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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 49%****Article number: HDHF49 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:

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.

**Hazard description: T+ Very toxic****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.

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

7664-39-3 Hydrofluoric acid 49%  
T+ R26/27/28; C R35  
Acute Tox. 2, H300; Acute Tox. 1, H310; Acute Tox. 2, H330  
Skin Corr. 1A, H314

7732-18-5 Water 51%

**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:**

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

*Immediately remove any clothing soiled by the product.*

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

*Seek immediate medical advice.*

*First aiders shall pay attention to self-protection.*

**After inhalation:**

*Supply fresh air or oxygen; call for doctor.*

*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.*

**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.*

*Consult a doctor in case of complaints.*

**After eye contact:**

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

*Consult an ophthalmologist in case of complaints.*

**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:**

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

*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.*

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**Trade name: AQUEOUS HYDROFLUORIC ACID 49%***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:**Fluorosis effect on bones, mottled teeth.***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:***Sand**Use fire extinguishing methods suitable for surrounding conditions.**Water haze**Foam**Fire-extinguishing powder**Dry 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 fully protective suit.**Wear self-contained breathing apparatus and protective suit.**Do not inhale explosion gases or combustion gases.*

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Trade name: **AQUEOUS HYDROFLUORIC ACID 49%****SECTION 6: Accidental release measures****6.1 Personal precautions, protective equipment and emergency procedures:***Wear protective clothing.**Remove persons from danger area.**Ensure adequate ventilation before entering the area.**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.**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:***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.**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:***Open and handle receptacle with care.**Prevent formation of aerosols.**Ensure good ventilation/exhaustion at the workplace.**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 only in unopened original receptacles.**Store material at 5 °C to 25 °C.**Store in a cool and dry location.**Provide acid-resistant floor.**Prevent any seepage into the ground.***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:***Store in cool, dry conditions in well sealed receptacle.**Keep container tightly sealed.**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.*

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**Trade name: AQUEOUS HYDROFLUORIC ACID 49%****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.

**8.1 Control parameters** No further information available.**Ingredients with limit values that require monitoring at the workplace:****7664-39-3 Hydrofluoric acid**IOELV (EU) Short-term value: 2,5 mg/m<sup>3</sup>, 3 ppmLong-term value: 1,5 mg/m<sup>3</sup>, 1,8 ppm**DNELs:****7664-39-3 Hydrofluoric acid**

Oral DNEL - consumer 0,01 mg/kg bw/d (long-term exposure) (systemic effects)  
0,01 mg/kg bw/d (short-term exposure) (systemic effects)

Inhalative DNEL - worker 1,5 mg/m<sup>3</sup> (long-term exposure) (local effects)  
1,5 mg/m<sup>3</sup> (long-term exposure) (systemic effects)  
2,5 mg/m<sup>3</sup> (short-term exposure) (local effects)  
2,5 mg/m<sup>3</sup> (short-term exposure) (systemic effects)

DNEL - consumer 0,2 mg/m<sup>3</sup> (long-term exposure) (local effects)  
0,03 mg/m<sup>3</sup> (long-term exposure) (systemic effects)  
1,25 mg/m<sup>3</sup> (short-term exposure) (local effects)  
0,03 mg/m<sup>3</sup> (short-term exposure) (systemic effects)

**PNECs:****7664-39-3 Hydrofluoric acid**

PNEC 0,9 mg/l (fresh water)

0,9 mg/l (marine water)

51 mg/l (sewage treatment plant)

PNEC 11 mg/kg dw (soil)

**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.

Do not eat or drink while working.

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 filters for acid gases.

**Protection of hands:**

Protective gloves

**Material of gloves:**

Neoprene gloves

Fluorocarbon rubber

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**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:**



