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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: R-407C****Article number: R407C STD****1.2 Relevant identified uses of the substance or mixture and uses advised against: Refrigerant**  
**Sector of Use SU8** Manufacture of bulk, large scale chemicals (including petroleum products)**1.3 Details of the supplier of the safety data sheet DCC-10005****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 C H280 Contains gas under pressure; may explode if heated.

**Hazard description:** F+ Extremely flammable**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: 75-10-5	Difluoromethane	21.0-25.0%
	F+ R12	
	Flam. Gas 1, H220	
	Press. Gas L, H280	
CAS: 354-33-6	Pentafluoroethane	23.0-27.0%
	Press. Gas L, H280	
CAS: 811-97-2	1,1,1,2-Tetrafluoroethane	50.0-54.0%
	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.

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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).*

*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.*

**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:**

*CO<sub>2</sub>, 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:**

*In case of fire, the following can be released:*

*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.*

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**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.

Do not inhale the 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.

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 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.

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

### **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.

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**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

**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>Odour threshold:</b>	Not determined.
<b>pH-value:</b>	Not applicable.
<b>Melting point/freezing point:</b>	No further information available.
<b>Initial boiling point and boiling range:</b>	-44 °C No further information available.
<b>Flash point:</b>	Not applicable.
<b>Flammability (solid, gas):</b>	No data.
<b>Decomposition temperature:</b>	No further information available.
<b>Auto-ignition temperature:</b>	Product is not selfigniting.
<b>Explosive properties:</b>	Not determined.
<b>Explosion limits:</b>	
<b>Lower explosive limit:</b>	No further information available.
<b>Upper explosive limit:</b>	No further information available.
<b>Vapour pressure at 25 °C:</b>	1,19 MPa
<b>Density:</b>	No further information available.
<b>Relative density</b>	Not determined.
<b>Vapour density</b>	Not determined.
<b>Evaporation rate</b>	Not applicable.
<b>Solubility in / Miscibility with water:</b>	Insoluble.

**Partition coefficient: n-octanol/water:** No further information available.

**Viscosity:**

<b>Dynamic:</b>	Not determined.
<b>Kinematic:</b>	Not determined.
<b>9.2 Other information:</b>	No further relevant information available.

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**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:**

Fluorophosgene in contact with naked flame or red hot objects.

Hydrofluoric acid, carbonyl fluoride

**SECTION 11: Toxicological information****11.1 Information on toxicological effects****Acute toxicity** Based on available data, the classification criteria are not met.**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** Based on available data, the classification criteria are not met.**CMR effects****Germ cell mutagenicity** In vitro tests did not show mutagenic effects.**Carcinogenicity** Based on available data, the classification criteria are not met.**Reproductive toxicity** Developmental Toxicity, rat, no observed effect (1,1,1,2-Tetrafluoroethane)**STOT-single exposure** No further information available.**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.**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 (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.**Ecotoxicological effects:** no data**Additional ecological information:****General notes:**

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

Global warming potential(GWP) :1500(CO<sub>2</sub>=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.

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**Uncleaned packaging**

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

**SECTION 14: Transport information**

**14.1 UN-Number:**

ADR, IMDG, IATA

UN3340

**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:**

**Marine pollutant:**

No

**14.6 Special precautions for user:**

Not applicable.

**EMS Number:**

F-C,S-V

**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

**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 3340 REFRIGERANT GAS R 407C, 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.

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**Trade name: R-407C****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*