1. Product and Company Identification

Material name: HYDROCHLORIC ACID
Version #: 04
Revision date: 09-01-2011
CAS #: Mixture
Product Codes: J.T.Baker: 0325, 0335, 0336, 0345, 4655, 5612, 5616, 5620, 5622, D010, D011, XL231, XL232, XL252
Macron: 6388

Synonym(s): Muriatic acid solution * Dilute hydrochloric acid
Manufacturer: Avantor Performance Materials, Inc.
Address: 3477 Corporate Parkway
            Suite #200
            Center Valley, PA 18034
            US

Customer Service: 855-282-6867
24 Hour Emergency: 908-859-2151
Chemtrec: 800-424-9300

2. Hazards Identification

Emergency overview: DANGER
Corrosive. Causes severe skin and eye burns. Causes digestive tract burns. Mist or vapor extremely irritating to eyes and respiratory tract.

OSHA regulatory status: This product is considered hazardous under 29 CFR 1910.1200 (Hazard Communication).

Potential health effects:

Routes of exposure: Ingestion. Inhalation. Skin contact. Eye contact.

Eyes: Corrosive. Causes severe eye burns. Vapor or spray may cause eye damage, impaired sight or blindness.

Skin: Corrosive. Causes severe skin burns.

Inhalation: Corrosive. May cause damage to mucous membranes in nose, throat, lungs and bronchial system.

Ingestion: Corrosive. Ingestion may produce burns to the lips, oral cavity, upper airway, esophagus and possibly the digestive tract.

Target organs: Eyes. Skin. Lungs. Respiratory system.

Chronic effects: Corrosive. Prolonged contact causes serious tissue damage.

Potential environmental effects: The product may affect the acidity (pH-factor) in water with risk of harmful effects to aquatic organisms.

3. Composition / Information on Ingredients

<table>
<thead>
<tr>
<th>Hazardous components</th>
<th>CAS #</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>HYDROCHLORIC ACID</td>
<td>7647-01-0</td>
<td>&lt; 10</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Non-hazardous components</th>
<th>CAS #</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>WATER</td>
<td>7732-18-5</td>
<td>&gt; 90</td>
</tr>
</tbody>
</table>
4. First Aid Measures

First aid procedures

**Eye contact**
Immediately flush with plenty of water for at least 15 minutes. If easy to do, remove contact lenses. Call a physician or poison control center immediately. In case of irritation from airborne exposure, move to fresh air. Get medical attention immediately.

**Skin contact**
Immediately flush with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Call a physician or poison control center immediately. Wash clothing separately before reuse. Destroy or thoroughly clean contaminated shoes.

**Inhalation**
Move to fresh air. If breathing stops, provide artificial respiration. If breathing is difficult, give oxygen. Call a physician or poison control center immediately.

**Ingestion**
Call a physician or poison control center immediately. Do not induce vomiting. If vomiting occurs, the head should be kept low so that stomach vomit doesn't enter the lungs.

Notes to physician
Keep victim under observation. Treat symptomatically.

General advice
In the case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). Show this safety data sheet to the doctor in attendance. Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

5. Fire Fighting Measures

**Flammable properties**
The product is not flammable. No unusual fire or explosion hazards noted.

**Extinguishing media**

**Suitable extinguishing media**
Water. Carbon dioxide (CO2). Dry chemical powder. Foam.

**Unsuitable extinguishing media**
None known.

**Protection of firefighters**

**Specific hazards arising from the chemical**
Fire may produce irritating, corrosive and/or toxic gases.

**Protective equipment and precautions for firefighters**
Use water spray to cool unopened containers. Self-contained breathing apparatus and full protective clothing must be worn in case of fire. Cool containers exposed to flames with water until well after the fire is out.

**Special protective equipment for fire-fighters**
Wear full protective clothing, including helmet, self-contained positive pressure or pressure demand breathing apparatus, protective clothing and face mask. Wear self-contained breathing apparatus with a full facepiece operated in the positive pressure demand mode when fighting fires.

**Specific methods**
In the event of fire and/or explosion do not breathe fumes.

6. Accidental Release Measures

**Personal precautions**
Wear appropriate protective equipment and clothing during clean-up. Keep upwind. Keep out of low areas. Ventilate closed spaces before entering them. Local authorities should be advised if significant spillages cannot be contained.

**Environmental precautions**
Prevent further leakage or spillage if safe to do so. Avoid discharge into drains, water courses or onto the ground.