Safety glasses

Tightly sealed goggles

**Body protection:**

Boots

Apron

Protective work clothing

Full head, face and neck protection



Acid resistant protective clothing including boots and apron

**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
<b>Odour threshold:</b>	Not determined.
<b>pH-value at 20 °C:</b>	0-1
<b>Melting point/freezing point:</b>	-37 °C
<b>Initial boiling point and boiling range:</b>	107 °C
<b>Flash point:</b>	Not applicable.
<b>Flammability (solid, gas):</b>	Not applicable.
<b>Decomposition temperature:</b>	No further information available.
<b>Auto-ignition temperature:</b>	Product is not selfigniting.
<b>Explosive properties:</b>	Product does not present an explosion hazard.
<b>Explosion limits:</b>	
<b>Lower explosive limit:</b>	No further information available.
<b>Upper explosive limit:</b>	No further information available.
<b>Vapour pressure:</b>	No further information available.
<b>Density at 20 °C:</b>	1,154 g/cm <sup>3</sup>
<b>Relative density</b>	Not determined.
<b>Vapour density</b>	Not determined.
<b>Evaporation rate</b>	Not determined.
<b>Solubility in / Miscibility with water:</b>	Fully miscible.
<b>Partition coefficient: n-octanol/water:</b>	No further information available.
<b>Viscosity:</b>	
<b>Dynamic:</b>	Not determined.
<b>Kinematic:</b>	Not determined.
<b>9.2 Other information:</b>	No further relevant information available.

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**SECTION 10: Stability and reactivity****10.1 Reactivity** May be corrosive to metals.**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 acids.

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 LD 100 80 mg/kg (Guinea pig) (2% solution)

Dermal NOEC 2 % (Rabbit) (1 min [0.01% / 30 min])

Inhalative LC50 342 ppm (Mouse)

1276 ppm (Rat)

LC50/1h 2240 - 2340 ppm (Rat) (gas)

**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****7664-39-3 Hydrofluoric acid**

Oral NOAEL 10 - 14 mg/kg bw/d (Rat) (Sodium fluoride)

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

**STOT-single exposure**

Causes damage to organs.

**STOT-repeated exposure****7664-39-3 Hydrofluoric acid**

Oral LOEL 50 ppm (Mouse) (Sodium fluoride)

Inhalative NOAEC 0,82 mg/m<sup>3</sup> (Rat) (= 1 ppm; OECD 412)

Causes damage to organs through prolonged or repeated exposure.

**Aspiration hazard** Based on available data, the classification criteria are not met.**Chronic study** No further information available.

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Trade name: **AQUEOUS HYDROFLUORIC ACID 49%****SECTION 12: Ecological information****12.1 Toxicity****Aquatic toxicity:****7664-39-3 Hydrofluoric acid**LC50/96h 51 mg/l (Fish) (*Oncorhynchus mykiss*; Sodium fluoride)EC50/48h 97 mg/l (*Daphnia*) (Sodium fluoride)

EC50/96h 43 mg/l (Alga) (Sodium fluoride)

NOEC 50 mg/l (Alga) (21 days; Sodium fluoride)

8,9 mg/l (*Daphnia*) (21 days; Sodium fluoride)

4 mg/l (Fish) (21 days; Sodium fluoride)

**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.**Ecotoxicological effects:** no data**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**

UN1790

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

HYDROFLUORIC ACID

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

8 (CT1) Corrosive substances.

**Label:**

8+6.1

**IMDG****Class:**

8 Corrosive substances.



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Label: 8/6.1  
IATA



Class: 8 Corrosive substances.  
Label: 8 (6.1)

14.4 Packing group: II  
ADR, IMDG, IATA

14.5 Environmental hazards: II

Marine pollutant: No

14.6 Special precautions for user: Warning: Corrosive substances.

Danger code (Kemler): 86

EMS Number: F-A,S-B

Segregation groups: Acids

Stowage Category: D

Stowage Code: SW1 Protected from sources of heat.

SW2 Clear of living quarters.

Handling Code: H2 Keep as cool as reasonably practicable

14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code: 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): 1L

Excepted quantities (EQ): Code: E2

Maximum net quantity per inner packaging: 30 ml

Maximum net quantity per outer packaging: 500 ml

Transport category: 2

Tunnel restriction code: E

IMDG

Limited quantities (LQ): 1L

Excepted quantities (EQ): Code: E2

Maximum net quantity per inner packaging: 30 ml

Maximum net quantity per outer packaging: 500 ml

UN "Model Regulation": UN 1790 HYDROFLUORIC ACID, 8 (6.1), 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 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.

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- 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.

**Directive 2012/18/EU****Seveso category H2 ACUTE TOXIC****Qualifying quantity (tonnes) for the application of lower-tier requirements 50 t****Qualifying quantity (tonnes) for the application of upper-tier requirements 200 t****National regulations** No further information available.**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

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

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

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