ANSI/AWWA **B501-25**

(Revision of ANSI/AWWA B501-19)

AWWA Standard

Sodium Hydroxide (Caustic Soda)

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American Water Works Association

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STANDARD Since 1881

AWWA Standard

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Foreword

This foreword is for information only and is not a part of ANSI/AWWA B501.*

I. Introduction

I.A. *Background*. Sodium hydroxide, NaOH (also known as caustic soda), is available in liquid form in two common concentrations: 50 percent NaOH and 73 percent NaOH. On special request, other solution concentrations, including 25 and 20 percent solutions, are available. Sodium hydroxide is also available as anhydrous sodium hydroxide, containing at least 96 percent NaOH. The 50 percent sodium hydroxide solution begins to crystallize at approximately 54°F (12°C), and the 73 percent concentration begins to crystallize at approximately 145°F (63°C). The 25 percent solution begins to crystallize at approximately 8°F (–13°C).

I.B. *History*. The first edition of this standard for sodium hydroxide was prepared under the direction of the Water Purification Division of AWWA. The first edition was approved by the AWWA Board of Directors on July 1, 1949. On Oct. 15, 1951, the AWWA Board of Directors reaffirmed the standard and designated it as AWWA B501-51T. In 1953, the designation was changed to AWWA B501-53. Subsequent revisions were prepared by the AWWA Standards Committee in 1964, 1975, 1980, 1988, 1993, 1998, 2003, 2008, 2013, and 2019. This edition was approved on Oct. 13, 2025.

I.C. *Acceptance*. In May 1985, the US Environmental Protection Agency (USEPA) entered into a cooperative agreement with a consortium led by NSF International (NSF) to develop voluntary third-party consensus standards and a certification program for direct and indirect drinking water additives. Other members of the original consortium included the Water Research Foundation (formerly AwwaRF) and the Conference of State Health and Environmental Managers (COSHEM). AWWA and the Association of State Drinking Water Administrators (ASDWA) joined later.

In the United States, authority to regulate products for use in, or in contact with, drinking water rests with individual states.[†] Local agencies may choose to impose requirements more stringent than those required by the state. To evaluate the health effects of products and drinking water additives from such products, state and local

* American National Standards Institute, 1180 Avenue of the Americas, 10th Floor, New York, NY 10036.

† Persons outside the United States should contact the appropriate authority having jurisdiction.

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agencies may use various references, including four standards developed under the direction of NSF:[‡] NSF/ANSI/CAN[§] 60, Drinking Water Treatment Chemicals—Health Effects; NSF/ANSI/CAN 61, Drinking Water System Components—Health Effects; NSF/ANSI/CAN 372, Drinking Water System Components—Lead Content; and NSF/ANSI/CAN 600, Health Effects Evaluation and Criteria for Chemicals in Drinking Water.

Various certification organizations may be involved in certifying products in accordance with NSF/ANSI/CAN 60. Individual states or local agencies have authority to accept or accredit certification organizations within their jurisdiction. Accreditation of certification organizations may vary from jurisdiction to jurisdiction.

NSF/ANSI/CAN 600 (which formerly appeared in NSF/ANSI/CAN 60 and 61 as Annex A, "Toxicology Review and Evaluation Procedures") does not stipulate a maximum allowable level (MAL) of a contaminant for substances not regulated by a USEPA final maximum contaminant level (MCL). The MALs of an unspecified list of "unregulated contaminants" are based on toxicity testing guidelines (noncarcinogens) and risk characterization methodology (carcinogens). Use of NSF/ANSI/CAN 600 procedures may not always be identical, depending on the certifier.

ANSI/AWWA B501 addresses additives requirements in Sec. 4.3.2 of the standard. The transfer of contaminants from chemicals to processed water or to residual solids is becoming a problem of great concern. The language in Sec. 4.3.2 is only a recommendation for direct additives used in the treatment of potable water to be certified by an accredited certification organization in accordance with NSF/ANSI/CAN 60, Drinking Water Treatment Chemicals—Health Effects. However, users of the standard may opt to make this certification a requirement for the product. Users of this standard should also consult the appropriate state or local agency having jurisdiction in order to

1. Determine additives requirements, including applicable standards.
2. Determine the status of certifications by parties offering to certify products for contact with, or treatment of, drinking water.
3. Determine current information on product certification.

II. Special Issues

II.A. *Safety*. Sodium hydroxide is usually shipped in insulated tank cars or tank trucks and should arrive at the receiving point in liquid form. Depending on

[‡] NSF International, 789 North Dixboro Road, Ann Arbor, MI 48105.
[§] Standards Council of Canada, 55 Metcalfe Street, Suite 600, Ottawa, ON K1P 6L5 Canada.

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geographical location, tank cars are usually equipped with coils for steam heating. When unloading the sodium hydroxide, carefully follow the manufacturer's unloading procedures. In climates where storage temperatures are below the solidification point for the grade of sodium hydroxide received, the material may be diluted on unloading to a concentration that will not solidify or require heated storage. Softened water should be used to dilute sodium hydroxide to prevent precipitation of calcium carbonate, which can clog feed equipment.

If the anhydrous form of sodium hydroxide is used, it should be carefully dissolved in water to prepare the desired strength of solution. A sodium hydroxide solution may be fed by conventional liquid-chemical-feeding equipment. However, when purchasing chemical-feeding equipment, the fact that a caustic solution is to be handled should be specified.

CAUTION: The handling of sodium hydroxide in all forms involves several extreme hazards. Considerable heat is generated in the dilution process. Therefore, the rate of dilution, methods of cooling, and equipment and piping materials selected should be carefully controlled so that the liquid does not boil, splatter, or result in failure of storage and handling facilities.

Because sodium hydroxide can cause severe burns to the skin and eyes, workers handling sodium hydroxide must wear complete protective equipment. This equipment should include head covering, face shield, chemical workers' goggles, cotton clothing (sodium hydroxide dissolves wool), long-sleeved shirt with buttoned collar, rubber apron, sleeves over rubber gloves, and trousers over rubber work shoes. Emergency shower and eyewash units should be located near feeding and pumping equipment, where sodium hydroxide is sampled, and where tank cars or trucks are connected or disconnected. Refer to safety data sheets (SDSs) available from the chemical supplier or manufacturer for additional information.

III. Use of This Standard. It is the responsibility of the user of an AWWA standard to determine that the products described in that standard are suitable for use in the particular application being considered.

III.A. *Purchaser Options and Alternatives.* The following information should be provided by the purchaser:

1. Standard used—that is, ANSI/AWWA B501, Sodium Hydroxide (Caustic Soda), of latest revision.
2. Quantity required.
3. Whether compliance with NSF/ANSI/CAN 60, