

# MURIATIC ACID (Aqueous Hydrochloric Acid)

## Burner Grade

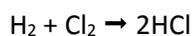
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|-------------------|--|--|
| CAS Number:       | 7647-01-0  | Refer to the Safety Data Sheet (SDS) for additional information and before handling this material. |
| Synonyms:         | hydrochloric acid, muriatic acid, HCl  |  |
| Chemical Formula: | HCl, aqueous   |  |
| Molecular Weight: | 36.46  |  |
| Description:      | Muriatic acid is a clear, colorless to slightly yellow liquid and has a pungent irritating odor. |  |

### Product Overview

Muriatic acid is an aqueous hydrogen chloride solution that is a strong, highly corrosive acid. It is a common mineral acid which has a variety of uses. Axiall produces burner grade muriatic acid at several plants across North America and in several concentrations. Burner grade acid is produced in dedicated purpose-built production lines to create a quality product that is ideal for applications in which a reliable, tightly specified, high purity acid is essential to the final product. Muriatic acid is also produced in North America as a “byproduct” of other chemical processes. Byproduct acid can have higher levels of impurities, and availability can vary depending on the inherent parent production process.

### Production

Axiall produces well over 90% of its aqueous hydrochloric acid, or muriatic acid, directly via dedicated burner units. This burner acid is produced from chlorine and hydrogen from the chlor-alkali process to provide a reliable supply of high quality, pure acid. In this process, hydrogen and chlorine are passed through a burner nozzle and ignited in a graphite combustion chamber to produce clean, high quality gaseous hydrochloric acid.



The gas is then cooled, absorbed in demineralized water, and diluted to specified concentrations, for which the industry typically refers to the product specific gravity represented as degrees Baumé. The relationship between these is shown in the following table.

| Approximate HCl Concentration | Degrees Baumé |
|-------------------------------|---------------|
| 26.5 % - 29.5%                | 18            |
| 29.0 % - 31.0%                | 19            |
| 31.5 % - 32.9%                | 20            |
| 35.2 % - 36.2%                | 22            |
| 37.1 % - 38.0%                | 23            |

### Uses

As one of the common mineral acids, muriatic acid has a variety of merchant uses. It is commonly used as a strong non-oxidizing acid in industrial segments. The largest of these are in food processing, oil and gas well acidizing, chemical production, and steel pickling. Axiall’s burner-grade muriatic acid makes it ideal for

consumption where consistency and purity are key to the final product. With all downstream applications, appropriate registrations and/or approvals may be required. Possible uses are described below:

- **Steel and Metals Producers** - The steel and metal industry use muriatic acid for pickling steel to remove mill scale (or surface oxides). Most steel is also cleaned, or fluxed, in acid before galvanizing, tinning, and other coating applications.
- **Petroleum and Natural Gas** - The oil and gas industry uses muriatic acid to acidize oil wells. The acid increases and stimulates oil production by dissolving calcium and magnesium carbonate bedrock to produce fissures, or pores, in the oil bearing rock formation. These pores make them more permeable to oil and gas flow into the well casing. Muriatic is a key ingredient in fluids used to fracture (or “frac”) shale formations to liberate natural gas and oil.
- **Pharmaceuticals** - The pharmaceutical industry consumes muriatic acid as a catalyst, for pH control, water treatment, and as a reducing agent in production.
- **Organic Chemical Synthesis** - Chemical manufacturers react muriatic acid to form chlorides and hydrochloride or as a pH regulator for process and effluent streams.
- **Water and Wastewater Treatment** - Muriatic acid is used to control pool water and industrial waste water pH and to clean commercial pool plasters and masonry.
- **Brine Treatment** - Muriatic acid is used to purify and adjust the pH of brine prior to chlorine/sodium hydroxide production.
- **Food Additives and Processing** - The food industry uses muriatic acid in a variety of products, the majority of which is the production of high fructose corn syrup. It is also used to produce vitamin supplements in animal feed, saccharin and aspartame, and in the processing of gelatin, vegetable and fruit juices, and canned goods.
- **Ore and Mineral Processing** - Mining operations use muriatic acid for ore treatment, extraction and separation, purification and water treatment. Mineral processing requires muriatic acid for the recovery of gold and molybdenum, as well as in the production of tungsten metals and chemicals. Muriatic acid is also used in potash ore, zirconium, and uranium production.

