Safety data sheet

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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:
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

Acute Tox. 2 H300 Fatal if swallowed.
Acute Tox. 3 H311 Toxic in contact with skin.
Acute Tox. 1 H330 Fatal if inhaled.

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. 1 H314 Causes severe skin burns and eye damage.
Eye Dam. 1 H318 Causes serious eye damage.

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

Hazard-determining components of labelling:
Hydrofluoric acid
Precautionary statements:
P284 [In case of inadequate ventilation] wear respiratory protection.
P303+P361+P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or 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.
P320 Specific treatment is urgent (see on this label).

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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:

CAS: 7664-39-3 Hydrofluoric acid 49%
Acute Tox. 2, H300; Acute Tox. 1, H310; Acute Tox. 2, H330
Skin Corr. 1A, H314
Press. Gas (Liq.), H280
Specific concentration limits: Skin Corr. 1A; H314: C ≥ 7 %
Skin Corr. 1B; H314: 1 % ≤ C < 7 %
Eye Irrit. 2; H319: 0.1 % ≤ C < 1 %

CAS: 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 opthalmologist.
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.
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.
4.2 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.

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-tern exposure:
Fluorosis effect on bones, mottled teeth.
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_2
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.

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 ℃ to 25 ℃.
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.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters No further information available.

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Ingredients with limit values that require monitoring at the workplace:

CAS: 7664-39-3 Hydrofluoric acid
IOELV (EU) Short-term value: 2.5 mg/m³, 3 ppm
Long-term value: 1.5 mg/m³, 1.8 ppm
DNELs:

CAS: 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/m³ (long-term exposure) (local effects)
		1.5 mg/m³ (long-term exposure) (systemic effects)
		2.5 mg/m³ (short-term exposure) (local effects)
		2.5 mg/m³ (short-term exposure) (systemic effects)
	DNEL - consumer	0.2 mg/m³ (long-term exposure) (local effects)
		0.03 mg/m³ (long-term exposure) (systemic effects)
		1.25 mg/m³ (short-term exposure) (local effects)
		0.03 mg/m³ (short-term exposure) (systemic effects)

PNECs:

CAS: 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
Appropriate engineering controls
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.
Individual protection measures, such as 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.
Hand protection

Protective gloves

Material of gloves:
Neoprene gloves
Fluorocarbon rubber
Penetration time of glove material
The exact break trough time has to be found out by the manufacturer of the protective gloves and has to be observed.

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Eye/face 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

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SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

General Information	
Physical state	*Fluid*
Colour:	*Colourless*
Odour:	*Pungent*
Odour threshold:	*Not determined.*
Melting point/freezing point:	*-37 °C*
Boiling point or initial boiling point and boiling range	*107 °C*
Flammability	*Not applicable.*
Lower and upper explosion limit	
Lower explosive limit:	*No further information available.*
Upper explosive limit:	*Not determined.*
Flash point:	*Not applicable.*
Decomposition temperature:	*No further information available.*
pH at 20 °C	*0-1*
Viscosity:	
Kinematic viscosity	*Not determined.*
Dynamic:	*Not determined.*
Solubility	
water:	*Fully miscible.*
Partition coefficient n-octanol/water (log value)	*No further information available.*
Vapour pressure:	*No further information available.*
Density and/or relative density	
Density at 20 °C:	*1.154 g/cm³*
Relative density	*Not determined.*
Vapour density	*Not determined.*
Particle characteristics	*Not applicable.*

9.2 Other information:

Form:	*Liquid*
Auto-ignition temperature:	*Product is not self-igniting.*
Explosive properties:	*Product does not present an explosion hazard.*
Evaporation rate	*Not determined.*

Information with regard to physical hazard classes

Explosives	*Not applicable*
Flammable gases	*Not applicable*
Aerosols	*Not applicable*
Oxidising gases	*Not applicable*
Gases under pressure	*Not applicable*
Flammable liquids	*Not applicable*

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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
May be corrosive to metals.

Desensitised explosives	Not applicable

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 hazard classes as defined in Regulation (EC) No 1272/2008
Acute toxicity
Fatal if swallowed or if inhaled.
Toxic in contact with skin.
LD/LC50 values relevant for classification:

CAS: 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)

Skin corrosion/irritation
Causes severe skin burns and eye damage.
Serious eye damage/irritation
Causes serious eye damage.
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: 7664-39-3 Hydrofluoric acid
Oral NOAEL 10 - 14 mg/kg bw/d (Rat) (Sodium fluoride)
STOT-single exposure
Causes damage to organs.
STOT-repeated exposure

CAS: 7664-39-3 Hydrofluoric acid

Oral	LOEL	50 ppm (Mouse) (Sodium fluoride)

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Inhalative NOAEC 0.82 mg/m³ (Rat) (= 1 ppm; OECD 412)
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.*
11.2 Information on other hazards
Endocrine disrupting properties

None of the ingredients is listed.

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SECTION 12: Ecological information

12.1 Toxicity
Aquatic toxicity:

CAS: 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.*
12.5 Results of PBT and vPvB assessment
PBT: *No further relevant information available.*
vPvB: *No further relevant information available.*
12.6 Endocrine disrupting properties *For information on endocrine disrupting properties see section 11.*
12.7 Other adverse effects:
Ecotoxical 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.

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 or ID 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.*

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Trade name: AQUEOUS HYDROFLUORIC ACID 49%

Label:	8+6.1
IMDG	

Class:	8 Corrosive substances.
Label:	8/6.1
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.
Hazard identification number (Kemler code):	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 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):	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.

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Hazard pictograms

GHS05 GHS06 GHS08

Signal word Danger

Hazard-determining components of labelling:
Hydrofluoric acid
Hazard statements
H290 May be corrosive to metals.
H300+H330 Fatal if swallowed or if inhaled.
H311 Toxic in contact with skin.
H314 Causes severe skin burns and eye damage.
H370 Causes damage to organs.
H372 Causes damage to organs through prolonged or repeated exposure.
Precautionary statements
P284 [In case of inadequate ventilation] wear respiratory protection.
P303+P361+P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or 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.
P320 Specific treatment is urgent (see on this label).
P405 Store locked up.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.
Seveso category H2 ACUTE TOXIC

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
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
Met. Corr.1: Corrosive to metals – Category 1
Acute Tox. 2: Acute toxicity – Category 2
Acute Tox. 1: Acute toxicity – Category 1
Acute Tox. 3: Acute toxicity – Category 3
Skin Corr. 1: Skin corrosion/irritation – Category 1
Skin Corr. 1A: Skin corrosion/irritation – Category 1A
Eye Dam. 1: Serious eye damage/eye irritation – Category 1
STOT SE 1: Specific target organ toxicity (single exposure) – Category 1
STOT RE 1: Specific target organ toxicity (repeated exposure) – Category 1
*** Data compared to the previous version altered.**