

MATERIAL SAFETY DATA SHEET

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY/UNDERTAKING

PRODUCT NAME: R 404A

Address/Phone No.: ZHEJIANG BINGER NEW TYPE REFRIGERANT CO., LTD.
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Emergency Phone No.: +0086-(0)570- 2829813

Subject to Member State regulations, applicable uses are: refrigerant

2. COMPOSITION/INFORMATION ON INGREDIENTS

EC No.: 206-996-5 HFC 143a, 206-557-8 HFC 125, 212-377-0 HFC 134a

HAZARDOUS INGREDIENT(S)	CAS No.	%(w/w)	Symbol	R Phrases
1,1,1-Trifluoroethane (HFC 143a)	000420-46-2	52	F+	R12
Pentafluoroethane (HFC 125)	000354-33-6	44		
1,1,1,2-tetrafluoroethane (HFC 134a)	000811-97-2	4		

3. HAZARDS IDENTIFICATION

Low acute toxicity. High exposures may cause an abnormal heart rhythm and prove suddenly fatal. Very high atmospheric concentrations may cause anaesthetic effects and asphyxiation.

Liquid splashes or spray may cause freeze burns to skin and eyes.

4. FIRST-AID MEASURES

The first aid advice given for skin contact, eye contact, and ingestion is applicable following exposures to the liquid or spray. See also section 11.

Inhalation: Remove patient from exposure, keep warm and at rest. Administer oxygen if necessary. Apply artificial respiration if breathing has ceased or shows signs of failing. In the event of cardiac arrest apply external cardiac massage. Obtain immediate medical attention.

Skin Contact: Thaw affected areas with water. Remove contaminated clothing. Caution: clothing may adhere to the skin in

the case of freeze burns. After contact with skin, wash immediately with plenty of warm water. If irritation or blistering occur obtain medical attention.

Eye Contact: Immediately irrigate with eyewash solution or clean water, holding the eyelids apart, for at least 10 minutes. Obtain immediate medical attention.

Ingestion: Unlikely route of exposure.

Do not induce vomiting. Provided the patient is conscious, wash out mouth with water and give 200-300 ml (half a pint) of water to drink. Obtain immediate medical attention.

Further Medical Treatment

Symptomatic treatment and supportive therapy as indicated.

Adrenaline and similar sympathomimetic drugs should be avoided following exposure as cardiac arrhythmia may result with possible subsequent cardiac arrest.

5. FIRE-FIGHTING MEASURES

This refrigerant is not flammable in air under ambient conditions of temperature and pressure. Certain mixtures of this refrigerant and air when under pressure may be flammable. Mixtures of this refrigerant and air under pressure should be avoided.

Certain mixtures of HFCs and chlorine may be flammable or reactive under certain conditions.

Thermal decomposition will evolve very toxic and corrosive vapours. (hydrogen fluoride)

Containers may burst if overheated.

Extinguishing Media: As appropriate for surrounding fire. Water spray should be used to cool containers.

Fire Fighting Protective Equipment: A self contained breathing apparatus and full protective clothing must be worn in fire conditions. See Also Section 8.

6. ACCIDENTAL RELEASE MEASURES

Ensure suitable personal protection (including respiratory protection) during removal of spillages. See Also Section 8.

Provided it is safe to do so, isolate the source of the leak. Allow small spillages to evaporate provided there is adequate ventilation. Large spillages: Ventilate area. Contain spillages with sand, earth or any suitable adsorbent material. Prevent liquid from entering drains, sewers, basements and workpits since the vapour may create a suffocating atmosphere.

7. HANDLING AND STORAGE

7.1 HANDLING

Avoid inhalation of high concentrations of vapours. Atmospheric levels should be controlled in compliance with the occupational exposure limit. Atmospheric concentrations well below the occupational exposure limit can be achieved by

good occupational hygiene practice.

The vapour is heavier than air, high concentrations may be produced at low levels where general ventilation is poor, in such cases provide adequate ventilation or wear suitable respiratory protective equipment with positive air supply.

Avoid contact with naked flames and hot surfaces as corrosive and very toxic decomposition products can be formed.

Avoid contact between the liquid and skin and eyes.

For correct refrigerant composition, systems should be charged using the liquid phase and not the vapour phase.

Process Hazards

Liquid refrigerant transfers between refrigerant containers and to and from systems can result in static generation. Ensure adequate earthing. Certain mixtures of HFCs and chlorine may be flammable or reactive under certain conditions.

7.2 STORAGE

Keep in a well ventilated place. Keep in a cool place away from fire risk, direct sunlight and all sources of heat such as electric and steam radiators.

Avoid storing near to the intake of air conditioning units, boiler units and open drains.

Cylinders and Drums:

Keep container dry.

Storage temperature (Deg C): < 45

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Wear suitable protective clothing, gloves and eye/face protection. Wear thermal insulating gloves when handling liquefied gases. In cases of insufficient ventilation, where exposure to high concentrations of vapour is possible, suitable respiratory protective equipment with positive air supply should be used.

