



Zhejiang Fotech International Co., Ltd  
**Material Safety Data Sheet**

**1. CHEMICAL PRODUCT/COMPANY IDENTIFICATION**

**MATERIAL IDENTIFICATION**

MSDS Number: FOTECH021  
Molecular Weight: 94.44

**TRADENAMES AND SYNONYMS**

REFRIGERANT GAS R401A

**COMPANY IDENTIFICATION**

**MANUFACTURER/DISTRIBUTOR' NAME**

Zhejiang Fotech International Co., Ltd.  
No.139, Renmin West RD., Jinhua, Zhejiang, P.R. China-321000

**PHONE NUMBERS**

Product Information: +86-571-87918266  
Medical Emergency: +86-571-87085066

**2. COMPOSITION/INFORMATION ON INGREDIENTS**

**COMPONENTS**

Material	CAS Number	Weight %
Chlorodifluoromethane (R22)	75-45-6	53%
1,1-difluoroethane (R152a)	75-37-6	13%
Chlorotetrafluoroethane (R124)	2837-89-0	34%

**3. HAZARDS IDENTIFICATION**

**Potential Health Effects**

Inhalation of high concentrations of vapor is harmful and may cause heart irregularities,

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unconsciousness or death. Intentional misuse or deliberate inhalation may cause death without warning. Vapor reduces oxygen available for breathing and is heavier than air. Liquid contact can cause frostbite.

**HUMAN HEALTH EFFECTS:**

Skin contact may cause frostbite from exposure to the liquid. Inhalation may include non-specific discomfort, such as nausea, headache, or weakness;  
Or temporary nervous system depression with anaesthetic effects such as dizziness, headache, confusion, incoordination, and loss of consciousness.

**Carcinogenicity Information**

None of the components present in this material at concentrations equal to or greater than 0.1% are listed by IARC, NTP, OSHA or ACGIH as a carcinogen.

**4. FIRST AID MEASURES**

**SKIN CONTACT**

In case of contact, flush with lukewarm water. Do not use hot water. If frostbite has occurred, call a physician.

**EYES CONTACT**

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

**INHALATION**

Immediately remove to fresh air. Keep person calm. Call a physician. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.

**INGESTION**

Not a probable route. However, in case of accidental ingestion, call a physician.

**ADVICE TO PHYSICIAN**

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

**5. FIRE-FIGHTING MEASURES**

**FLAMMABLE PROPERTIES**

**FLASH POINT:**

**No flash point**



**Flammable Limits in air, % by Volume:**

**LEL:** None per ASTM E681

**UEL:** None per ASTM E681

**Autoignition:** 681C (1258F) R-401A

**Fire and Explosion Hazards:**

Cylinders may rupture under fire conditions. Decomposition may occur.

Contact of welding or soldering torch flame with high concentrations of refrigerant can result in visible changes in the size and color of torch flames. This flame effect will only occur in concentrations of product well above the recommended exposure limit, therefore stop all work and ventilate to disperse refrigerant vapors from the work area before using any open flames.

R-401A is not flammable in air at temperatures up to 100 deg C (212 deg F) at atmospheric pressure. However, mixtures of R-401A with high concentrations of air at elevated pressure and/or temperature can become combustible in the presence of an ignition source. R-401A can also become combustible in an oxygen enriched environment (oxygen concentrations greater than that in air). Whether a mixture containing R-401A and air, or R-401A in an oxygen enriched atmosphere becomes combustible depends on the inter-relationship of 1) the temperature 2) the pressure, and 3) the proportion of oxygen in the mixture. In general, R-401A should not be allowed to exist with air above atmospheric pressure or at high temperatures; or in an oxygen enriched environment. For example: R-401A should NOT be mixed with air under pressure for leak testing or other purposes.

Experimental data have also been reported which indicate combustibility of HCFC-22, a component in this blend, in the presence of chlorine.

## **EXTINGUISHING MEDIA**

Use media appropriate for surrounding material.

