



## MATERIAL SAFETY DATA SHEET OF R134a

### 1. PRODUCT AND COMPANY IDENTIFICATION

Product name: 1,1,1,2-Tetrafluoroethane  
Synonyms: HFC-134a, refrigeration gas (R134a)  
Supplier: SHANDONG YUEAN CHEMICAL INDUSTRY CO.,LTD.  
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This MSDS effected since Nov 18<sup>th</sup>, 2009

### 2. COMPOSITION/ INGREDIENTS

PURITY (  )                      MIXTURE (  )

Material Name: 1,1,1,2-Tetrafluoroethane  
Content Wt: 99.9%  
CAS No.: 811-97-2

### 3. HAZARDS IDENTIFICATION

Hazards Class: 2.2 Non Flammable Gas

**Invasive routes:** inhalation, ingestion, eye and skin

**Potential health effects:**

High concentration of vapor in air will reduce the oxygen and cause anoxic asphyxiation. Eye/skin contact with liquid may cause frostbite or other harms. Under high temperature (like fire or on the surface of hot metal) will decompose and forming toxic materials like hydrochloric, hydrofluoric acid and carbonyl halides.

**Environment effects:**

The potential ODP=0, GWP=1200.

**Flame effects:**

Under common situation (common temperature and atmospheric pressure), this product is non-flammable, but under certain situation it will .

### 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:**

In case of contact, flush with plenty of clean water or physiological saline, call a physician.

**Inhalation:**

If inhaled, immediately remove to fresh air. Keep respiratory tract fluntely. If have difficulty in breathing, give an oxgen therapy. If not breathing, give artificial respiration or closed cardiac massage at once. Call a physician.

**Ingestion:**

Not a probable rout, owever 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 phyrogenetic decomposition, it will form toxic materials like hydrochloric, hydrofluoric acid and carbonyl halides. In case of meeting hihg tempreature, the inner pressure of the container strengthen and may cause craze and explosion.

**Harmful combustion products:**

Forming toxic materials like hydrochloric, hydrofluoric acid and carbonyl halides.

**Fire-fighting 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

Remove the staffs from the release polluted places to upper wind position, and isolote the staffs and the polluted zone, control the passes. The handling personnel had better to wear specialized protective suit and self-contained breathing apparatus(SCBA), find out the release source and cut off it, and remove the released container to ventilate area and keep ventilation. The

leaked container should be dealt with properly. Use after repairing and checking.

**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 filtermask(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

The max consistency:

China MAC (mg/m<sup>3</sup>): No data.

China PC—TWA (mg/m<sup>3</sup>): No data.

China PC—STEL (mg/m<sup>3</sup>): No data

Former Soviet Union MAC (mg/m<sup>3</sup>): No data

USA TLV-TWA: No data

USA TLV-STEL: No data

Monitor way: gas phase chromatography.

Engineering control: airtight producing procedure, good ventilation.

Respiratory system protection: While the consistency in the air surpass the standard consistency, the handling personnel have to wear self-contained breathing filtermask(half-mask respirator).

Eyes protection: wear chemical protective goggles when necessary.

Personnel protection: wear general job protective suit.

Hands protection: wear general job protective gloves.

Others: avoid high consistency inhalation. Under the monitor while working in the container,restricted area and other high consistency area.

## 9 PHYSICAL PROPERTIES

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(°C)



Liquid density:	1206 kg/m <sup>3</sup> (25°C)
Saturation vapor density:	5.25 kg/m <sup>3</sup>
Saturation vapor pressure(kPa):	No data.
Critical temperature (K):	374.25
Critical pressure(MPa):	4.06
Flash point(°C):	insignificance
Inflame temperature(°C):	insignificance
UEL[% (V/V)]:	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
The condition to be avoided:	high temperature
Incompatibility with other material:	alkali or alkaline earth metal-powdered Al, Zn, Be etc.
Polymerization:	will not occur
Decomposition:	forming toxic materials like hydrochloric, hydrofluoric acid and carbonyl halides.

## 11 TOXICOLOGICAL INFORMATION

Virulent	
LD <sub>50</sub> :	No data.
LC <sub>50</sub> :	No data.
Thrill:	No data.

## 12 ECOLOGICAL INFORMATION

Ecotoxicity:	No data.
Biological degradability:	No data.
Non-biological degradability:	No data.

## 13 DISPOSAL CONSIDERATION

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 TRANSPORTATION INFORMATION

Hazard class: 2.2  
UN No.: 3159  
Package lable: non-flammable gas  
Package classification: III  
Package: steel cylinder, ampoule bottle with common wooden case outside.  
Notice: while transported in steel cylinders, make sure the cylinders' safety cap are fixed. Cylinders should be lied flat and make the cylinders' mouth at the same directions. The height should not surpass the vehicle's fence board and fix with the trigonal board to prevent the move of the cylinders. Mixture transportation with edible chemicals is forbidden. During summer the products should be transported in the morning or in the evening and avoid direct sunshine. Should transport on certain route during road transportation, never stop in residential area or densely populated area. Humping is forbidden during railroad transportation.

## 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 above information was supplied by:  
**SHANDONG YUEAN CHEMICAL INDUSTRY CO.,LTD.**