Occupational Exposure Limits

HAZARDOUS INGREDIENT(S)	LTEL 8hr TWA	LTEL 8hr TWA	STEL ppm	STEL mg/m ³	Notes
	ppm	mg/m ³			
1,1,1-Trifluoroethane (HFC 143a)	1000				COM
Pentafluoroethane (HFC 125)	1000				COM
1,1,1,2-Tetrafluoroethane (HFC 134a)	1000	4240			OES

9. PHYSICAL AND CHEMICAL PROPERTIES

Form:	liquefied gas
Colour:	colourless
Odour:	slight ethereal

Boiling Point (Deg C): -47.2 to -46.4 (boiling range)
Vapour Pressure (mm Hg): 8270 at 20 Deg C
Density (g/ml): 1.06 at 20 Deg C
Solubility (Water): insoluble
Solubility (Other): soluble in: chlorinated solvents, alcohols, esters
Vapour Density (Air= 1): 3.42 approx, at bubble point temperature

10. STABILITY AND REACTIVITY

Hazardous Reactions: Certain mixtures of HFCs and chlorine may be flammable or reactive under certain conditions.
Incompatible materials: finely divided metals, magnesium and alloys containing more than 2% magnesium.
Can react violently if in contact with alkali metals and alkaline earth metals - sodium, potassium, barium.

Hazardous Decomposition Product(s): hydrogen fluoride by thermal decomposition and hydrolysis.

11. TOXICOLOGICAL INFORMATION

Inhalation

High exposures may cause an abnormal heart rhythm and prove suddenly fatal. Very high atmospheric concentrations may cause anaesthetic effects and asphyxiation.

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.

Long Term Exposure

HFC 143a: An inhalation study in animals has shown that repeated exposures produce no significant effects (40000ppm in rats).
HFC 125: An inhalation study in animals has shown that repeated exposures produce no significant effects (50000ppm in rats).
HFC 134a: A lifetime inhalation study in rats has shown that exposure to 50000ppm resulted in benign tumours of the testis. The increased tumour incidence was observed only after prolonged exposure to high levels, and is considered not to be of relevance to humans occupationally exposed to HFC 134a at or below the occupational exposure limit.

12. ECOLOGICAL INFORMATION

Environmental Fate and Distribution

High tonnage material produced in wholly contained systems. High tonnage material used in open systems. Vapour.

Persistence and Degradation

HFC 143a: Decomposed slowly in the lower atmosphere (troposphere). Atmospheric lifetime is 53.5 year(s).

Has a Global Warming Potential (GWP) of 3800 (relative to a value of 1 for carbon dioxide at 100 years).

HFC 125: Decomposed slowly in the lower atmosphere (troposphere). Atmospheric lifetime is 32.6 year(s).

Has a Global Warming Potential (GWP) of 2800 (relative to a value of 1 for carbon dioxide at 100 years).

HFC 134a: Decomposed comparatively rapidly in the lower atmosphere (troposphere). Atmospheric lifetime is 13.6 year(s).

Has a Global Warming Potential (GWP) of 1300 (relative to a value of 1 for carbon dioxide at 100 years).

HFC 143a, HFC 125, HFC 134a: Do not influence photochemical smog (i.e. they are not VOCs under the terms of the UNECE agreement). Do not deplete ozone.

Effect on Effluent Treatment

Discharges of the product will enter the atmosphere and will not result in long term aqueous contamination.

13. DISPOSAL CONSIDERATIONS

Best to recover and recycle. If this is not possible, destruction is to be in an approved facility which is equipped to absorb and neutralise acid gases and other toxic processing products.

14. TRANSPORT INFORMATION

UN No.:	3337
IMO Class(Hazard Class):	2.2
DOT/IMO Label:	Non-Flammable Gas
Marine Pollutant:	Not classified as a Marine Pollutant
DOT Name:	REFRIGERANT GAS R 404A
Proper Shipping Name:	REFRIGERANT GAS R 404A

15. REGULATORY INFORMATION

Not Classified as Hazardous to Users.

16. OTHER INFORMATION

This data sheet was prepared in accordance with Directive 2001/58/EC

The following sections contain revisions or new statements: 1,12,14,16.

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GLOSSARY

OES : Occupational Exposure Standard

MEL : Maximum Exposure Limit

COM : The company aims to control exposure in its workplace to this limit

TLV : The company aims to control exposure in its workplace to the ACGIH limit

TLV-C: The company aims to control exposure in its workplace to the ACGIH Ceiling limit

MAK : The company aims to control exposure in its workplace to the German limit

Sk : Can be absorbed through skin

Sen : Capable of causing respiratory sensitisation

Bmgv : Biological monitoring guidance value

ILV : Indicative Limit Value

R12: Extremely flammable.