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Version number 2

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*** SECTION 1: Identification of the substance/mixture and of the company/undertaking****1.1 Product identifier****Trade name: FLUOROCARBON GAS R-404A****Article number: R-404A****Product name: REFRIGERANT GAS N.O.S.(1,1,1-TRIFLUOROETHANE,PENTAFLUOROETHANE,
1,1,1,2-TETRAFLUOROETHANE)****1.2 Relevant identified uses of the substance or mixture and uses advised against: Refrigerant****1.3 Details of the supplier of the safety data sheet DCC-10035****Manufacturer/Supplier:****DAIKIN FLUORO-CHEMICALS (CHINA) CO.,LTD.****No.8 Jinyu Road (West) Advanced Materials Industrial Park, Changshu, Jiangsu 215522, China****Phone: (+86) 512-5232-2266****1.4 Emergency telephone number: (+86) 532-8388-9090***** SECTION 2: Hazard identification****2.1 Classification of the substance or mixture****Classification according to Regulation (EC) No 1272/2008****Press. Gas (Liq.) H280 Contains gas under pressure; may explode if heated.****2.2 Label elements****Labelling according to Regulation (EC) No 1272/2008:****The product is classified and labelled according to the CLP regulation.****Signal word: Warning****Precautionary statements:****P410+P403 Protect from sunlight. Store in a well-ventilated place.***** SECTION 3: Composition/information on ingredients****Information on ingredients:**

CAS: 420-46-2 1,1,1-Trifluoroethane	52%
Flam. Gas 1A, H220	
Press. Gas (Liq.), H280	

CAS: 354-33-6 Pentafluoroethane	44%
Press. Gas (Liq.), H280	

CAS: 811-97-2 1,1,1,2-Tetrafluoroethane	4%
Press. Gas (Liq.), H280	

Additional information: For the wording of the listed hazard phrases refer to section 16.**SECTION 4: First aid measures****4.1 Description of first aid measures****General information: Seek immediate medical advice.****After inhalation:****Take affected persons into fresh air. Keep at rest.****Supply fresh air. If required, provide artificial respiration. Keep patient warm. Consult a doctor if symptoms persist.****In case of unconsciousness place patient stably in side position for transportation.****In case of emergency to rescue the victims; be sure to wear supplied-air respirator (SAR) or self-contained breathing apparatus (SCBA).****After skin contact:****In cases of frost bites, rinse with plenty of water. Do not remove clothing.****Immediately rinse with warm water and soap.****Consult a doctor in case of complaints.****After eye contact:****Rinse opened eye for several minutes under running water.**

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Consult an ophthalmologist in case of complaints.

After swallowing: Not applicable.

Information for doctor:

Catecholamines such as adrenaline, and other compounds having similar effects, should be reserved for emergencies and then used only with special caution.

The examining physician should advise workers taking medications containing catecholamines that they may be at increased risk and should avoid excessive exposure.

4.2 Most important symptoms and effects, both acute and chronic:

Frost bites

High concentrations cause asphyxiation. May cause an abnormal heart rhythm and prove suddenly fatal.

4.3 Indication of any immediate medical attention and special treatment needed:

No further relevant information available.

* **SECTION 5: Firefighting measures**

5.1 Extinguishing media

Suitable extinguishing agents:

CO₂, powder or water spray. Fight larger fires with water spray or alcohol resistant foam.

5.2 Special hazards arising from the substance or mixture:

Hydrogen fluoride (HF)

Formation of toxic gases is possible during heating or in case of fire.

Receptacle may explode when heated.

5.3 Advice for firefighters:

If fire extinguishing is impossible, protect the outskirts and burn it until materials disappear.

If possible, close valves of receptacles to shut off the gas supply.

Protective equipment:

Wear self-contained breathing apparatus and protective suit.

Do not inhale explosion gases or combustion gases.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures:

Remove persons from danger area.

Wear appropriate protective devices (See Section 8 Exposure Controls/Personal Protection).

Avoid contact with eyes and skin.

Do not inhale the product.

Ensure adequate ventilation before entering the area.

Keep out unauthorized persons.

6.2 Environmental precautions:

Suppress gases/fumes/haze with water spray.

