

Printing date 19.11.2015

Version number 1

Revision: 19.11.2015

**\* SECTION 1: Identification of the substance/mixture and of the company/undertaking****1.1 Product identifier****Trade name:** HFC-32**EC number:**

200-839-4

**Registration number:** 01-2119471312-47-0013**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:

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:** sales@daikinchem.de**1.4 Emergency telephone number:** During normal opening times (9:00 - 17:00 (CET)): +49 211 179225-0**\* SECTION 2: Hazard identification****2.1 Classification of the substance or mixture**

Classification according to Regulation (EC) No 1272/2008



Flam. Gas 1 H220 Extremely flammable gas.

Press. Gas L 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:** Danger**Precautionary statements:**

P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P377 Leaking gas fire: Do not extinguish, unless leak can be stopped safely.

P381 Eliminate all ignition sources if safe to do so.

P410+P403 Protect from sunlight. Store in a well-ventilated place.

**SECTION 3: Composition/information on ingredients****Information on ingredients:**

75-10-5 Difluoromethane

100%

F+ R12

Flam. Gas 1, H220

Press. Gas L, H280

**Identification number(s)****EC number:** 200-839-4**\* SECTION 4: First aid measures****4.1 Description of first aid measures****General information:** Seek immediate medical advice.**After inhalation:**

Take affected persons into fresh air. Keep at rest.

Supply fresh air or oxygen; call for doctor.

In case of unconsciousness place patient stably in side position for transportation.

At high levels, cardiac arrhythmia may occur.

**After skin contact:**

Immediately wash with water and soap and rinse thoroughly.

In cases of frost bites, rinse with plenty of water. Do not remove clothing.

Printing date 19.11.2015

Version number 1

Revision: 19.11.2015

**Trade name: HFC-32**

Seek medical treatment in case of complaints or frostbite.

**After eye contact:** Rinse opened eye for several minutes under running water. Then consult an ophthalmologist.

**After swallowing:** Not applicable.

**4.2 Most important symptoms and effects, both acute and chronic:**

Frost bites

Prolonged skin contact may defat the skin and produce dermatitis.

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.

**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.

**For safety reasons unsuitable extinguishing agents:** Water with full jet

**5.2 Special hazards arising from the substance or mixture:**

Extremely flammable; can ignite easily with heat, sparks, fire.

Formation of toxic gases is possible during heating or in case of fire.

Hydrogen fluoride (HF)

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 fire extinguishing is impossible, protect the outskirts and burn it until materials disappear.

If possible, close valves of receptacles to shut off the gas supply.

**Protective equipment:**

Wear fully protective suit.

Wear self-contained respiratory protective device.

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.

Stay on the windward side.

Keep away from ignition sources.

Ensure adequate ventilation before entering the area.

Keep out unauthorized persons.

Vapours are heavier than air and can cause suffocation by reducing oxygen available for breathing.

Wear protective equipment. Keep unprotected persons away.

**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.

Inform authorities in case of gas release.

**6.3 Methods and material for containment and cleaning up:**

Allow to evaporate.

Ensure adequate ventilation.

Remove ignition sources immediately.

Ground all equipment when the product leaks.

There is a danger of explosion. Prepare fire extinguisher in case of emergency.

Printing date 19.11.2015

Version number 1

Revision: 19.11.2015

Trade name: HFC-32

**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:**

Store in cool, dry place in tightly closed receptacles.  
Waste air is to be released into the atmosphere only via suitable separators.  
Open and handle receptacle with care.  
Ensure good ventilation/exhaustion at the workplace.  
Handle with care. Avoid jolting, friction and impact.  
Be careful of leakage when attaching/detaching receptacles.  
Do not handle until all safety precautions have been read and understood.

**Information about fire - and explosion protection:**

Do not spray onto a naked flame or any incandescent material.  
Keep ignition sources away - Do not smoke.  
Protect against electrostatic charges.  
Use only in explosion protected area.  
Keep respiratory protective device available.  
Use flame proof electric/lighting devices and ventilation equipment.  
Use explosion-proof apparatus / fittings and spark-proof tools.  
Pressurised container: protect from sunlight and do not expose to temperatures exceeding 50 °C, i.e. electric lights.  
Do not pierce or burn, even after use.