## Health Effects

Read and follow all instructions on the product label and review the Safety Data Sheet (SDS) to understand and avoid the hazards associated with muriatic acid. Wear appropriate personal protective equipment and avoid direct contact. Eye contact with muriatic acid causes serious eye damage; repeated or prolonged exposure to corrosive materials or fumes may cause conjunctivitis. Skin contact causes severe burns; repeated or prolonged exposure to skin will cause dermatitis. Muriatic acid is harmful if swallowed and may cause irreversible damage to mucous membranes; repeated or prolonged exposure to corrosive materials or fumes may cause gastrointestinal disturbances. Inhalation of muriatic acid may cause respiratory irritation; repeated or prolonged exposure to corrosive fumes may cause bronchial irritation with chronic cough.

The United States Occupational Safety and Health Administration (OSHA) and the American Conference of Governmental Industrial Hygienists (ACGIH) have established or recommended occupational airborne exposure limits for muriatic acid. The OSHA Permissible Exposure Limit (PEL) is a Ceiling Limit of 5 ppm (parts per million) and the ACGIH Threshold Limit Value (TLV) is a Ceiling Limit of 2 ppm. A Ceiling Limit should not be exceeded during any part of the working exposure.

Before handling, it is important that engineering controls are operating and protective equipment requirements and personal hygiene measures are being followed. People working with this chemical should be properly

trained regarding its hazards and its safe use and should be given the opportunity to review this document and the safety data sheet.

## Environmental Effects

Muriatic Acid should be kept out of lakes, streams, ponds, or other water sources. Muriatic acid does not bioaccumulate due to its high solubility in water.

## Exposure Potential

Precautions should be taken to minimize potential harm to people, animals and the environment. Potential for exposure may vary depending upon site-specific conditions. When handling muriatic acid, refer to the Safety Data Sheet and Product Warning Label and follow all instructions and warnings. Based on the expected uses for muriatic acid, exposure could be through:

- **Workplace exposure** - Exposure can occur either in a muriatic acid manufacturing facility or in the various industrial facilities that use muriatic acid. When exposures occur, they are most frequently to the skin and eyes, although oral exposure and ingestion are possible. Good industrial hygiene practices and the use of personal protective equipment will, when combined with proper training and environmental, health and safety practices, contribute to a safe work environment.
- **Environmental releases** - In the event of a spill, contain the spill to prevent contaminated soil, surface or ground water. Muriatic acid can significantly decrease the pH of soil and/or water. Industrial spills (releases to soil or water) should be controlled by workplace spill programs which include containment around loading and unloading operations and storage tanks and employee training. Many aspects of a spill control program are mandated by federal, state and local requirements. In addition, if a spill occurs, governmental reporting may be required. Refer to the Safety Data Sheet for instructions to contain and clean up a spill to minimize exposure.
- **Consumer exposure** - Muriatic acid is not sold directly to consumers; however it is an ingredient in some consumer products. Keep all chemical products out of the reach of children.

## Safe Handling and Storage

Always take precautions to minimize potential harm to people, animals, and the environment. When making solutions or diluting, muriatic acid should only be added slowly to the surface of cold water while stirring. Add the acid slowly with agitation to prevent local hot spots. Avoid contact with alkalis as this may cause violent reactions.

Muriatic acid attacks certain metals; the reaction may be dangerous because hydrogen is generated and may introduce an explosion hazard. Bulk storage tanks should be constructed of corrosion-resistant materials such as rubber or glass-lined steel, fiberglass, or plastic and should be vented to a scrubber to remove acid fumes.

## Packaging and Shipping

Axiall ships muriatic acid in tank cars and tank trucks.

- **Tank car** - Single compartment rail cars are available with nominal capacities of 95 wet tons
- **Tank trucks** - Axiall ships muriatic acid in bulk tanks trucks with a capacity of 20 wet tons in the United States and from 20 to 40 wet tons in Canada.

## Fire and Explosion Hazards

Muriatic acid by itself is nonflammable and nonexplosive. However, muriatic acid attacks many metals producing extremely flammable hydrogen gas which can form explosive mixtures with air.

