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**SECTION 1: Identification of the substance/mixture and of the company/undertaking****1.1 Product identifier****Trade name: AQUEOUS HYDROFLUORIC ACID 50%****Article number: HDHF50****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:** <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**

Acute Tox. 3 H301 Toxic if swallowed.

Acute Tox. 3 H331 Toxic if inhaled.



Muta. 2 H341 Suspected of causing genetic defects.

STOT SE 1 H370 Causes damage to organs.

STOT RE 1 H372 Causes damage to organs through prolonged or repeated exposure.



Met. Corr. 1 H290 May be corrosive to metals.

Skin Corr. 1A H314 Causes severe skin burns and eye damage.

Eye Dam. 1 H318 Causes serious eye damage.



Skin Sens. 1 H317 May cause an allergic skin reaction.

**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:** Danger**Precautionary statements:**

P260 Do not breathe dusts or mists.

P301+P310 IF SWALLOWED: Immediately call a POISON CENTER/ doctor.

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P303+P361+P353 *IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.*

P305+P351+P338 *IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.*

P405 *Store locked up.*

P501 *Dispose of contents/container in accordance with local/regional/national/international regulations.*

### SECTION 3: Composition/information on ingredients

#### Information on ingredients:

7732-18-5 Water 50,0%

7664-39-3 Hydrofluoric acid 50,0%

T+ R26/27/28; C R35

Acute Tox. 2, H300; Acute Tox. 1, H310; Acute Tox. 2, H330

Skin Corr. 1A, H314

**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:

Immediately remove any clothing soiled by the product.

Remove breathing equipment only after contaminated clothing have been completely removed.

In case of irregular breathing or respiratory arrest provide artificial respiration.

Seek immediate medical advice.

##### After inhalation:

Supply fresh air or oxygen; call for doctor.

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

##### After skin contact:

After rinsing with water thoroughly, apply 2.5% Ca-gluconate solution or Ca-gluconate gel immediately. Do not rub hard.

Apply the solution or the gel every 1-2 hours. Continue applying them every several hours even after the pain is eased.

If they are not at hand, keep rinsing with warm water for at least 30 minutes and call for a doctor immediately. Hand this SDS to the doctor.

Immediately wash with water and soap and rinse thoroughly.

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

##### After swallowing:

Do not induce vomiting; Consult a doctor immediately.

Drink plenty of water and provide fresh air. Consult a doctor immediately.

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

##### After inhalation:

HF damages the respiratory tract and the lungs, causes cough, burning sensation, pharyngeal pain, and feeling of dyspnea.

If severe, lapse into dyspnea caused by pulmonary edema.

##### After skin contact:

Redness, pain, blisters.

When HF permeates deeply into body, it causes acute pain and ulcers.

The calcium concentration in the body decreases when HF is absorbed in the skin.

##### After eye contact:

Extreme irritation of mucous membranes, pain, redness, severe burn, and loss of eyesight.

##### After swallowing:

Nausea, stomachaches, diarrhea, coma, asthenia, and convulsion.

##### After long-term exposure:

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Fluorosis effect on bones, mottled teeth.

Protection of rescuers: Wear self-contained breathing apparatus and fully protective suit to avoid contact with toxic substances.

**Information for doctor:**

Hydrofluoric Acid (HF) is quickly absorbed in the respiratory organs, skin and alimentary canal.

Fluorine ions may cause hypocalcemia and hypomagnesemia when bound with calcium ions and magnesium ions.

After inhalation:

The gas/mist may cause pulmonary edema.

The effect may not appear until 2-3 hours after the accident.

Monitor the patient under medical supervision for at least 48 hours.

After skin contact:

Subcutaneous administration of Ca-gluconate solution (5-10%) on the affected part is thought to be effective.

Hydrofluoric acid burns cause extreme pain.

The pain is thought to result from nerve ending irritation due to the increased level of potassium ions in extracellular spaces to compensate for the reduced levels of calcium ions bound with the fluoride.

Relief of pain is an excellent indication of the success of treatment and, therefore, local anesthetics should be avoided.

After eye contact:

Apply 1-2 drops of sterilized Ca-gluconate solution (5-10%) on the eyes.

Alternatively, wash the eyes with 1% of Ca-gluconate solution blended with 500 ml of physiological saline solution.

**4.3 Indication of any immediate medical attention and special treatment needed:**

Medical supervision for at least 48 hours.

**SECTION 5: Firefighting measures****5.1 Extinguishing media****Suitable extinguishing agents:**

Use fire extinguishing methods suitable for surrounding conditions.