**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.

**Information about storage in one common storage facility:**

Store away from flammable substances.  
Store away from oxidising agents.  
See section 10 for information on incompatible materials.

**Further information about storage conditions:**

Keep container tightly sealed.  
Store in cool, dry conditions in well sealed receptacle.  
Protect from humidity and water.  
Protect from heat and direct sunlight.  
Store in a cool place. Heat will increase pressure and may lead to the receptacle bursting.  
Store locked up.

**Maximum storage temperature: 40 °C****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****Ingredients with limit values that require monitoring at the workplace:****75-10-5 Difluoromethane**

WEEL (USA) 1000 ppm

**DNELs:****75-10-5 Difluoromethane**Inhalative DNEL - fogyasztói 750 mg/m<sup>3</sup> (long-term exposure) (szisztémás hatások)DNEL - munkás 7035 mg/m<sup>3</sup> (long-term exposure) (szisztémás hatások)

Inhalative

DNEL - general population 750 mg/m<sup>3</sup> (long-term exposure) (systemic effects)DNEL - worker 7035 mg/m<sup>3</sup> (long-term exposure) (systemic effects)

Printing date 19.11.2015

Version number 1

Revision: 19.11.2015

**Trade name: HFC-32****PNECs:****75-10-5 Difluoromethane**

PNEC 0,142 mg/l (fresh water)

0,534 mg/kg dw (fresh water sediment)

1,42 mg/l (intermittent release)

**PNEC**

0.142 mg/l (freshwater) (aqua)

0.534 mg/kg dw (freshwater) (sediment)

1.42 mg/l (intermittent release) (aqua)

**Additional information:** The lists valid during the making were used as basis.**8.2 Exposure controls****Personal protective equipment****General protective and hygienic measures:**

Wash hands before breaks and at the end of work.

Keep away from tobacco products.

Keep away from foodstuffs, beverages and feed.

Do not inhale gases / fumes / aerosols.

Avoid skin contact with the liquefied material.

**Respiratory protection:**

Use suitable respiratory protective device in case of insufficient ventilation.

Self-contained respiratory protective device.

Wear self-contained breathing apparatus in confined spaces, in cases where the oxygen level is depleted, or in case of significant emissions.

**Protection of hands:**

The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.



Protective gloves

**Material of gloves:**

Strong material gloves

Leather

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.

**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 protection:**

Tightly sealed goggles

**Body protection:** Protective work clothing**\* SECTION 9: Physical and chemical properties****9.1 Information on basic physical and chemical properties****General Information****Appearance****Form:** Compressed liquefied gas**Colour:** Colourless**Odour:** Odourless**pH-value:** Neutral**Melting point/Melting range:** -136 °C**Boiling point/Boiling range:** -51,6 °C

Printing date 19.11.2015

Version number 1

Revision: 19.11.2015

Trade name: HFC-32

<b>Flash point:</b>	Not applicable.
<b>Flammability (solid, gaseous):</b>	Extremely flammable liquefied gas.
<b>Fundamental burning velocity</b>	6.7 cm/s
<b>Ignition temperature:</b>	530 °C (1018 hPa)
<b>Explosion limits:</b>	
<b>Lower explosive limit:</b>	13,8 Vol % 13.8 Vol% (High Pressure Gas Safety Act: Japan)
<b>Upper explosive limit:</b>	29,9 Vol % 29.9 Vol% (High Pressure Gas Safety Act: Japan)
<b>Vapour pressure at 25 °C:</b>	1701 kPa
<b>Density at 25 °C:</b>	0,959 g/cm <sup>3</sup>
<b>Relative density at 25 °C</b>	0,0021 (calculated)
<b>Vapour density</b>	1,18
<b>Solubility in / Miscibility with water at 25 °C:</b>	1680 mg/l 1680 mg / l (25 °C atmospheric pressure)
<b>Partition coefficient (n-octanol/water) at 25 °C:</b>	0,21
<b>9.2 Other information:</b>	No further relevant information available.