**Methods for containment**
Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Prevent entry into waterways, sewer, basements or confined areas.
Methods for cleaning up

Large Spills: Dike far ahead of spill for later disposal. Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal.

Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.

Never return spills in original containers for re-use. Clean up in accordance with all applicable regulations. Neutralize spill area and washings with soda ash or lime. Collect in a non-combustible container for prompt disposal.

J. T. Baker NEUTRASORB® acid neutralizers are recommended for spills of this product.

7. Handling and Storage

Handling

Do not breathe mist or vapor. Do not get in eyes, on skin, on clothing. Do not taste or swallow. Use only with adequate ventilation. Wash thoroughly after handling. Do not eat, drink or smoke when using the product. Use caution when combining with water; DO NOT add water to acid, ALWAYS add acid to water while stirring to prevent release of heat, steam and fumes.

Storage

Do not store in metal containers. Keep tightly closed in a dry, cool and well-ventilated place.

8. Exposure Controls / Personal Protection

ACGIH

Components | Type | Value
---|---|---
HYDROCHLORIC ACID (7647-01-0) | Ceiling | 2.0000 ppm

Occupational exposure limits

U.S. - OSHA

Components | Type | Value
---|---|---
HYDROCHLORIC ACID (7647-01-0) | Ceiling | 5.0000 ppm
| | | 7.0000 mg/m³

Engineering controls

Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

Personal protective equipment

Eye / face protection

Wear safety glasses with side shields (or goggles) and a face shield.

Skin protection

Wear appropriate chemical resistant clothing. Wear appropriate chemical resistant gloves.

Respiratory protection

If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn. Respirator type: Chemical respirator with acid gas cartridge.

General hygiene considerations

Provide eyewash station and safety shower. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

General

Wear chemical protective equipment that is specifically recommended by the manufacturer. Launder contaminated clothing before reuse.

9. Physical & Chemical Properties

Appearance

Clear.

Color

Colorless.

Odor

Pungent.

Odor threshold

Not available.

Physical state

Liquid.

Form

Liquid.
pH 1.1
Melting point -0.4 - 32 °F (-18 - 0 °C)
Freezing point -0.4 - 32 °F (-18 - 0 °C)
Boiling point 212 - 217.4 °F (100 - 103 °C)
Flash point Not available.
Flammability limits in air, upper, % by volume Not available.
Flammability limits in air, lower, % by volume Not available.
Specific gravity 1 - 1.05
Relative density Not available.
Solubility (water) Complete
Partition coefficient (n-octanol/water) Not available
Auto-ignition temperature Not available.
Decomposition temperature Not available.
Molecular weight 36.46 g/mol
Molecular formula HCl

10. Chemical Stability & Reactivity Information

Material is stable under normal conditions.
Reacts violently with strong alkaline substances. This product may react with reducing agents. Do not mix with other chemicals. This product may react with oxidizing agents. Unsuitable containers: metals.
Hazardous decomposition products Hydrogen chloride. Chlorine. May decompose upon heating to produce corrosive and/or toxic fumes.
Possibility of hazardous reactions Hazardous polymerization does not occur.

11. Toxicological Information

Toxicological data

<table>
<thead>
<tr>
<th>Product</th>
<th>Test Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>HYDROCHLORIC ACID (Mixture)</td>
<td>Acute Inhalation LC50 Rat: 39050 mg/l estimated&lt;br&gt;Acute Oral LD50 Rabbit: 11250 mg/kg estimated</td>
</tr>
</tbody>
</table>

Components

<table>
<thead>
<tr>
<th>HYDROCHLORIC ACID (7647-01-0)</th>
<th>Test Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute Inhalation LC50 Rat: 3124 mg/l 1.00 Hours</td>
<td></td>
</tr>
</tbody>
</table>

Sensitization Not a skin sensitizer.
Acute effects Corrosive. Prolonged contact causes serious tissue damage.
Local effects Causes severe burns.
Chronic effects Corrosive. Prolonged contact causes serious tissue damage.
Carcinogenicity This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.

ACGIH Carcinogens
HYDROCHLORIC ACID (CAS 7647-01-0) A4 Not classifiable as a human carcinogen.
IARC Monographs. Overall Evaluation of Carcinogenicity
HYDROCHLORIC ACID (CAS 7647-01-0) 3 Not classifiable as to carcinogenicity to humans.
Skin corrosion/irritation Corrosive to skin and eyes.
Epidemiology No epidemiological data is available for this product.
Mutagenicity

No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.

