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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-407H****Article number: R407H STD****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:

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: 811-97-2 1,1,1,2-Tetrafluoroethane 50.5-54.5%
Press. Gas (Liq.), H280

CAS: 75-10-5 Difluoromethane 31.5-33.5%
Flam. Gas 1B, H221
Press. Gas (Liq.), H280

CAS: 354-33-6 Pentafluoroethane 14.0-16.0%
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).

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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.

Remove contaminated clothes immediately.

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: 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 fully protective suit.

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:

Stop leakage if possible.

Ensure adequate ventilation.

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Hand protection



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

Penetration time of glove material

The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.

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:	Odourless
Odour threshold:	Not determined.
Melting point/freezing point:	Undetermined.
Boiling point or initial boiling point and boiling range	-44.6 °C
Flammability	Product is not flammable.
Lower and upper explosion limit	
Lower explosive limit:	None (ASHRAE34-2016)
Upper explosive limit:	None (ASHRAE34-2016)
Flash point:	Not applicable.
Decomposition temperature:	No further information available.
pH	Not determined.
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:	1.24 MPa (saturation steam pressure)
Density and/or relative density	
Density at 25 °C:	1.11 g/cm ³ (saturated liquid)
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

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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
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:

CAS: 75-10-5 Difluoromethane

Inhalative ALC/4h >760000 ppm (Rat)

LC50/4h 1107000 mg/m³ (Rat) (520000 ppm; OECD 403)

CAS: 354-33-6 Pentafluoroethane

Inhalative LC50/4h > 800000 ppm (Rat)

LC0/4h > 800000 ppm (Rat) (OECD 403)

CAS: 811-97-2 1,1,1,2-Tetrafluoroethane

Inhalative LC50/4h > 500000 ppm (Rat)

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

Carcinogenicity: Based on available data, the classification criteria are not met.

Reproductive toxicity:

CAS: 75-10-5 Difluoromethane

Inhalative NOAEC 208000 mg/m³ (Mouse)

STOT-single exposure: Based on available data, the classification criteria are not met.

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Trade name: FLUOROCARBON GAS R-407H**STOT-repeated exposure:****CAS: 75-10-5 Difluoromethane***Inhalative NOAEC 105000 mg/m³ (Rat) (OECD 413)***CAS: 354-33-6 Pentafluoroethane***Inhalative NOAEL ≥ 50000 ppm (Rat and rabbit)***CAS: 811-97-2 1,1,1,2-Tetrafluoroethane***Inhalative NOAEL ≥ 50000 ppm (Rat)**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.***Additional toxicological information:****CMR effects** Not genotoxic**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.***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.***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**Global warming potential(GWP) : 1495(CO₂=1 100year integrated value)(IPCC 4th report estimate)***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**

UN3163

14.2 UN proper shipping name:**ADR, IMDG, IATA**

LIQUEFIED GAS, N.O.S.

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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

UN "Model Regulation":

UN 3163 LIQUEFIED 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.

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)

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