**\* SECTION 10: Stability and reactivity****10.1 Reactivity**

Risk of violent reaction.

Risk of explosion if heated under confinement.

**10.2 Chemical stability****Thermal decomposition / conditions to be avoided:** No decomposition if used and stored according to specifications.**10.3 Possibility of hazardous reactions:**

Strong oxidizers, alkali metals and alkaline earth metals may cause fires or explosions.

Danger of receptacles bursting because of high vapour pressure when heated.

**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.

Oxidizing agents

**10.6 Hazardous decomposition products:**

Poisonous gases/vapours

Hydrogen fluoride

Fluorophosgene

**\* SECTION 11: Toxicological information****11.1 Information on toxicological effects****Acute toxicity****LD/LC50 values relevant for classification:**Inhalative LC50/4h 1107000 mg/m<sup>3</sup> (Rat) (OECD 403)**Primary irritant effect****Skin corrosion/irritation** No further information available.**Serious eye damage/irritation** No further information available.**Respiratory or skin sensitisation** No further information available.**Additional toxicological information:**Cardiotoxicity: NOAEC: 735000 mg/m<sup>3</sup> (dog)

No cardiac sensitisation potential of HFC-32 (up to 35% v/v in air) to adrenaline in dogs.

**Repeated dose toxicity** NOAEC (inhalation): 105000 mg/m<sup>3</sup> (rat) (OECD 413)**CMR effects****Mutagenicity:**

Ames test: negative (OECD 471)

In vitro mammalian chromosome aberration test: negative (OECD 473)

Mammalian erythrocyte micronucleus test: negative (OECD 474)

Printing date 19.11.2015

Version number 1

Revision: 19.11.2015

**Trade name: HFC-32****Toxicity for reproduction:**NOAEC (inhalation): 208000 mg/m<sup>3</sup> (mouse) (OECD 478; read across)**Developmental toxicity:**NOAEC (inhalation): 105000 mg/m<sup>3</sup> (rat)**Germ cell mutagenicity**

Ames Assay - Negative

In vitro tests did not show mutagenic effects.

Chromosomal Aberration Study in vivo - Negative

In vivo tests did not show mutagenic effects.

**Carcinogenicity** No further information available.**Reproductive toxicity**Inhalative NOAEC 208000 mg/m<sup>3</sup> (Mouse) (OECD 478, read across)105000 mg/m<sup>3</sup> (Rat) (developmental toxicity)

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

**STOT-single exposure** No further information available.**STOT-repeated exposure**Inhalative NOAEC 105000 mg/m<sup>3</sup> (Rat) (OECD 413)

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

**Aspiration hazard** No further information available.**Chronic study****75-10-5 Difluoromethane**

Inhalative Subchronic study NOAEC: 50000 ppm (Rat)

90 day 105000 mg/m<sup>3</sup>(OECD413)**\* SECTION 12: Ecological information****12.1 Toxicity****Aquatic toxicity:**

EC50/96h 142 mg/l (Alga) (QSAR)

LC50/48h 652 mg/l (Daphnia) (QSAR)

LC50/96h 1507 mg/l (Fish) (QSAR)

EC50/96 h 142 mg/l (algae) (QSAR)

LC50/48 h 652 mg/l (daphnia) (QSAR)

LC50/96 h 1507 mg/l (fish) (QSAR)

**12.2 Persistence and degradability:**

Not easily biodegradable

5% after 28 days (OECD 301 D)

5% / 28 days (OECD 301D)

**Abiotic degradation:**

Air (indirect photo-oxidation): Half life: 3.39 years

Conditions: sensitizer: OH radicals

Degradation products: Carbon dioxide (CO<sub>2</sub>) / hydrofluoric acid

Water, pH = 7

Hydrolyses slowly on contact with water.

