

1 Identification of the substance/preparation and of the company/undertaking

- **Product details**
- **Trade name:** AQUEOUS HYDROFLUORIC ACID 49%
- **Article number:** 49
- **Application of the substance / the preparation** wet etchant for semiconductor applications
- **Manufacturer/Supplier:**
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- **Further information obtainable from:** <http://www.daikin.com/>
- **Information in case of emergency:** +81-6-6349-7521, +1-256-306-5000, +86-512-5232-0973, +49-211-179 225-0

2 Hazards identification

- **GHS label elements**

**Danger**

- 3.1/2 - Fatal if swallowed.
- 3.1/2 - Fatal in contact with skin.
- 3.1/2 - Fatal if inhaled.
- 3.8/3 - May cause respiratory irritation.

**Danger**

- 3.2/1A - Causes severe skin burns and eye damage.

· Prevention:

- Do not breathe dust/fume/gas/mist/vapours/spray.
- Avoid breathing dust/fume/gas/mist/vapours/spray.
- Do not get in eyes, on skin, or on clothing.
- Wash thoroughly after handling.
- Do not eat, drink or smoke when using this product.
- Use only outdoors or in a well-ventilated area.
- Wear protective gloves/protective clothing/eye protection/face protection.
- Wear respiratory protection.

· Response:

- IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
- IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
- IF ON SKIN: Gently wash with plenty of soap and water.
- IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
- IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing.
- IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- Immediately call a POISON CENTER or doctor/physician.
- Call a POISON CENTER or doctor/physician if you feel unwell.
- Specific treatment is urgent (see label).
- Specific treatment (see label).
- Specific measures (see label).
- Rinse mouth.
- Remove/Take off immediately all contaminated clothing.
- Wash contaminated clothing before reuse.

· Storage:

- Store in a well-ventilated place. Keep container tightly closed.
- Store locked up.

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· Disposal:*Dispose of contents/container in accordance with local/regional/national/international regulations.*

3 Composition/information on ingredients

· Chemical characterization:

7732-18-5 water	51,0%
7664-39-3 hydrofluoric acid	49,0%

Danger: Skull and crossbones 3.1.O/I, 3.1.D/I, 3.1.I/I; Corrosion 3.2/1A

4 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.*

· 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:

*Immediately wash with water and soap and rinse thoroughly.
Rub in Ca-gluconate solution or Ca-gluconate gel immediately.*

· After eye contact: Rinse opened eye for several minutes under running water. Then consult a doctor.**· After swallowing:**

*Do not induce vomiting; call for medical help immediately.
Drink plenty of water and provide fresh air. Call for a doctor immediately.*

5 Fire-fighting measures

· Suitable extinguishing agents:

CO2, powder or water spray. Fight larger fires with water spray or alcohol resistant foam.

· Protective equipment: Mouth respiratory protective device.

6 Accidental release measures

· Person-related safety precautions: Wear protective equipment. Keep unprotected persons away.**· Measures for environmental protection:**

*Dilute with plenty of water.
Do not allow to enter sewers/ surface or ground water.*

· Measures for cleaning/collecting:

*Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
Use neutralizing agent.*

Dispose contaminated material as waste according to item 13.

Ensure adequate ventilation.

7 Handling and storage

· Handling:**· Information for safe handling:**

Ensure good ventilation/exhaustion at the workplace.

Open and handle receptacle with care.

Only handle and refill product in closed systems.

Prevent formation of aerosols.

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- **Information about fire - and explosion protection:** Keep respiratory protective device available.
- **Storage:**
- **Requirements to be met by storerooms and receptacles:**
 - Store only in the original receptacle.
 - Provide acid-resistant floor.
- **Information about storage in one common storage facility:** Do not store together with alkalis (caustic solutions).
- **Further information about storage conditions:**
 - Store under lock and key and with access restricted to technical experts or their assistants only.
 - Keep container tightly sealed.

