZARDOUS COMBUSTION PRODUCTS: Highly toxic decomposition products.

FIREFIGHTING WAYS: Cut off the gas origin, use water spray or fog to cool the container, remove the container to clean place if possible.

EXTINGUISH AGENT: Roridous water, foam, carbon dioxide.

EXTINGUISH NOTICES AND MEASURES: Wear specialized protective suit and self-contained breathing apparatus(SCBA), and to extinguish the fire on the upper wind position.

6. ACCIDENTAL RELEASE MEASURES

Precautions should take into account the severity of the leak or spill. For large releases: Use recommended personal protection and evacuate unprotected personnel. Shut off the leak if without risk. Ventilate the spill area. If possible, dike and contain spillage. Prevent liquid from entering



sewers, sumps or pit areas since vapor can create a suffocating atmosphere. Capture material for recycle or destruction if suitable equipment is available.

Eliminate way: Keep ventilation and accelerating spread. If possible, use the gas into production immediately.

7. HANDLING AND STORAGE

HANDLING: Keep ventilation and airtight producing procedure. The operators must have professional training and obey the operation rules strictly. While the consistency in the air surpass the standard consistency, the handling personnel have to wear self-contained breathing filter mask(half-mask respirator) and chemical protective goggles. Preventing the gas leak out to the workplace's air. Gently handling to avoid the damage of the container or its accessories. To equip the relevant emergency equipment.

STORAGE: Keep in cool, ventilated places. Keep far away from fire, hot source. The storage places temperature should lower than 30°C, avoid direct sunlight. And separated with inflammables, oxidizer, edible chemicals, do not have a mix storage. Storage place should have emergency release handling equipment. Notice the chemical name while checking and accepting, note the checking date, use them orderly.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE HAZARDS: As R22 is a simple asphyxiant, avoid any areas where spillage has taken place. Only enter once testing has proved the atmosphere to be safe, and remember that the gas is heavier than air.

ENGINEERING CONTROL MEASURES: Engineering control measures are preferred to reduce exposure to oxygen depleted atmospheres. General methods include forced-draught ventilation, separate from other exhaust ventilation systems. Ensure that sufficient fresh air enters at, or near, floor level.

PERSONAL PROTECTION: Self-contained breathing apparatus should always be worn when entering area where oxygen depletion may have occurred. Safety goggles, gloves and shoes or boots should be worn when handling cylinders.

SKIN: 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.

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE AND CHARACTERISTICS: colorless transparency liquid, gas with slight ethereal odor.



APPEARANCE AND CHARACTERISTICS:	colorless transparency liquid, gas with slight aetheral odor
PH INDEX:	No data.
MELTING POINT (°C):	No data.
BOILING POINT (°C):	-21.6°C
FREEZING POINT(°C):	-101°C
LIQUID DENSITY:	1206 kg/m ³ (25°C)
SATURATION VAPOR DENSITY:	5.25 kg/m ³
SATURATION VAPOR PREEASURE(kPa):	No data.
CRITICAL TEMPREATURE(K):	374.25
CRITICAL PRESSURE(MPa):	4.06
FLASH POINT(°C):	insignificance
INFLAME TEMPERATURE(°C):	insignificance
LEL[% (V/V)] :	insignificance
SOLUBILITY:	slight solubilize in water, solubilize in ethanol, ether.
MAIN USE:	refrigerant agent, plastic vesicant, medicine, makeup aerosol, medical inhalator propellant etc.

10. STABILITY AND REACTIVITY

STABILITY: Stable under normal conditions.

INCOMPATIBILITY: Finely divided metals, magnesium and alloys containing more than 2% magnesium. Can react violently if in contact with alkali or alkali earth metals such as sodium, potassium or barium.

HAZARDOUS DECOMPOSITION PRODUCTS: Hydrogen fluoride by thermal decomposition

HAZARDOUS POLYMERIZATION: Will not occur.

11. TOXICOLOGICAL INFORMATION

INHALATION: High atmospheric concentrations may lead to anesthetic effects, including loss of consciousness. Very high exposures may cause an abnormal heart rhythm and prove suddenly fatal. Higher concentrations may cause asphyxiation due to reduced oxygen content of the atmosphere.

SKIN CONTACT: Liquid splashes or spray may cause freeze burns. Unlikely to be hazardous by skin absorption.

EYE CONTACT: Liquid splashes or spray may cause freeze burns.

INGESTION: Highly unlikely, but should this occur, freeze burns will result.

12. ECOLOGICAL INFORMATION

PERSISTENCE AND DEGRADATION: Decomposes comparatively rapidly in the lower atmosphere (troposphere). Atmospheric lifetime is 15.6 years. Products of decomposition will be highly dispersed and hence will have a very low concentration. It is not a significant contributor to



photochemical smog and is not considered to be a VOC. Is not considered an ozone depleting chemical. Effect on effluent treatment: Discharges of the product will enter the atmosphere and will not result in long term aqueous contamination.

13. DISPOSAL CONSIDERATIONS

WASTE DISPOSAL: Mix with the other fuels before burning, be careful to form phosgene during the burning. The halogen hydride discharged from incinerator should be cleaned by acid.

NOTICE: the disposal should comply with local regulation.

14. TRANSPORT INFORMATION

DOT HAZARD DESCRIPTION:

PROPER SHIPPING NAME:	1,1,1,2-TETRAFLUOROETHANE (R134A)
HAZARD CLASS:	2.2
IDENTIFICATION NUMBER:	UN 3159
PACKING GROUP:	None
HAZARDOUS SUBSTANCE(RQ):	None
PLACARD/LABEL:	NON-FLAMMABLE GAS

15. REGULATORY INFORMATION

REGULATIONS ON SECURITY ADMINISTRATION OF DANGEROUS CHEMICAL GOODS' (Rule No. 344, stated by State Council, China, carry into execution from Mar. 15, 2002); 'REGULATIONS ON CHEMICALS' SAFETY USE IN WORKPLACE'(Rule No. 423, stated by employment department, China)etc. have made a series of relevant rules including the use, producing, storage, transportation, loading and unloading. According to GB 13690-92 Standard of Republic of China ,its dangerous classification is 2.2 non-flammable gas. This MSDS obeys the Standard GB 16843-2000.

16. OTHER INFORMATION

The information herein is given in good faith, but no warranty, expressed or implied, is made.

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