**Behaviour in environmental systems****Components:** Half-life in air: 1237 days**12.3 Bioaccumulative potential:**

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

log Pow = 0.21

**12.4 Mobility in soil:****75-10-5 Difluoromethane**Henry's law constant 295 hPa\*m<sup>3</sup>/mol (air) (25 °C)

log Koc 0,17 (soil)

Printing date 19.11.2015

Version number 1

Revision: 19.11.2015

Trade name: HFC-32

**Other information**

Koc = 1.49 - 21-73 (QSAR)

log Koc = 0.17 - 1.34 (QSAR)

**Additional ecological information:**

**General notes:**

Ozone depletion potential(ODP) : 0

Global warming potential(GWP) : 675 / IPCC Fourth Assessment Report (AR4)

Ozone depleting potential (ODP): 0

Global warming potential (GWP): 675

Reference value for carbon dioxide: GWP = 1

[Source: Regulation (EU) No 517/2014 on fluorinated greenhouse gases]

**12.5 Results of PBT and vPvB assessment**

**PBT:**

According to the results of its assessment, this substance is not PBT.

Not applicable.

**vPvB:**

According to the results of its assessment, this substance is not vPvB.

Not applicable.

**12.6 Other adverse effects:** No further relevant information available.

\* **SECTION 13: Disposal considerations**

**13.1 Waste treatment methods**

**Recommendation:** Must be specially treated adhering to official regulations.

**Uncleaned packaging**

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

\* **SECTION 14: Transport information**

**14.1 UN-Number:**

ADR, IMDG, IATA

UN3252

**14.2 UN proper shipping name:**

ADR:

3252 DIFLUOROMETHANE (REFRIGERANT GAS R 32)

IMDG, IATA

DIFLUOROMETHANE (REFRIGERANT GAS R 32)

**14.3 Transport hazard class(es):**

ADR



Class:

2 2F Gases.

Label:

2.1

IMDG, IATA



Class:

2.1

Label:

2.1

**14.4 Packing group:**

ADR, IMDG, IATA

Not applicable

**14.5 Environmental hazards:**

Marine pollutant:

No

**14.6 Special precautions for user:**

Warning: Gases.

Danger code (Kemler):

23

Printing date 19.11.2015

Version number 1

Revision: 19.11.2015

**Trade name: HFC-32****14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code:****Transport/Additional information:**

Not applicable.

Avoid direct sunlight. Make sure of no damage, corrosion, leaks on the receptacles.

Take necessary measures for preventing cargo shift.

**ADR****Limited quantities (LQ):**

0

**Excepted quantities (EQ)**

Code: E0

Not permitted as Excepted Quantity

**Transport category:**

2

**Tunnel restriction code:**

B/D

**IMDG****Limited quantities (LQ)**

0

**Excepted quantities (EQ)**

Code: E0

Not permitted as Excepted Quantity

**UN "Model Regulation":**

UN3252, DIFLUOROMETHANE (REFRIGERANT GAS R 32), 2.1

**\* SECTION 15: Regulatory information****15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture****Labelling according to Regulation (EC) No 1272/2008**

The substance is classified and labelled according to the CLP regulation.

**Hazard pictograms**

GHS02

**Signal word Danger****Hazard statements**

H220 Extremely flammable gas.

H280 Contains gas under pressure; may explode if heated.

**Precautionary statements**

P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P377 Leaking gas fire: Do not extinguish, unless leak can be stopped safely.

P381 Eliminate all ignition sources if safe to do so.

P410+P403 Protect from sunlight. Store in a well-ventilated place.

**Directive 2012/18/EU****Named dangerous substances - ANNEX I Liquefied flammable gases****Qualifying quantity (tonnes) for the application of lower-tier requirements 50 t****Qualifying quantity (tonnes) for the application of upper-tier requirements 200 t****Other regulations, limitations and prohibitive regulations:**

High Pressure Gas Safety Act (Japan) : non-flammable gas

ISO817 : Classification A2L (lower flammability)

**\* 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: Legal & Compliance****Contact:**

sales@daikinchem.de

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)



Printing date 19.11.2015

Version number 1

Revision: 19.11.2015

**Trade name: HFC-32***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**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**Flam. Gas 1: Flammable gases, Hazard Category 1**Press. Gas L: Gases under pressure: Liquefied gas***\* Data compared to the previous version altered.**