During a fire, promptly isolate the scene by removing all persons from the vicinity of the incident. No other action shall be taken without suitable training. Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.

## Physical and Chemical Properties

Muriatic acid is a clear, fuming liquid with an irritating odor. It is completely miscible with water. When mixing with water, extreme heat of reaction will occur. Always add small amounts of acid to large amounts of water, with constant agitation to allow heat to dissipate. Vapor from the acid is highly irritating to the respiratory tract.

| Properties of Muriatic Acid            | 18 Baume    | 20 Baume    | 22 Baume    | 23 Baume    |
|--|-------------|-------------|-------------|-------------|
| <b>Concentration Range (% HCl)</b>     | 26.5 - 29.5 | 31.5 - 32.9 | 35.2 - 36.2 | 37.1 - 38.0 |
| <b>Boiling Point</b>                   | 100°C       | 84°C        | 61°C        | 48°C        |
| <b>Freezing Point</b>                  | -58°C       | -44.5°C     | -32°C       | -27°C       |
| <b>Vapor Pressure (mm Hg)</b>          | 14          | 24          | 100         | 150         |
| <b>Specific Gravity</b>                | 1.142       | 1.160       | 1.179       | 1.189       |
| <b>Bulk Density (lbs/gal @ 15.6°C)</b> | 9.5         | 9.7         | 9.8         | 9.9         |

## Regulatory Information

The muriatic acid Safety Data Sheet contains regulatory information, including Chemical Inventory Status, California Proposition 65 status, and Transportation Classifications. The following is additional regulatory information.

### North American Regulatory Information

- **FDA Status** - Muriatic acid is Generally Recognized as Safe (GRAS) when used as a buffer and neutralizing agent and when used in accordance with good manufacturing practices (21 CFR 182.1057).
- **CONEG Regulation/Model Toxics in Packaging Legislation** - Not determined.
- **RCRA** - Commercial grade muriatic acid, if discarded or spilled, as well as other wastes generated during use of muriatic acid or containing muriatic acid may exhibit one or more hazardous waste characteristics under 40 CFR 261.24, including D002 - corrosive. (Note: Axiall provides information on U.S. hazardous waste criteria for the product as manufactured. It remains the obligation of the user to evaluate their specific waste and to manage, treat, and dispose of unused material, residues, and containers in accordance with applicable federal, state, and local requirements.)
- **VOC Information** - Muriatic acid does not contain constituents that qualify as volatile organic compounds (VOC) based on the definition in 40 CFR 51.100.
- **HAP Information** - Muriatic acid is listed as a hazardous air pollutant (HAPs) in the Clean Air Act Amendments of 1990, 42 USC 7412 (b).
- **Ozone-Depleting Chemicals** - Muriatic acid is not/does not contain ozone depleting chemicals (40 CFR 82, Subpart A, Appendix F)

- **CERCLA Hazardous Substance** - Muriatic acid (hydrogen chloride) appears in the List of Hazardous Substances and Reportable Quantities table (40 CFR 302.4) with a reportable quantity (RQ) of 5,000 pounds (2270 Kg).
- **Canadian Food Inspection Agency (CFIA)/Agence Canadienne d'Inspection des Aliments (ACIA)** - Muriatic acid manufactured at Beauharnois, Quebec, Canada is acceptable for use with food in Registered Establishments per CFIA provided that the label instructions are followed.
- **FDA Bioterrorism Act of 2002 Section 305 (Registration of Food Facilities)** - The following facilities have been registered with the FDA: Beauharnois, Quebec, Canada (Registration Number 19271135316), Lake Charles, Louisiana, USA (Registration Number 14461027778), Longview, Washington, USA (Registration Number 15630199746), Plaquemine, Louisiana, USA (Registration Number 11208062940) and New Martinsville, WV, USA (Registration Number 11696337946).
- **TSCA Information** - Muriatic acid is not currently subject to any rule or order under TSCA Sections 4,5,7,8(a), or 8(d).

## Other Regulatory Information

- **RoHS/WEEE** - Muriatic acid has been reviewed with regard to the EU Directive 2011/65/EU "Restriction on the Use of Certain Hazardous Substances" (RoHS 2). Based on our knowledge of this product and information on the raw material suppliers' Safety Data Sheets, this product does not contain cadmium, hexavalent chromium, lead, mercury, polybrominated biphenyls (PBBs) or polybrominated diphenyl ethers (PBDEs) at levels greater than the tolerated maximum concentration values established by the directive.