Must not be emitted into the environment.

6.3 Methods and material for containment and cleaning up: Ensure adequate ventilation.

6.4 Reference to other sections:

See Section 8 for information on personal protection equipment.

See Section 13 for disposal information.

* **SECTION 7: Handling and storage**

7.1 Precautions for safe handling:

Waste air is to be released into the atmosphere only via suitable separators.

Danger of ignition/explosion if mixed with flammable gas.

Ensure good ventilation/exhaustion at the workplace.

Handle with care. Avoid jolting, friction and impact.

Stay on the windward side when working outdoors.

Inhaling large quantities may cause cardiac arrhythmia or asphyxiation or both.

Keep away from naked flame or metal heated over 300 - 400 °C to prevent thermal decomposition that may form toxic gases.

Do not handle until all safety precautions have been read and understood.

Information about fire - and explosion protection:

The product is not flammable.

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Keep ignition sources away - Do not smoke.

Keep respiratory protective device available.

7.2 Conditions for safe storage, including any incompatibilities:

Storage

Requirements to be met by storerooms and receptacles:

Store in a cool and dry location.

Keep containers tightly sealed.

Information about storage in one common storage facility:

See section 10 for information on incompatible materials.

Further information about storage conditions:

Protect from heat and direct sunlight.

Store containers in a well ventilated area.

Store locked up.

7.3 Specific end use(s): No further relevant information available.

* **SECTION 8: Exposure controls/personal protection**

8.1 Control parameters No further information available.

Additional information about design of technical facilities: No further data; see item 7.

Ingredients with limit values that require monitoring at the workplace:

The product does not contain any relevant quantities of materials with critical values that have to be monitored at the workplace.

Additional information: The lists valid during the making were used as basis.

8.2 Exposure controls

Personal protective equipment

General protective and hygienic measures:

Wash hands before breaks and at the end of work.

Do not eat or drink while working.

Do not smoke.

Respiratory protection: Use respiratory protective device with organic gas cartridge.

Protection of hands:



Protective gloves

Material of gloves: Leather

Eye protection:



Safety glasses

Body protection: Protective work clothing

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

General Information

Appearance

Form: Liquefied gas

Colour: Colourless

Odour: Ether-like

Odour threshold: Not determined.

pH-value: No further information available.

Melting point/freezing point: No further information available.

Initial boiling point and boiling range: -46.8 °C

Flash point: Not applicable.

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Flammability (solid, gas):	No data.
Decomposition temperature:	No further information available.
Auto-ignition temperature:	Product is not selfigniting.
Explosive properties:	Not determined.
Explosion limits:	
Lower explosive limit:	No further information available.
Upper explosive limit:	No further information available.
Vapour pressure at 25 °C:	1.25 Mpa
Density at 25 °C:	1.043 g/cm ³
Relative density	Not determined.
Vapour density	Not determined.
Evaporation rate	Not applicable.
Solubility in / Miscibility with water:	No further information available.
Partition coefficient: n-octanol/water:	No further information available.
Viscosity:	
Dynamic:	Not determined.
Kinematic:	Not determined.
9.2 Other information:	No further relevant information available.

SECTION 10: Stability and reactivity

10.1 Reactivity No further relevant information available.

10.2 Chemical stability

Thermal decomposition / conditions to be avoided: To avoid thermal decomposition do not overheat.

10.3 Possibility of hazardous reactions: No dangerous reactions known under normal conditions of use.

10.4 Conditions to avoid: Keep away from heat, sparks, flame, high temperature.

10.5 Incompatible materials: Alkali or alkaline earth metals - powdered Al, Zn, Mg, etc.

10.6 Hazardous decomposition products: Hydrofluoric acid, carbonyl fluoride

*** SECTION 11: Toxicological information**

11.1 Information on toxicological effects No further information available.

Acute toxicity no data

LD/LC50 values relevant for classification: No further information available.

Primary irritant effect

Skin corrosion/irritation No further information available.

Serious eye damage/irritation No further information available.

after inhalation: No further information available.

Respiratory or skin sensitisation No further information available.

Other information (about experimental toxicology): No further information available.

Subacute to chronic toxicity No further information available.