## **FIRE FIGHTING INSTRUCTIONS**

Cool tank/container with water spray. Self-contained breathing apparatus (SCBA) is required if drums rupture and contents are spilled under fire conditions.

## **6. ACCIDENTAL RELEASE MEASURES**

### **Safeguards (Personnel)**



**NOTE: Review FIRE FIGHTING MEASURES and HANDLING (PERSONNEL) sections before proceeding with clean-up. Use appropriate PERSONAL PROTECTIVE EQUIPMENT during clean-up.**

**Ventilate area, especially low or enclosed places where heavy vapors might collect.**

**Remove open flames. Use self-contained breathing apparatus (SCBA) for large spills or releases.**

## **Spill clean up**

**Comply with Federal, State, and local regulations for reporting releases.**

## **7. HANDLING AND STORAGE**

### **HANDLING (PERSONNEL)**

**Avoid breathing vapor. Avoid liquid contact with eyes and skin. Use with sufficient ventilation to keep employee exposure below recommended limits.**

### **STORAGE**

**Store in a clean, dry place.**

**Do not heat above 52 deg C to avoid over pressurizing the container.**

## **8. EXPOSURE CONTROLS/PERSONAL PROTECTION**

### **Engineering Controls**

**Avoid breathing vapors. Avoid contact with skin or eyes. Use with sufficient ventilation to keep employee exposure below the recommended exposure limits. Local exhaust should be used if large amounts are released. Mechanical ventilation should be used in low or enclosed places. Refrigerant concentration monitors may be necessary to determine vapor concentrations in work areas prior to use of torches or other open flames, or if employees are entering enclosed areas.**

## **9. PHYSICAL AND CHEMICAL PROPERTIES**

### **Physical Data**

<b>Boiling Point of saturated liquid:</b>	<b>-33 C (-27 F)</b>
<b>Vapor Pressure of saturated liquid:</b>	<b>112.1 psia at 25 C (77 F)</b>
<b>Vapor density:</b>	<b>3.3 (Air=1.0)@25C (77F)</b>
<b>Liquid Density:</b>	<b>1.194 g/cm<sup>3</sup> @25C (77F)</b>
<b>% Volatiles:</b>	<b>100 WT%</b>



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Evaporation Rate :	>1 (CCl4=1.0)
Solubility in Water:	0.1WT%@25C (77F)
Odor:	Slight ethereal
Form:	Liquefied gas
Color:	Clear, colorless

## 10. STABILITY AND REACTIVITY

### Chemical Stability

Stable

### Conditions to Avoid

Avoid open flames and high temperatures.

### Incompatibility with Other Materials

Incompatible with active metals, alkali or alkaline earth metals – powdered Al, Zn, Be, etc.

### Decomposition

Decomposition products are hazardous. This material can be decomposed by high temperatures (open flames, glowing metal surfaces, etc.) forming hydrochloric and hydrofluoric acids and possibly carbonyl halides. These materials are toxic and irritating. Contact should be avoided.

### Polymerization

Polymerization will not occur.

## 11. TOXICOLOGICAL INFORMATION

### Animal Data

The blend is untested.

#### CHLORODIFLUOROMETHANE (HCFC-22)

Inhalation 4-hour LC50: 220,000 ppm in rats

The compound is a skin irritant and a slight eye irritant, but is not a skin sensitiser in animals.

Effects from single high exposures include central nervous system depression, anaesthesia, rapid breathing, lung congestion and microscopic liver changes. Cardiac sensitisation occurred in dogs at 50,000 ppm or greater from the action of exogenous epinephrine.

No toxic effects or abnormal histopathological observations occurred in rats repeatedly exposed to concentrations ranging from 10,000 to 50,000 ppm (v/v). Long-term exposures to 50,000 ppm (v/v) of vapours produced organ weight increases and a



decrease in body weight gain, but no increased mortality or adverse haematological effects.