## Product Certifications and Listings

- **NSF Standard 60 Drinking Water Treatment Chemicals** - Muriatic acid has the Health Effects listing, and is certified for maximum use levels as noted on the NSF website, which can be viewed at [www.nsf.org/certified/PwsChemicals](http://www.nsf.org/certified/PwsChemicals).
- **Kosher Certification** - Muriatic acid, including the equipment used in its manufacture, does not come into contact with or contain any animal by-products, animal fats, or animal products, nor does it contain chemical additives that are organic in nature. According to the current policies of the Orthodox Union (OU) muriatic acid is acceptable for use in Kosher-related activities without Kosher certification.
- **Halal Certification** - Axiall's Muriatic acid is not Halal certified. However, muriatic acid does not contain alcohol, natural L-cysteine extracted from hair or feathers, animal fats and/or extracts, blood of any origin, blood plasma, or pork/or other meat byproducts. Alcohol is not used as processing aid. As such, this product may be acceptable for Halal consideration.

## Additional Product Information

- **Source** - Muriatic acid is derived from mineral and petroleum sources and has not been derived from plant, animal, synthetic, or fermentation sources
- **Allergenic Materials** - Muriatic acid is not manufactured using any of the following allergenic materials: carmine/cochineal extracts, celery, colors/color additives, dyes/food dyes, eggs/egg products, seafood/fish/shellfish/crustaceans, flavors, gluters, legumes, milk, mollusks, monosodium glutamate (MSG), mustards, plant nuts/seeds/oils (sesame, sunflower, safflower, canola, etc.), peanuts/peanut products, protein hydrolysates, soy/soybeans/soybean products, spices, sulfites, sulfates, tree nuts/tree nut oils, and wheat.

- **Bovine Spongiform Encephalopathy** - Muriatic acid is not of animal origin, and, to Axiall's knowledge, does not contribute to Transmissible Spongiform Encephalopathy (TSE)/Bovine Spongiform Encephalopathy (BSE).
- **Genetically Modified Organisms (GMOs)** - Muriatic acid is not manufactured with and does not contain genetically modified organisms.
- **Natural Latex Rubber** - Muriatic acid is not manufactured with and does not contain natural latex rubber as defined in 21 CFR 801.437(b)(1).
- **Nutritional Value** - Muriatic acid does not have nutritional value.

## Product Stewardship

Axiall Corporation is committed to managing muriatic acid so that it can be safely used by its employees and customers. Axiall's relationships with its customers encourage communication about safety and environmental stewardship.

## Additional Information

For more information regarding Axiall's muriatic acid, contact our customer service department by calling **800-243-6774**. Or, in Canada, contact Axiall Canada Inc., 31 Industry Road, Beauharnois, Quebec J6N 1W5 Canada, 450-429-4641.

## References

- Axiall Corporation Web page: <http://www.axiall.com/>
- Axiall Safety Data Sheets: <http://www.axiall.com/en-US/Products/Safety-Data-Sheets/>

## Notice

Prior to its use, the user is responsible for determining the suitability of the product or products covered by this Product Stewardship Summary and for complying with all federal, state, and local laws and regulations in connection with its use. Neither Axiall Corporation nor any of its affiliates shall be responsible for any damages of any kind whatsoever resulting from the use of or reliance on this Product Stewardship Summary or product or products to which it refers.

This Product Stewardship Summary is intended only to provide a general summary of the potential hazards associated with the product or products described herein. It is not intended to provide detailed information about potential health effects and safe use and handling information and, although Axiall Corporation believes this information is correct, Axiall Corporation makes no warranties as to its completeness or accuracy. Appropriate literature has been assembled which provides information concerning the health and safety precautions that must be observed when handling the Axiall Corporation product(s) mentioned in this document. Before working with any of these products, users must read and become familiar with the available information on product hazards, proper use, and handling. Information is available in several forms, such as safety data sheets (SDS) and product labels. A copy of Axiall's SDS for muriatic acid can be obtained by going to the company's website [www.axiall.com](http://www.axiall.com).

This information is subject to change without notice.

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