Additional toxicological information:

CMR effects

Germ cell mutagenicity Based on available data, the classification criteria are not met.

Carcinogenicity Based on available data, the classification criteria are not met.

Reproductive toxicity Based on available data, the classification criteria are not met.

STOT-single exposure Based on available data, the classification criteria are not met.

STOT-repeated exposure Based on available data, the classification criteria are not met.

Aspiration hazard Based on available data, the classification criteria are not met.

*** SECTION 12: Ecological information**

12.1 Toxicity

Aquatic toxicity: No further relevant information available.

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12.2 Persistence and degradability: Not easily biodegradable**Other information:** The product is slightly biodegradable.**Abiotic degradation:**

Air, indirect photo-oxidation

Conditions: sensitizer: OH radicals

Degradation products: Carbon dioxide (CO₂) / hydrofluoric acid

Water: non-significant hydrolysis

12.3 Bioaccumulative potential:

Due to the distribution coefficient n-octanol/water an accumulation in organisms is not expected.

12.4 Mobility in soil: No further relevant information available.**Other information****Ecotoxicological effects:** no data**General notes:**

Ozone depletion potential(ODP) : 0(Pentafluoroethane)

Global warming potential(GWP) :0.94

12.5 Results of PBT and vPvB assessment**PBT:** No further relevant information available.**vPvB:** No further relevant information available.**12.6 Other adverse effects:** No further relevant information available.**SECTION 13: Disposal considerations****13.1 Waste treatment methods****Recommendation:** Disposal must be made according to official regulations.**Uncleaned packaging****Recommendation:** Disposal must be made according to official regulations.**SECTION 14: Transport information****14.1 UN-Number:**

ADR, IMDG, IATA

UN3337

14.2 UN proper shipping name:

ADR, IMDG, IATA

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14.3 Transport hazard class(es):

ADR, IMDG, IATA

**Class:**

2.2

14.4 Packing group:

ADR, IMDG, IATA

Not applicable

14.5 Environmental hazards:

Not applicable.

Marine pollutant:

No

14.6 Special precautions for user:

Not applicable.

EMS Number:

F-C,S-V

14.7 Transport in bulk according to Annex II of**MARPOL73/78 and the IBC Code:**

Not applicable.

Transport/Additional information:

Avoid direct sunlight. Make sure of no damage, corrosion, leaks on the receptacles.

Take necessary measures for preventing cargo shift.

ADR**Limited quantities (LQ):**

120 ml

Excepted quantities (EQ)

Code: E1

Maximum net quantity per inner packaging: 30 ml

Maximum net quantity per outer packaging: 1000 ml

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IMDG

Limited quantities (LQ)

120 ml

Excepted quantities (EQ)

Code: E1

Maximum net quantity per inner packaging: 30 ml

Maximum net quantity per outer packaging: 1000 ml

UN "Model Regulation":

UN3337, REFRIGERANT GAS R 404A, 2.2

*** SECTION 15: Regulatory information****15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture****Labelling according to Regulation (EC) No 1272/2008**

The product is classified and labelled according to the CLP regulation.

Hazard pictograms

GHS04

Signal word Warning**Hazard statements**

H280 Contains gas under pressure; may explode if heated.

Precautionary statements

P410+P403 Protect from sunlight. Store in a well-ventilated place.

National regulations No further information available.**15.2 Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.**SECTION 16: Other information**

The product is for the industrial use only. We do not guarantee the safety in case the product is used for the other purposes. When using the product for health-care application or food/feed application, consult us in advance.

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

Department issuing SDS: SAFETY&ENVIRONMENT DEPT.**Contact:** <http://www.daikinchem.com.cn>**Abbreviations and acronyms:**

ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)

IMDG: International Maritime Code for Dangerous Goods

IATA: International Air Transport Association

GHS: Globally Harmonised System of Classification and Labelling of Chemicals

LC50: Lethal concentration, 50 percent

LD50: Lethal dose, 50 percent

PBT: Persistent, Bioaccumulative and Toxic

vPvB: very Persistent and very Bioaccumulative

Flam. Gas 1A: Flammable gases – Category 1A

Press. Gas (Liq.): Gases under pressure – Liquefied gas

*** Data compared to the previous version altered.**