Neurological effects

No data available for this product.

Reproductive effects

Contains no ingredient listed as toxic to reproduction

Teratogenicity

No data available to indicate product or any components present at greater than 0.1% may cause birth defects.

Symptoms and target organs

Corrosive effects.

Further information

Danger of very serious irreversible effects. Symptoms may be delayed.

12. Ecological Information

Ecotoxicological data

<table>
<thead>
<tr>
<th>Product</th>
<th>Test Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>HYDROCHLORIC ACID (Mixture)</td>
<td></td>
</tr>
<tr>
<td>Components</td>
<td></td>
</tr>
<tr>
<td>HYDROCHLORIC ACID (7647-01-0)</td>
<td>LC50 Western mosquitofish (Gambusia affinis): 282 mg/l 96.00 hours</td>
</tr>
</tbody>
</table>

Ecotoxicity

The product may affect the acidity (pH-factor) in water with risk of harmful effects to aquatic organisms.

Persistence and degradability

Expected to be readily biodegradable.

Partition coefficient (n-octanol/water)

Not available

13. Disposal Considerations

Waste codes

D002: Waste Corrosive material [pH <=2 or =>12.5, or corrosive to steel]

Disposal instructions

Dispose of this material and its container to hazardous or special waste collection point. Incinerate the material under controlled conditions in an approved incinerator. All wastes must be handled in accordance with local, state and federal regulations.

Contaminated packaging

Since emptied containers retain product residue, follow label warnings even after container is emptied. Offer rinsed packaging material to local recycling facilities.

14. Transport Information

DOT

Basic shipping requirements:

UN number                  UN1789
Proper shipping name       Hydrochloric acid solution
Hazard class               8
Packing group              II

Additional information:

Special provisions          A3, A6, B3, B15, IB2, N41, T8, TP2, TP12

Basic shipping requirements:

Labels required            8

Additional information:

Packaging exceptions       154
Packaging non bulk         202
Packaging bulk             242
ERG number                 157

IATA

Basic shipping requirements:

UN number                  1789
Proper shipping name       Hydrochloric acid solution
15. Regulatory Information

US federal regulations
This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200. All components are on the U.S. EPA TSCA Inventory List.

US EPCRA (SARA Title III) Section 302 - Extremely Hazardous Spill: Reportable quantity
HYDROCHLORIC ACID (CAS 7647-01-0) 5000 LBS

US EPCRA (SARA Title III) Section 302 - Extremely Hazardous Substance: Threshold Planning Quantity
HYDROCHLORIC ACID (CAS 7647-01-0) 500 LBS

US EPCRA (SARA Title III) Section 313 - Toxic Chemical: De minimis concentration
HYDROCHLORIC ACID (CAS 7647-01-0) 1.0 %

US EPCRA (SARA Title III) Section 313 - Toxic Chemical: Listed substance
HYDROCHLORIC ACID (CAS 7647-01-0) Listed.

CERCLA (Superfund) reportable quantity
HYDROCHLORIC ACID: 5000.0000

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories
Immediate Hazard - Yes
Delayed Hazard - No
Fire Hazard - No
Pressure Hazard - No
Reactivity Hazard - No

Inventory status
Yes

Material name: HYDROCHLORIC ACID
MSDS ID: H3883  Version #: 04  Revision date: 09-01-2011
<table>
<thead>
<tr>
<th>Country(s) or region</th>
<th>Inventory name</th>
<th>On inventory (yes/no)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Japan</td>
<td>Inventory of Existing and New Chemical Substances (ENCS)</td>
<td>Yes</td>
</tr>
<tr>
<td>Korea</td>
<td>Existing Chemicals List (ECL)</td>
<td>Yes</td>
</tr>
<tr>
<td>New Zealand</td>
<td>New Zealand Inventory</td>
<td>Yes</td>
</tr>
<tr>
<td>Philippines</td>
<td>Philippine Inventory of Chemicals and Chemical Substances (PICCS)</td>
<td>Yes</td>
</tr>
<tr>
<td>United States &amp; Puerto Rico</td>
<td>Toxic Substances Control Act (TSCA) Inventory</td>
<td>Yes</td>
</tr>
</tbody>
</table>

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)*

**State regulations**

This product does not contain a chemical known to the State of California to cause cancer, birth defects or other reproductive harm.

