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**SECTION 1: Identification of the substance/mixture and of the company/undertaking****1.1 Product identifier****Trade name:** R-410A**Article number:** R410A**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

Phone: (+81) 6-6373-4345 Fax: (+81) 6-6373-4281

**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	50%
Press. Gas C, H280	

75-10-5 Difluoromethane	50%
F+ R12	
Flam. Gas 1, H220	

**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:**

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).

At high levels, cardiac arrhythmia may occur.

**After skin contact:**

Rinse with warm water.

In cases of frost bites, rinse with plenty of water. Do not remove clothing.

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*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:**

*Close the plug of the cylinder to cut off the supply of gas, if possible.*

*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.*

*Do not allow to enter sewers/ surface or ground water.*

*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.*

*Ensure good ventilation/exhaustion at the workplace.*

*Handle with care. Avoid jolting, friction and impact.*

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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.

Protect against electrostatic charges.

Keep respiratory protective device available.

**7.2 Conditions for safe storage, including any incompatibilities:**

**Storage**

**Requirements to be met by storerooms and receptacles:**

Store only in unopened original 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:**

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

**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

To avoid skin problems reduce the wearing of gloves to the required minimum.

**Material of gloves:**

The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.

Leather

**Eye protection:**



Safety glasses

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**Trade name: R-410A****Body protection:** Protective work clothing**SECTION 9: Physical and chemical properties****9.1 Information on basic physical and chemical properties****General Information****Appearance**

<b>Form:</b>	Liquefied gas
<b>Colour:</b>	Colourless
<b>Odour:</b>	Ether-like
<b>pH-value:</b>	Not applicable.
<b>Melting point/Melting range:</b>	-103 °C (Pentafluoroethane)
<b>Boiling point/Boiling range:</b>	-52,7 °C
<b>Flash point:</b>	Not applicable.
<b>Flammability (solid, gaseous):</b>	Product is not flammable.
<b>Lower explosive limit:</b>	No further information available.
<b>Upper explosive limit:</b>	No further information available.
<b>Vapour pressure at 15 °C:</b>	12,46 bar
<b>Density:</b>	No further information available.
<b>Relative density at 15 °C</b>	1,11
<b>Vapour density</b>	2,3
<b>Solubility in / Miscibility with water at 25 °C:</b>	430 mg/l (Pentafluoroethane)
<b>Partition coefficient (n-octanol/water) at 20 °C:</b>	1,48 (Pentafluoroethane)
<b>Viscosity at 25 °C:</b>	0,15 mPa.s

**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 &gt;800000 ppm (Rat)

**75-10-5 Difluoromethane**

Inhalative LC50/ 4h 1107000 mg/m3 (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.

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**Trade name: R-410A****CMR effects****Germ cell mutagenicity***In vitro tests did not show mutagenic effects.(Pentafluoroethane)**In vivo tests did not show mutagenic effects.(Pentafluoroethane)**Carcinogenicity No further information available.***Reproductive toxicity***No toxicity to reproduction (Pentafluoroethane)**Inhalation, mouse, 208000 mg/m<sup>3</sup>, Effect on fertility, NOAEC (Difluoromethane)**foetotoxic effect (Difluoromethane)**STOT-single exposure No further information available.**STOT-repeated exposure Based on available data, the classification criteria are not met.***Aspiration hazard****SECTION 12: Ecological information****12.1 Toxicity***Aquatic toxicity: No further relevant information available.***12.2 Persistence and degradability: No further relevant information available.****Abiotic degradation***Air, indirect photo-oxidation, t 1/2 from 4.16-28.2 y**Conditions: sensitizer: OH radicals**Degradation products: Carbon dioxide (CO<sub>2</sub>)/hydrofluoric acid/ TFA***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**Global warming potential(GWP) : <0.5***12.5 Results of PBT and vPvB assessment***PBT: This mixture does not contain any substances that are assessed to be PBT.**vPvB: This mixture does not contain any substances that are assessed to be 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.**Incineration in an adequate incinerator is recommended.***Uncleaned packaging***Recommendation: Disposal must be made according to official regulations.***SECTION 14: Transport information****14.1 UN-Number:****ADR, IMDG, IATA****UN1078****14.2 UN proper shipping name:****ADR:****1078 REFRIGERANT GAS, N.O.S.****IMDG, IATA****REFRIGERANT GAS, N.O.S.****14.3 Transport hazard class(es):****ADR****Class:****2 Gases.**

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IMDG, IATA

2.2

**Class:** 2.2  
**Label:** 2.2**14.4 Packing group:****ADR:** Not applicable**14.5 Environmental hazards:****Marine pollutant:** No**14.6 Special precautions for user:** Warning: Gases.**Danger code (Kemler):** 20**14.7 Transport in bulk according to Annex II of****MARPOL73/78 and the IBC Code:****Transport/Additional information:**

Not applicable.

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

C/E

**Tunnel restriction code:****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":** UN1078, REFRIGERANT GAS, N.O.S., 2.2**SECTION 15: Regulatory information****15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**

No further relevant information available.

**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.

**Directive 2012/18/EU**

Named dangerous substances - ANNEX I None of the ingredients is listed.

**National regulations** No further information available.**Other regulations, limitations and prohibitive regulations:** 1**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.

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*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:**

*RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)*

*ICAO: International Civil Aviation Organisation*

*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 1: Flammable gases, Hazard Category 1*

*Press. Gas C: Gases under pressure: Compressed gas*

*Press. Gas L: Gases under pressure: Liquefied gas*