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SECTION 1: Identification of the substance/mixture and of the company/undertaking**1.1 Product identifier****Trade name:** R-404A**Article number:** R404A**1.2 Relevant identified uses of the substance or mixture and uses advised against:**

No further relevant information available.

1.3 Details of the supplier of the safety data sheet**Manufacturer/Supplier:**

DAIKIN INDUSTRIES, LTD. CHEMICALS DIVISION:

Umeda Center Bldg., 4-12, Nakazaki-Nishi 2-chome, Kita-Ku, Osaka, JAPAN

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Further information obtainable from: <http://www.daikin.com/>**1.4 Emergency telephone number:**

Japan: +81-6-6349-7521

China: +86-512-5-232-0949, +86-21-34151689

South Korea: +82-2-568-1722

Americas: +1-256-306-5000

Europe: +49-211-179 225-0

SECTION 2: Hazard identification**2.1 Classification of the substance or mixture****Classification according to Regulation (EC) No 1272/2008**

Press. Gas L 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:**

354-33-6 Pentafluoroethane 44%

Press. Gas C, H280

420-46-2 1,1,1-Trifluoroethane 52%

F R11

Flam. Gas 1, H220

Press. Gas C, H280

811-97-2 1,1,1,2-Tetrafluoroethane 4%

Press. Gas L, H280

Additional information: For the wording of the listed risk 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.

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In case of emergency to rescue the victims; be sure to wear supplied-air respirator (SAR) or self-contained breathing apparatus (SCBA).

At high levels, cardiac arrhythmia may occur.

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.

Consult an ophthalmologist in case of complaints.

After swallowing: *Not applicable.*

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.

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.

4.3 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: *Use fire extinguishing methods suitable for surrounding conditions.*

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:

Move receptacle to a safe place immediately if possible. If not, spray water on the receptacles and surrounding equipment to cool.

If receptacle catches fire: cool them with plenty of water.

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:**

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.

Stay on the windward side.

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.

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Danger of ignition/explosion if mixed with flammable gas.

Ensure good ventilation/exhaustion at the workplace.

Handle with care. Avoid jolting, friction and impact.

For heating receptacle, use hot compresses or lukewarm water below 40 °C.

Do not use heaters.

Stay on the windward side when working outdoors.

Be careful of leakage when attaching/ detaching receptacles.

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.

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

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

8.1 Control parameters No further information available.

Ingredients with limit values that require monitoring at the workplace:

811-97-2 1,1,1,2-Tetrafluoroethane

WEEL (USA) Long-term value: 1000 ppm

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.

Keep away from tobacco products.

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

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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/Melting range:	-103 °C
Boiling point/Boiling range:	-46,7 °C
Flash point:	Not applicable.
Ignition temperature:	728 °C
Decomposition temperature:	> 700 °C
Lower explosive limit:	No further information available.
Upper explosive limit:	No further information available.
Vapour pressure at 20 °C:	10,98 bar
Density:	No further information available.
Relative density	1,05
Vapour density	>3
Solubility in / Miscibility with water at 25 °C:	430 mg/l (Pentafluoroethane)
Partition coefficient (n-octanol/water) at 20 °C:	1,48 (Pentafluoroethane)

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****Acute toxicity****LD/LC50 values relevant for classification:****354-33-6 Pentafluoroethane****Inhalative LC0/ 4h** >800000 ppm (Rat)**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.**CMR effects****Germ cell mutagenicity****In vitro tests** did not show mutagenic effects.**In vivo tests** did not show mutagenic effects.**Carcinogenicity** No further information available.**Reproductive toxicity** No further information available.

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STOT-single exposure No further information available.*STOT-repeated exposure* No further information available.*Aspiration hazard* No further information available.*** SECTION 12: Ecological information****12.1 Toxicity****Aquatic toxicity:****420-46-2 1,1,1-Trifluoroethane**

EC50/48 h 300 mg/l (Daphnia)

EC50/72 h 71 mg/l (Alga)

LC50/96 h 109 mg/l (Fish)

354-33-6 Pentafluoroethane

EC50/48 h >200 mg/l (Daphnia)

LC50/48 h 100 mg/l (Daphnia)

LC50/96 h >200 mg/l (Fish) (semi-static fresh water)

NOEC 13,2 mg/l (Alga)

72h

≥6 g/m3 (Terrestrial plants)

200 mg/l (Daphnia)

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)/hydrofluoroc 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.**Additional ecological information:****General notes:**

Ozone depletion potential(ODP) : 0(Pentafluoroethane)

Global warming potential(GWP) :0.94

12.5 Results of PBT and vPvB assessment**PBT:** According to the results of its assessment, this substance is not PBT.**vPvB:** According to the results of its assessment, this substance is not vPvB.**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:

3337 REFRIGERANT GAS R 404A

IMDG, IATA

REFRIGERANT GAS R 404A

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Trade name: R-404A**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:****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

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.**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: EHS Department**Contact:** <http://www.daikin.com/>**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

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LD50: Lethal dose, 50 percent

PBT: Persistent, Bioaccumulative and Toxic

vPvB: very Persistent and very Bioaccumulative

Flam. Gas 1: Flammable gases, Hazard Category 1

Press. Gas C: Gases under pressure: Compressed gas

Press. Gas L: Gases under pressure: Liquefied gas

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