In chronic inhalation studies, HCFC-22, at a concentration of 50,000 ppm (v/v), produced a small, but statistically significant increase of late-occurring tumours involving salivary glands in male rats, but not female rats or male or female mice. In the same studies, no increased incidence of tumours was seen in either species at concentrations of 10,000 ppm or 1000 ppm (v/v).

Long-term administration in corn oil produced no effects on body weight or mortality. HCFC-22 was mutagenic in some strains of bacteria in cell cultures, but not in mammalian cell cultures or animals. It did not cause heritable genetic damage in mammals.

A slight, but significant increase in developmental toxicity was observed at high concentrations (50,000 ppm) of HCFC-22, a concentration which also produced toxic effects in the adult animal. Based on these findings, and other negative developmental studies, HCFC-22 is not considered a unique hazard to the conceptus. Studies of the effects of HCFC-22 on male reproductive performance have been negative. Specific studies to evaluate the effect on female reproductive performance have not been conducted, however, limited information obtained from studies on developmental toxicity do not indicate adverse effects on female reproductive performance at concentrations up to 50,000 ppm.

#### **DIFLUOROETHANE (HFC-152a)**

**Inhalation 4-hour ALC 383,000 ppm in rats**

**Oral ALD>1,500 mg/kg in rats**

Effects of a single exposure to high levels include laboured breathing, lung irritation, lethargy, incoordination and loss of consciousness. Cardiac sensitisation occurred in dogs exposed to a concentration of 150,000 ppm in air and given an intravenous epinephrine challenge. Effects of repeated exposure include increased urinary fluoride, reduced kidney weight, and reversible kidney changes.

Effects of a single high oral dose include weight loss and lethargy.

Tests in animals demonstrate no carcinogenic activity or developmental effects. Tests in animals for reproductive effects have not been performed. This compound does not produce genetic damage in bacterial cell cultures but has not been tested in animals.

#### **CHLOROTETRAFLUOROETHANE (HCFC-124)**

**Inhalation 4-hour ALC>230,000 ppm in rats**

**The effects in animals from single inhalation exposures by inhalation include central**



nervous system effects, anaesthesia and decreased blood pressure. Cardiac sensitisation occurred in dogs exposed to a concentration of 2.5% in air and given an intravenous epinephrine challenge. Repeated exposures produced increased liver weights, anaesthetic effects, irregular respiration, poor coordination and non-specific effects such as decreased body weight gain. However, no irreversible effects were seen as evidenced by histopathologic evaluation.

Tests in animals suggest no developmental toxicity potential. HCFC-124 was not mutagenic in bacterial and mammalian cell cultures or whole animal studies.

## 12. ECOLOGICAL INFORMATION

### Ecotoxicological Information

Aquatic Toxicity

HCFC-22

48 hour EC50 - Daphnia magna: 433 mg/L

## 13. DISPOSAL CONSIDERATIONS

### Waste Disposal

Treatment, storage, transportation, and disposal must be in accordance with applicable Federal, State/Provincial, and Local regulations. Recover by distillation or remove to a permitted waste disposal facility.

## 14. TRANSPORT INFORMATION

### Shipping Information

DOT/IMO/IATA

Proper Shipping Name: LIQUEFIED GAS N. O .S.

Technical Name: Refrigerant Gas R401a

Hazard Class: 2.2

UN No.: 3163

Label(s): Nonflammable Gas

### Shipping Containers

Cylinders

Ton Tanks



Tank Trucks

## 15. REGULATORY INFORMATION

### U.S. Federal Regulations

TSCA Inventory Status:	Reported/Included.
TITLE III HAZARD CLASSIFICATIONS SECTIONS 311, 312	
Acute:	Yes
Chronic:	No
Fire:	No
Reactivity:	No
Pressure:	Yes

## 16. OTHER INFORMATION

The information given corresponds to the current state of our knowledge and experience of the product, and is not exhaustive. This applies to product that conforms to the specification, unless otherwise stated. In the case of combinations and mixtures one must make sure 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