Material Safety Data Sheet

Issued Aug-15-2005 Revised (0.1) Sep-10-2005

Section1: Chemical Product / Company Identification

Trade name R-404A
Synonym HFC 125/HFC 143a/HFC 134a: 44/52/4

Company identification
Manufacturer DAIKIN FLUOROCHEMICALS(CHINA)CO.,LTD.
CHANGSHU INTERNATIONAL CHEMICAL INDUSTRIAL PARK,HAIYU TOWN,
CHANGSHU,JIANGSU 215522 CHINA
PHONE: (+86)512-5232-2266 FAX: (+86)512-5232-2366
Emergency telephone
Company +86-512-5232-2266

Section 2: Composition / information on ingredients

Component	mass %	CAS No.	Symbol	R-phrases
Pentafluoroethane	44	354-33-6	-	-
1,1,1-Trifluoroethane	52	420-46-2	-	-
1,1,1,2-Tetrafluoroethane	4	811-97-2	-	-

Section 3: Hazard identification

None-flammable liquified gas.

Potential Health Effects
High concentrations in the air cause a deficiency of oxygen with the risk of unconsciousness.
Rapidly evaporating liquid may cause frostbite.
Inhalation of the vapour may cause depression of the central nervous system.
Exposure could cause cardiac arrythmia and asphyxiation.

WARNING:
Toxic gases (such as CO, CO_2, HF, COF_2) will be produced if this product is decomposed by heat.

Section 4: First aid measures

Inhalation Remove to fresh air. Keep warm and at rest.
If breathing has stopped, give artificial respiration.
Use oxygen as required, provided a qualified operator is available.

Skin Contact Wash with lukewarm water (not hot).
Consult a physician if frostbitten by liquid or if irritation occurs.

Eyes Contact Flush with plenty of water for at least 15 minutes (remove contact lenses if easily possible). Consult a physician.

Ingestion Ingestion is not considered a potential route of exposure.

SECTION 5: Fire-fighting measures

Flammable Properties: Non flammable

Extinguishing Media:

Water Spray, Water Fog, Dry Chemical, Alcohol Foam, Carbon Dioxide.

Fire fighting procedures:

Keep personnel removed and upwind of fire.
Wear self-contained breathing apparatus (SCBA) and full protective equipment.
Water may be used to cool and protect exposed containers.
Stop the flow of gas if possible.

WARNING:

Hazardous decomposition products including carbon dioxide, carbon monoxide, hydrogen fluoride, toxic gases or particles may be formed during combustion. These products may cause severe eye, nose, throat, and lung irritation or toxic effects.

SECTION 6: Accidental release measures

General Information:

Use proper personal protective equipment as indicated in Section 8.
Keep personnel not involved with emergency activities removed and upwind.

Spills/Leaks:

Protected personnel should shut off leak, if without risk, and provide ventilation.
Remove ignition sources if possible.

SECTION 7: Handling and storage

Handling:

Use proper personal protective equipment as indicated in Section 8.
Use in well ventilated areas.
Wash hands thoroughly after handling.
Wash clothing after use.
Exposure to toxic gases through inhalation can occur if smoking tobacco becomes contaminated by this material. Therefore, do not smoke in the work areas and wash hands and face after handling in order to avoid transfer of the material onto smoking tobacco.
Keep away from heat, sparks and flames.

Storage:

Keep containers tightly closed in a cool place away from heat, sparks, and flames.
Do not heat above 40 °C.

SECTION 8: Exposure controls / personal protection

Exposure Guidelines:

Exposure limits

HFC-125;	WEEL (AIHA): 1000 ppm, 4900 mg/m^3, 8 Hr. TWA
HFC-143a;	WEEL (AIHA): 1000 ppm, 8 Hr. TWA
HFC-134a;	WEEL (AIHA): 1000 ppm, 8 Hr. TWA

WEEL: Workable Environmental Exposure Limit
AIHA: American Industrial Hygiene Association

Engineering Controls:

Provide local exhaust to prevent accumulation of high concentrations.