8 Exposure controls/personal protection

- **Additional information about design of technical facilities:** No further data; see item 7.
- **Ingredients with limit values that require monitoring at the workplace:**

7664-39-3 hydrofluoric acid

OEL (Japan)	2,5* mg/m ³ , 3* ppm
*exposure conc. must be kept below this level	
PEL (USA)	3 ppm as F
REL (USA)	Short-term value: C 5* mg/m ³ , C 6* ppm Long-term value: 2,5 mg/m ³ , 3 ppm *15-min
TLV (USA)	Short-term value: C 1,64 mg/m ³ , C 2* ppm Long-term value: 0,41 mg/m ³ , 0,5* ppm *as F; Skin

- **Additional information:** The lists valid during the making were used as basis.

- **Personal protective equipment:**

- **General protective and hygienic measures:**

Keep away from foodstuffs, beverages and feed.
Immediately remove all soiled and contaminated clothing
Wash hands before breaks and at the end of work.
Store protective clothing separately.
Avoid contact with the eyes and skin.

- **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.

- **Protection of hands:**



Protective gloves

- **Material of gloves** Fluorocarbon rubber (Viton)

- **Eye protection:**

Safety glasses



Tightly sealed goggles

- **Body protection:**

Acid resistant protective clothing
Boots
Apron

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Full head, face and neck protection

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9 Physical and chemical properties

· General Information

Form: Fluid
Colour: Colourless
Odour: Pungent

· Change in condition

Melting point/Melting range: -37°C
Boiling point/Boiling range: 107°C

· Flash point: Not applicable.

· Self-igniting: Product is not selfigniting.

· Danger of explosion: Product does not present an explosion hazard.

· Density at 20°C: 1,154 g/cm³

· Solubility in / Miscibility with water: Fully miscible.

· pH-value: 0-1

10 Stability and reactivity

- **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
- **Materials to be avoided:** Glass, concrete and silicon
- **Dangerous reactions**
Reacts with alkali (lyes).
Reacts with base metals forming hydrogen.
- **Dangerous decomposition products:** No dangerous decomposition products known.

11 Toxicological information

- **Acute toxicity:**
- **LD/LC50 values relevant for classification:**

7664-39-3 hydrofluoric acid

Oral LD50 1276 mg/kg (rat)

· Primary irritant effect:

- **on the skin:** Strong caustic effect on skin and mucous membranes.
- **on the eye:** Strong caustic effect.

12 Ecological information

· General notes:

Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
 Must not reach sewage water or drainage ditch undiluted or unneutralized.

Rinse off of bigger amounts into drains or the aquatic environment may lead to decreased pH-values. A low pH-value harms aquatic organisms. In the dilution of the use-level the pH-value is considerably increased, so that after the use of the product the aqueous waste, emptied into drains, is only low water-dangerous.

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13 Disposal considerations

- **Product:**
- **Recommendation**
Must not be disposed together with household garbage. Do not allow product to reach sewage system.
- **Uncleaned packaging:**
- **Recommendation:** Disposal must be made according to official regulations.
- **Recommended cleansing agents:** Water, if necessary together with cleansing agents.

14 Transport information

- UN "Model Regulation": UN1790, HYDROFLUORIC ACID, 8 (6.1), II

15 Regulatory information

- **Code letter and hazard designation of product:**
T+ Very toxic
C Corrosive
- **Hazard-determining components of labelling:**
hydrofluoric acid
- **Risk phrases:**
26/27/28 Very toxic by inhalation, in contact with skin and if swallowed.
35 Causes severe burns.
37 Irritating to respiratory system.
- **Safety phrases:**
26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
27/28 After contact with skin, take off immediately all contaminated clothing, and wash immediately with plenty of water.
36/37/39 Wear suitable protective clothing, gloves and eye/face protection.
45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
60 This material and its container must be disposed of as hazardous waste.

16 Other information

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 MSDS:** Toxicology and Product Regulatory
- **Contact:** <http://www.daikin.com/>
- **Abbreviations and acronyms:**
GHS: Globally Harmonized System of Classification and Labelling of Chemicals
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent

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