**US - New Jersey Community RTK (EHS Survey): Reportable threshold**

HYDROCHLORIC ACID (CAS 7647-01-0) 500 LBS

**US - Pennsylvania RTK - Hazardous Substances: Listed substance**

HYDROCHLORIC ACID (CAS 7647-01-0) Listed.

**Saf-T-Data**

- Health: 3 - Severe
- Flammability: 0 - None
- Reactivity: 1 - Slight
- Contact: 4 - Extreme (Corrosive)

Lab Protective Equip: D - GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES

Storage Color Code: W - White (Corrosive)

**16. Labeling Info**

**Label Hazard Warning**

DANGER

Corrosive. Causes severe skin and eye burns. Causes digestive tract burns. Mist or vapor extremely irritating to eyes and respiratory tract.

**Label Precautions**

Do not breathe mist or vapor. Do not get in eyes, on skin, or on clothing. Use only with adequate ventilation. Keep container closed. Wash thoroughly after handling.

**Label First Aid**

Immediately flush eyes with plenty of water for at least 15 minutes. Immediately flush skin with plenty of water. If gas/fume/vapor/dust/mist from the material is inhaled, remove the affected person immediately to fresh air. Get medical attention immediately. IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. Do not induce vomiting without advice from poison control center. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs. Do not use mouth-to-mouth method if victim ingested the substance.

**17. Other Information**

**NFPA ratings**

- Health: 3
- Flammability: 0
- Instability: 0
THE INFORMATION PRESENTED IN THIS MATERIAL SAFETY DATA SHEET (MSDS/SDS) WAS PREPARED BY TECHNICAL PERSONNEL BASED ON DATA THAT THEY BELIEVE IN THEIR GOOD FAITH JUDGMENT IS ACCURATE. HOWEVER, THE INFORMATION PROVIDED HEREIN IS PROVIDED “AS IS,” AND AVANTOR PERFORMANCE MATERIALS MAKES AND GIVES NO REPRESENTATIONS OR WARRANTIES WHATSOEVER, AND EXPRESSLY DISCLAIMS ALL WARRANTIES REGARDING SUCH INFORMATION AND THE PRODUCT TO WHICH IT RELATES, WHETHER EXPRESS, IMPLIED, OR STATUTORY, INCLUDING WITHOUT LIMITATION, WARRANTIES OF ACCURACY, COMPLETENESS, MERCHANTABILITY, NON-INFRINGEMENT, PERFORMANCE, SAFETY, SUITABILITY, STABILITY, AND FITNESS FOR A PARTICULAR PURPOSE, AND ANY WARRANTIES ARISING FROM COURSE OF DEALING, COURSE OF PERFORMANCE, OR USAGE OF TRADE. THIS MSDS/SDS IS INTENDED ONLY AS A GUIDE TO THE APPROPRIATE PRECAUTIONARY HANDLING OF THE MATERIAL BY A PROPERLY TRAINED PERSON USING THIS PRODUCT, AND IS NOT INTENDED TO BE COMPREHENSIVE AS TO THE MANNER AND CONDITIONS OF USE, HANDLING, STORAGE, OR DISPOSAL OF THE PRODUCT. INDIVIDUALS RECEIVING THIS MSDS/SDS MUST ALWAYS EXERCISE THEIR OWN INDEPENDENT JUDGMENT IN DETERMINING THE APPROPRIATENESS OF SUCH ISSUES. ACCORDINGLY, AVANTOR PERFORMANCE MATERIALS ASSUMES NO LIABILITY WHATSOEVER FOR THE USE OF OR RELIANCE UPON THIS INFORMATION. NO SUGGESTIONS FOR USE ARE INTENDED AS, AND NOTHING HEREIN SHALL BE CONSTRUED AS, A RECOMMENDATION TO INFRINGE ANY EXISTING PATENTS OR TO VIOLATE ANY FEDERAL, STATE, LOCAL, OR FOREIGN LAWS. AVANTOR PERFORMANCE MATERIALS REMINDS YOU THAT IT IS YOUR LEGAL DUTY TO MAKE ALL INFORMATION IN THIS MSDS/SDS AVAILABLE TO YOUR EMPLOYEES.

Issue date
09-01-2011

Material name: HYDROCHLORIC ACID
MSDS US COV
MSDS ID: H3883  Version #: 04  Revision date: 09-01-2011