Personal Protective Equipment:

Eyes	Wear coverall chemical splash goggles.
Clothing	Wear impervious gloves, apron, pants, and jacket.
Respirators	Wear NIOSH approved respiratory protection, as appropriate.

SECTION 9: Physical and chemical properties

Form	Liquefied gas
Color	Colorless
Odor	characteristic odor
Boiling point	-46.8 ℃
Vapor pressure	1.25 MPa (12.75 kgf/cm^2 abs) at 25 ℃
Vapor density	3.4 (air=1)
Specific gravity	1.043 at 25 ℃
Solubility in water	0.070/100g H_2O at 25 ℃
Flash point	no data
Autoignition point	no data
Flammable limits	no

SECTION 10: Stability and reactivity

Stability:

Stable at room temperature in closed containers under normal storage and handling conditions.

Conditions to avoid: Ignition sources, excess heat.

Incompatibilities : None reasonably foreseeable.

Thermal decomposition products:

Hazardous decomposition products including carbon dioxide, carbon monoxide, hydrogen fluoride, toxic gases or particles may be formed during combustion. These products may cause severe eye, nose, throat, and lung irritation or toxic effects.

Polymerization:

Polymerization will not occur.

SECTION 11: Toxicological information

The blend is untested.

(HFC-125)

Acute toxicity	inhalation >800,000ppm in rat (4hours ALC)
Subchronic toxicity	inhalation >50,000ppm in rat (90days NOEL)
Generic study	Ames test: negative
Terarogenicity	not: >50,000ppm in rat and rabbit
Cardiac sensitization	inhalation: 8% for adrenaline in dog
Carcinogenicity	Not listed in ACGIH, NTP, IARC

(HFC143a)

Acute toxicity	inhalation >540,000ppm in rat (4hours ALC)
Subacute toxicity	inhalation =10,000ppm in rat (6hours/day; 28days NOEL)
Subchronic toxicity	inhalation =40,000ppm in rat (6hours/day; 90days NOEL)
Generic study	Ames test: negative Micronucleus test: negative
Carcinogenicity	Not listed in ACGIH, NTP, IARC

(HFC134a)

Acute toxicity	Inhalation >500,000ppm in rat (4hours LC50)
Chronic toxicity	Inhalation =10,000ppm in rat (2years NOEL)
Generic study	Ames test: negative
Teratogenicity	not: =40,000ppm Inhalation in rabbit
Teratogenicity	not: =40,000ppm Inhalation in rabbit

SECTION 12: Ecological information

	HFC-125	HFC-143a	HFC-134a
Biodegradation	no	no	no
Bioaccumulation	no	no data	no

ODP (Ozone depletion potential): 0
GWP: 3300 (relative to a value of 1 for carbon dioxide at 100 years)

G.W.P :Global warming potential

SECTION 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.
Treatment, storage, transportation, and disposal must be in accordance with applicable Federal, State/Provincial, and Local regulations.

SECTION 14: Transport information

UN Number	UN3337
ICAO/IATA	-primary: 2.2
IMDG	-primary: 2.

SECTION 15: Regulatory information

NFPA-HMIS RATINGS (SCALE 0-4): HEALTH=1, FIRE=0, REACTIVITY=1

EC Classification:

Hazard Symbol	-
Risk Phrases	-
Safety Phrases	-

SECTION 16: Other information

Japan (ENCS)	listed
US (TSCA)	listed
EU (EINECS)	listed
Australia (AICS)	listed

This product is not designed, manufactured, or intended for medical uses, including implantation to the body or other applications in direct contact with body fluids or tissues.
Do not use for non-industrial applications.

The information in this Material Safety Data Sheet (MSDS) is believed to be correct as of the date issued. The information dose not relate to use in combination with any other material or in any process.