Water haze

Foam

Fire-extinguishing powder

Sand

CO<sub>2</sub>

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

Can form explosive gas-air mixtures.

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

**5.3 Advice for firefighters:**

Cool the container thoroughly with a large amount of water even after extinguishment.

In case of a large fire: stay a safe distance away from the fire and use unmanned hose holder or monitor nozzles.

If impossible, evacuate from the fire and burn in until the materials disappear.

Remove receptacles from area of fire if possible.

Do not pour water into receptacle.

**Protective equipment:**

Wear self-contained breathing apparatus and protective suit.

Do not inhale explosion gases or combustion gases.

Wear fully protective suit.

**SECTION 6: Accidental release measures****6.1 Personal precautions, protective equipment and emergency procedures:**

Wear protective clothing.

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.

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Stay on the windward side.

Keep out unauthorized persons.

Wear appropriate protective devices (See Section 8 Exposure Controls/Personal Protection).

Avoid contact with eyes and skin.

Do not swallow the product.

**6.2 Environmental precautions:**

Dilute with plenty of water.

Must not be emitted into the environment.

Do not allow to enter sewers/surface or ground water.

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

For a small amount of leakage: Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders) or collect in an empty container that can be sealed tightly.

Use neutralising agent.

Dispose contaminated material as hazardous waste according to section 13.

Ensure adequate ventilation.

For a large amount of leakage: Enclose with banks to avoid outflow. Lead the leakage to a safe place and collect.

Remove gas with water haze. After recovering it, rinse with a large amount of water.

**6.4 Reference to other sections:**

See Section 7 for information on safe handling.

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.

Open and handle receptacle with care.

Prevent formation of aerosols.

Do not handle until all safety precautions have been read and understood.

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

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 the original receptacle.

Store in a cool and dry location.

Provide acid-resistant floor.

Store only in unopened original receptacles.

Store material at 5 °C to 25 °C.

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

Do not store together with acids.

Do not store together with alkalis (caustic solutions).

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 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:**

Install eyewash containers and safety showers in worksites where the product is stored or handled.

Keep the process closed, equip with local exhaust ventilation and take other engineering measurements to control airborne concentration below administrative level or threshold limit value.

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**Trade name: AQUEOUS HYDROFLUORIC ACID 50%****8.1 Control parameters****Ingredients with limit values that require monitoring at the workplace:****7664-39-3 Hydrofluoric acid**OEL (Japan) 2,5\* mg/m<sup>3</sup>, 3\* ppm

\*exposure conc. must be kept below this level

PEL (USA) 3 ppm  
as FREL (USA) Short-term value: C 5\* mg/m<sup>3</sup>, C 6\* ppm  
Long-term value: 2,5 mg/m<sup>3</sup>, 3 ppm  
\*15-minTLV (USA) Short-term value: C 1,64 mg/m<sup>3</sup>, C 2\* ppm  
Long-term value: 0,41 mg/m<sup>3</sup>, 0,5\* ppm  
\*as F; Skin**Additional information:** The lists valid during the making were used as basis.**8.2 Exposure controls****Personal protective equipment****General protective and hygienic measures:**

Immediately remove all soiled and contaminated clothing

Wash hands before breaks and at the end of work.

Avoid contact with the eyes and skin.

Keep away from tobacco products.

**Respiratory protection:**

In case of brief exposure or low pollution use respiratory filter device. In case of intensive or longer exposure use self-contained respiratory protective device.

Use respiratory protective device with organic gas cartridge.

**Protection of hands:**

Protective gloves

**Material of gloves:**

Fluorocarbon rubber

Neoprene gloves

**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:**

Acid resistant protective clothing.

Boots

Apron

Full head, face and neck 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>	Liquid
<b>Colour:</b>	Colourless
<b>Odour:</b>	Pungent

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<b>pH-value:</b>	0-1
<b>Melting point/freezing point:</b>	-36 °C
<b>Initial boiling point and boiling range:</b>	106 °C
<b>Flash point:</b>	Not applicable.
<b>Auto-ignition temperature:</b>	Product is not selfigniting.
<b>Explosive properties:</b>	Product does not present an explosion hazard.
<b>Explosion limits:</b>	Not applicable.
<b>Lower explosive limit:</b>	Product does not present an explosion hazard.
<b>Upper explosive limit:</b>	Product does not present an explosion hazard.
<b>Vapour pressure:</b>	No further information available.
<b>Density at 20 °C:</b>	1,155 g/cm <sup>3</sup>
<b>Solubility in / Miscibility with water:</b>	Fully miscible.
<b>Partition coefficient: n-octanol/water:</b>	No further information available.
<b>9.2 Other information:</b>	No further relevant information available.

## SECTION 10: Stability and reactivity

**10.1 Reactivity** No further relevant information available.

**10.2 Chemical stability**

**Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.

**10.3 Possibility of hazardous reactions:**

Reacts with alkali (lyes).

Reacts with base metals forming hydrogen.

**10.4 Conditions to avoid:** Keep away from heat, sparks, flame, high temperature.

**10.5 Incompatible materials:** Glass, concrete and silicon

**10.6 Hazardous decomposition products:** No dangerous decomposition products known.

## SECTION 11: Toxicological information

**11.1 Information on toxicological effects**

**Acute toxicity**

Toxic if swallowed or if inhaled.

**LD/LC50 values relevant for classification:**

**7664-39-3 Hydrofluoric acid**

Oral LD50 1276 mg/kg (Rat)

**Primary irritant effect**

**Skin corrosion/irritation**

Causes severe skin burns and eye damage.

**Serious eye damage/irritation**

Causes serious eye damage.

**Respiratory or skin sensitisation**

May cause an allergic skin reaction.

**CMR effects**

**Germ cell mutagenicity**

Suspected of causing genetic defects.

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

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

**STOT-single exposure**

Causes damage to organs.

**STOT-repeated exposure**

Causes damage to organs through prolonged or repeated exposure.

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

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**Trade name: AQUEOUS HYDROFLUORIC ACID 50%***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.***12.3 Bioaccumulative potential:** *No further relevant information available.***12.4 Mobility in soil:** *No further relevant information available.***Additional ecological information:****General notes:***Do not allow product to reach ground water, water course or sewage system.**Must not reach sewage water or drainage ditch undiluted or unneutralised.**Danger to drinking water if even small quantities leak into the ground.***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.***Uncleaned packaging****Recommendation:** *Disposal must be made according to official regulations.***SECTION 14: Transport information****14.1 UN-Number:****ADR, IMDG, IATA** 1790**14.2 UN proper shipping name:****IMDG, IATA** HYDROFLUORIC ACID**14.3 Transport hazard class(es):****ADR, IMDG, IATA****Class:** 8 Corrosive substances.**Label:** 8+6.1**14.4 Packing group:****ADR, IMDG, IATA** II**14.5 Environmental hazards:****Marine pollutant:** No**14.6 Special precautions for user:** Warning: Corrosive substances.**Danger code (Kemler):** 86**EMS Number:** F-A,S-B**14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code:** Not applicable.**Transport/Additional information:****ADR****Limited quantities (LQ):** LQ22**Transport category:** 2**Tunnel restriction code:** E**UN "Model Regulation":** UN1790, HYDROFLUORIC ACID, 8 (6.1), II

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**Trade name: AQUEOUS HYDROFLUORIC ACID 50%****\* 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 product is classified and labelled according to the CLP regulation.

**Hazard pictograms**

GHS05 GHS06 GHS08

**Signal word** Danger**Hazard-determining components of labelling:**

Hydrofluoric acid

**Hazard statements**

- H290 May be corrosive to metals.  
H301+H331 Toxic if swallowed or if inhaled.  
H314 Causes severe skin burns and eye damage.  
H317 May cause an allergic skin reaction.  
H341 Suspected of causing genetic defects.  
H370 Causes damage to organs.  
H372 Causes damage to organs through prolonged or repeated exposure.

**Precautionary statements**

- P260 Do not breathe dusts or mists.  
P301+P310 IF SWALLOWED: Immediately call a POISON CENTER/ doctor.  
P303+P361+P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.  
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.  
P405 Store locked up.  
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

**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 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  
Met. Corr.1: Corrosive to metals – Category 1  
Acute Tox. 2: Acute toxicity – Category 2  
Acute Tox. 3: Acute toxicity – Category 3  
Acute Tox. 1: Acute toxicity – Category 1  
Skin Corr. 1A: Skin corrosion/irritation – Category 1A  
Eye Dam. 1: Serious eye damage/eye irritation – Category 1  
Skin Sens. 1: Skin sensitisation – Category 1  
Muta. 2: Germ cell mutagenicity – Category 2  
STOT SE 1: Specific target organ toxicity (single exposure) – Category 1



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*STOT RE 1: Specific target organ toxicity (repeated exposure) – Category 1*

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