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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-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:

OSAKA UMEDA TWIN TOWERS SOUTH, 1-13-1 Umeda, Kita-ku, Osaka-shi, Osaka, 530-0001, Japan

Phone: +81-6-6147-9702 Fax: +81-6-6147-9807

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

Japan: +81-6-6349-7521

China: +86-532-8388-9090, +86-21-34151689

South Korea: +82-2-568-1722

Americas: CHEMTREC +1-800-424-9300 (Outside US/Canada: +1-703-527-3887)

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 (Comp.) 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: 75-10-5 | Difluoromethane | 21.0-25.0% |
| | Flam. Gas 1B, H221 | |
| | Press. Gas (Liq.), H280 | |
| CAS: 354-33-6 | Pentafluoroethane | 23.0-27.0% |
| | Press. Gas (Liq.), H280 | |
| CAS: 811-97-2 | 1,1,1,2-Tetrafluoroethane | 50.0-54.0% |
| | 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:**

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.

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Trade name: FLUOROCARBON GAS R-407C**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.***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.**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.***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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*** 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

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

Appropriate engineering controls No further data; see item 7.

Individual protection measures, such as 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.

Hand protection

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/face 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

| | |
|---|-----------------------------------|
| Physical state | Liquefied gas |
| Colour: | Colourless |
| Odour: | Ether-like |
| Odour threshold: | Not determined. |
| Melting point/freezing point: | Undetermined. |
| Boiling point or initial boiling point and boiling range | -44 °C |
| | Undetermined. |
| Flammability | No data. |
| Lower and upper explosion limit | |
| Lower explosive limit: | No further information available. |
| Upper explosive limit: | Not determined. |
| Flash point: | Not applicable. |
| Decomposition temperature: | No further information available. |
| pH | Not applicable. |
| Viscosity: | |
| Kinematic viscosity | Not determined. |
| Dynamic: | Not determined. |
| Solubility | |
| water: | No further information available. |
| Partition coefficient n-octanol/water (log value) | No further information available. |
| Vapour pressure at 25 °C: | 1.19 Mpa |
| Density and/or relative density | |
| Density: | Not determined. |
| Relative density | Not determined. |
| Vapour density | Not determined. |
| Particle characteristics | No further information available. |

9.2 Other information:

| | |
|-----------------------------------|-------------------------------|
| Form: | Liquefied gas |
| Auto-ignition temperature: | Product is not self-igniting. |
| Explosive properties: | Not determined. |
| Evaporation rate | Not applicable. |

Information with regard to physical hazard classes

| | |
|---|----------------|
| Explosives | Not applicable |
| Flammable gases | Not applicable |
| Aerosols | Not applicable |
| Oxidising gases | Not applicable |
| Gases under pressure | |
| Contains gas under pressure; may explode if heated. | |
| Flammable liquids | Not applicable |
| Flammable solids | Not applicable |
| Self-reactive substances and mixtures | Not applicable |

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| | |
|--|----------------|
| Pyrophoric liquids | Not applicable |
| Pyrophoric solids | Not applicable |
| Self-heating substances and mixtures | Not applicable |
| Substances and mixtures, which emit flammable gases in contact with water | Not applicable |
| Oxidising liquids | Not applicable |
| Oxidising solids | Not applicable |
| Organic peroxides | Not applicable |
| Corrosive to metals | Not applicable |
| Desensitised explosives | Not applicable |

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 hazard classes as defined in Regulation (EC) No 1272/2008**

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

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

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.

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.

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

Subacute to chronic toxicity: No further information available.

11.2 Information on other hazards:

Endocrine disrupting properties:

None of the ingredients is listed.

*** 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.

12.5 Results of PBT and vPvB assessment

PBT: No further relevant information available.

vPvB: No further information available.

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12.6 Endocrine disrupting properties For information on endocrine disrupting properties see section 11.

12.7 Other adverse effects:

Ecotoxicological effects: no data

Additional ecological information:

General notes:

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

Global warming potential(GWP) :1500(CO2=1 100years integrated value)

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 or ID 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 Gases.

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 Maritime transport in bulk according to IMO instruments

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.

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Trade name: FLUOROCARBON GAS R-407C**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: 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 relatif au transport international 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 1B: Flammable gases – Category 1B**Press. Gas (Comp.): Gases under pressure – Compressed gas**Press. Gas (Liq.): Gases under pressure – Liquefied gas**** Data compared to the previous version altered.**