



# FORWARD MATERIAL CO., LTD

Add: Hi-tech Industrial Area, Yumin Road, Zibo City, Shandong Province, China  
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## MATERIAL SAFETY DATA SHEET

### R404A/10.9KG

#### Identification

**Name:** Pentafluoroethane, tetrafluoroethane, Trifluoroethane Mixture

**Synonyms:** Refrigerant 404A

**Formula:** CHF<sub>2</sub>CF<sub>3</sub>/CF<sub>3</sub>CH<sub>2</sub>F/CF<sub>3</sub>CH<sub>3</sub>

**Chemical family:** Hydrofluorocarbons

#### Hazardous Components

Material	CAS No.	Approximate %
Pentafluoroethane	354-33-6	44
1,1,1,2-Tetrafluoroethane	811-97-2	4
1,1,1-Trifluoroethane	420-46-2	52

#### SARA TITLE III INFORMATION (40CFR300)

##### Extremely hazardous substances (400CFR355)

Material	TPQ (LBS)	RQ(LBS)
None listed	N/A	N/A

##### Cercla hazardous substances (40CFR302.4)

Material	WT%	RQ(LBS)
None listed	N/A	N/A

#### Product hazard categories (SARA TILE III/SECTIONS 311 & 312)

Immediate	YES	Delayed	NO
Fire	NO	Pressure	YES
Reactive	NO		

#### Toxic substances (SARA TILE III/SECTION 313 & 40 CFR372)

Material	CAS No.	WT%
None listed	N/A	N/A

#### Physical data

Boiling Point	-54.0°F (-47.8°C)	Volatility	100% VOL
Liquid Density	67.37 lb/ft <sup>3</sup> @ 70°F(21.1°C)	Vapor Density	3.36(Air=1)
Vapor Pressure	184.3 psia @ 70°F(21.1°C)	Solubility in water	Negligible
PH Information	Neutral	Evaporation rate	>1 (CCL4=1)



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Form	Liquified Gas	Appearance	Clear
Color	Colorless	Odor	Slightly ethereal

## Hazardous Reactivity

Stability	Material is stable. Avoid open flames and high temperatures (decomposition may occur at > 800°F)
Decomposition	This material may decompose if exposed to high temperatures (open flames, glowing metal surfaces, etc.) forming hydrofluoric acid, Carbon monoxide, and carbon dioxide.
Incompatibility	Alkali or alkaline earth metals (powdered AL, Zn, Be, etc) and strong Oxidizers.
Polymerization	Will not occur.

## Fire and explosion information

Flash Point	None
Flammable limits in air:	Lower: Not applicable Upper: Not applicable
Autoignition temperature:	Not determined
Autodecomposition temperature:	Not determined
Fire and explosion hazards:	Cylinders may rupture under fire conditions. Decomposition may occur releasing toxic and corrosive gases.
Extinguishing media:	Use water spray or fog, water stream, dry chemical, or CO2.
Special firefighting instructions:	Use water spray or fog to cool containers. Self-contained Breathing apparatus (SCBA) is required if cylinders rupture and contents are released under fire conditions. Stop the flow of gas as soon as possible.

## Health hazard information

### Principle health hazards:

Inhaling high concentrations of vapor is harmful and may cause light-headache, shortness of breath, heart irregularities, unconsciousness or death. Vapor is heavier than air and may reduce oxygen available for breathing.

Intentional misuse can be fatal.

Human health effects from overexposure by inhalation, ingestion, or skin or eye contact may initially include: temporary nervous system depression with anaesthetic effects such as dizziness, headache, confusion, incoordination and loss of consciousness. Higher



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exposures may lead to temporary alteration of the heart's electrical activity with irregular pulse, palpitations or inadequate circulation. Gross overexposure may be fatal. Skin contact with liquid may cause frostbite.

Individuals with preexisting diseases of the central nervous system or cardiovascular System may have increased susceptibility to the toxicity of excessive exposure.

Inhalation 4-hour LC50: Not established for mixture (>500,000ppm for R134a)  
Oral LD50: Not established for mixture.

Carcinogenicity: Not listed as a carcinogen by IARC, NTP, OSHA or ACGIH.

Exposure limits: PEL (OSHA): None established. (1000ppm recommended)  
TLV (ACGIH) None established (1000ppm recommended)

Safety precautions: Avoid breathing vapors and prolonged skin exposure. Use with sufficient Ventilation to keep exposure below recommended limits.

## First Aid

Inhalation of high concentrations:

Remove to fresh air, keep calm. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Do not give adrenaline, epinephrine or similar drugs. Call a physician.

Skin contact:

Flush skin with plenty of water. Get medical attention if irritation is persistent.

Eye contact:

Immediately flush with plenty of water. Call a physician.

If swallowed:

No specific intervention is indicated as the compound is not likely to be hazardous by ingestion. Call a physician.

Note 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.

## Protection information

General control measures:

Normal ventilation for standard manufacturing procedures is generally adequate. Local exhaust should be used when large amounts are released. Mechanical ventilation should be used in low places.

Personal protective equipment

Rubber gloves should be worn to avoid frostbite from skin exposure. Chemical splash



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goggles should be worn as needed to prevent eye contact. Under normal use, no respiratory protection is required when using this chemical. Self-contained breathing apparatus (SCSA) is required if a large release occurs.

## Disposal information

Spill, leak or release:

Ventilate area. Use self contained breathing apparatus (SCBA) in case of large leaks. Comply with Federal, State and local regulations on reporting release.

Water disposal:

Comply with Federal, State and local regulations. Do not vent to atmosphere.

## Environmental information

Product warning label: None required

Ozone depletion potential: 0.0

## Shipping information:

Proper shipping name: Compressed Gases, N.O.S. (Pentafluoroethane, Tetrafluoroethane, Trifluoroethane Mixide)

UN number: 1956

Hazard Class: 2.2 (non-flammable gas)

DOT labels: 2.2 (non-flammable gas)

DOT Placard: non-flammable gas (required when transporting >1000 lbs)

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