

Printing date 23.03.2023

Version number 2

Revision: 23.03.2023

*** SECTION 1: Identification of the substance/mixture and of the company/undertaking****1.1 Product identifier****Trade name:** HFC-134a**Article number:** DF134a change**EC number:**

212-377-0

Registration number: 01-2119459374-33-0003**1.2 Relevant identified uses of the substance or mixture and uses advised against:****Sector of Use** SU8 Manufacture of bulk, large scale chemicals (including petroleum products)**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 (Liq.) H280 Contains gas under pressure; may explode if heated.

2.2 Label elements**Labelling according to Regulation (EC) No 1272/2008:**

The substance 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

≥99.9%

Press. Gas (Liq.), H280

Identification number(s)**EC number:** 212-377-0*** 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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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:

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:**

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.

Inform authorities in case of gas release.

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:**

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.

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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.

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 humidity and water.

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:

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

AIHA WEEL-TWA 1000ppm

DNELs:

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

Inhalative DNEL - worker 13936 mg/m³ (long-term exposure) (systemic effects)

DNEL - consumer 2476 mg/m³ (long-term exposure) (systemic effects)

PNECs:

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

PNEC 0.1 mg/l (fresh water)

1 mg/l (intermittent release)

0.01 mg/l (marine water)

73 mg/l (sewage treatment plant)

PNEC 0.75 mg/kg dw (fresh water sediment)

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:

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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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

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:

-101 °C

Boiling point or initial boiling point and boiling range

-26 °C

Flammability

No data.

Lower and upper explosion limit**Lower explosive limit:**

Product does not present an explosion hazard.

Upper explosive limit:

Product does not present an explosion hazard.

Flash point:

nonflammable

Decomposition temperature:

>300-400 °C

pH

7-8

Viscosity:

0.204 mPa · s

Kinematic viscosity

Not determined.

Dynamic:

Not determined.

Solubility**water at 25 °C:**

0.15 g/100g

Partition coefficient n-octanol/water (log value)

1.06 log POW

Vapour pressure at 25 °C:0.665 MPa (6.79kgf/cm² abs)**Density and/or relative density****Density at 25 °C:**1.21 g/cm³**Relative density**

Not determined.

Vapour density3.52 g/cm³ (Air=1)**Particle characteristics**

No further information available.

9.2 Other information:**Form:**

Molecular weight 102.3

Liquefied gas

Auto-ignition temperature:

>743 °C

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

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

Inhalative LC50/4h > 500000 ppm (Rat)

LCLo ≥ 567000 ppm (Rat) (OECD 403)

Skin corrosion/irritation:

No slight irritation ((PATTY (5 h , 2001)) or irritation (ECETOC JACC no.50) was observed in the rabbit test.

Serious eye damage/irritation:

No slight irritation ((PATTY (5 h , 2001)) or irritation (ECETOC JACC no.50) was observed in the rabbit test.

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.

In vivo tests did not show mutagenic effects.

As a result of conducting dominant lethal test (in vivo Generation mutagenicity test), micronucleus test and chromosomal aberration test (Somatic cell in vivo mutagenicity test) by inhalation exposure to mice, it came out as negative in all tests, so it was out of Category.

(ECETOC JACC no.50)

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

Inhalative NOEL 10000 ppm (Rat) (OECD 453)

As inhalation chronic toxicity · carcinogenicity in rats No evidence of tumor development by exposure test was found, it was judged that there was no carcinogenic effect. (ECETOC JACC no.50)

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Inhalative NOEL 50000 ppm (Mouse) (OECD 478)

2500 ppm (Rabbit) (development) (OECD 414)

STOT-single exposure: Based on available data, the classification criteria are not met. (ECETOC JACC no.50)**STOT-repeated exposure:****CAS: 811-97-2 1,1,1,2-Tetrafluoroethane**

Inhalative NOAEC 50000 ppm (Rat) (OECD 453)

As a result of testing using rats, mice, dogs, no reports of hazards are found. (ECETOC JACC no.50)

Not classified

Aspiration hazard: As a result of testing using rats, mice, no reports of hazards are found. (ECETOC JACC no.50)**Other information (about experimental toxicology):**

No further information available.

Chromosomal Abberation Study in

Chromosomal Aberration Study in vitro- Negative

Mouse Micronucleus Assay in Vivo - Negative

Subacute to chronic toxicity: No further information available.**Additional toxicological information:****CAS: 811-97-2 1,1,1,2-Tetrafluoroethane**

Inhalative Cardiac sensitive 75000 ppm (Dog)

The cardiac sensitization response is observed.

11.2 Information on other hazards:**Endocrine disrupting properties:**

Substance is not listed.

*** SECTION 12: Ecological information****12.1 Toxicity****Aquatic toxicity:****CAS: 811-97-2 1,1,1,2-Tetrafluoroethane**

LC50/96h 450 mg/l (Fish) (EU Method C.1)

rainbow trout

EC50/48h 980 mg/l (Daphnia) (EU Method C.2)

EC50/72h > 118 mg/l (Alga) (1,1,1,3,3-pentafluorobutane) (EU Method C.3)

12.2 Persistence and degradability: Not easily biodegradable**Abiotic degradation:**

Air, indirect photo-oxidation

Conditions: sensitizer: OH radicals

Degradation products: Carbon dioxide (CO₂) / hydrofluoric acid

Water: non-significant hydrolysis

12.3 Bioaccumulative potential:

Due to the distribution coefficient n-octanol/water an accumulation in organisms is not expected.

12.4 Mobility in soil:**CAS: 811-97-2 1,1,1,2-Tetrafluoroethane**Henry's law constant 102 hPa*m³/mol (air) (25 °C)log K_{oc} 1.57 (soil)**12.5 Results of PBT and vPvB assessment****PBT:** According to the results of its assessment, this substance is not PBT.**vPvB:** According to the results of its assessment, this substance is not vPvB.**12.6 Endocrine disrupting properties** For information on endocrine disrupting properties see section 11.**12.7 Other adverse effects:****Ecotoxicological effects:** no data

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Behaviour in sewage processing plants:

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

EC50/6h > 730 mg/ml (Microorganisms)

Additional ecological information:**General notes:**

Ozone depletion potential(ODP) : 0

Global warming potential(GWP) : 3,500 / IPCC Fourth Assessment Report (AR4)

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

UN3159

14.2 UN proper shipping name:

ADR, IMDG, IATA

1,1,1,2-TETRAFLUOROETHANE (REFRIGERANT GAS R 134a)

14.3 Transport hazard class(es):

ADR



Class:

2 Gases.

Label:

2.2

IMDG, IATA



Class:

2.2 Gases.

Label:

2.2

14.4 Packing group:

ADR, IMDG, IATA

II

14.5 Environmental hazards:**Marine pollutant:**

No

14.6 Special precautions for user:

Warning: Gases.

Hazard identification number (Kemler code):

20

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

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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":

UN 3159 1,1,1,2-TETRAFLUOROETHANE (REFRIGERANT GAS R 134A), 2.2, II

*** 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 substance 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:**

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

EINECS: European Inventory of Existing Commercial Chemical Substances

DNEL: Derived No-Effect Level (REACH)

PNEC: Predicted No-Effect Concentration (REACH)

LC50: Lethal concentration, 50 percent

LD50: Lethal dose, 50 percent

PBT: Persistent, Bioaccumulative and Toxic

vPvB: very Persistent and very Bioaccumulative

Press. Gas (Liq.): Gases under pressure – Liquefied gas

*** Data compared to the previous version altered.**