

Printing date 20.10.2017

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: R-410A****Article number: R410A STD****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****Manufacturer/Supplier:****DAIKIN INDUSTRIES, LTD. CHEMICALS DIVISION:**

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Japan: +81-6-6349-7521

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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 C 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: 354-33-6 Pentafluoroethane 49.5-51.5%
Press. Gas L, H280

CAS: 75-10-5 Difluoromethane 48.5-50.5%
F+ R12
Flam. Gas 1, H220
Press. Gas L, 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:***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).**If the patient does not breathe or hardly breathes, unbutton clothes, secure the airway for breathing and perform artificial respiration.**At high levels, cardiac arrhythmia may occur.*

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Trade name: R-410A**After skin contact:***Rinse with warm water.**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:***CO₂, powder or water spray. Fight larger fires with water spray or alcohol resistant foam.**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:***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.**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.*

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Trade name: R-410A**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.

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:**

Do not smoke.

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.

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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

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:	Not applicable.
Melting point/freezing point:	No further information available.
Initial boiling point and boiling range:	-52,7 °C
Flash point:	Not applicable.
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:	1,65 MPa (16,84 kgf/cm ² abs)
Density at 25 °C:	1,06 g/cm ³
Relative density at 25 °C	1,06
Vapour density at 25 °C	0,056 (/100g H ₂ O 1atm)
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.

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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.**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/m³, 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****Chronic study** No further information available.**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 (CO₂)/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.**Ecotoxicological effects:** no data**Additional ecological information:****General notes:**

Ozone depletion potential(ODP) : 0(CFC-11 1.0)

Global warming potential(GWP) : 1700(CO₂=1 100years integrated value)**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.

Incineration in an adequate incinerator is recommended.

Uncleaned packaging**Recommendation:** Disposal must be made according to official regulations.

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SECTION 14: Transport information**14.1 UN-Number:**

ADR, IMDG, IATA

UN1078

14.2 UN proper shipping name:

ADR, IMDG, IATA

REFRIGERANT GAS, N.O.S.

14.3 Transport hazard class(es):

ADR



Class:

2 Gases.

Label:

2.2

IMDG, IATA



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

Stowage Category

A

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

Tunnel restriction code:

C/E

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":

UN 1078 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

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Trade name: R-410A**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.**Other regulations, limitations and prohibitive regulations: 1****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: 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 – 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.**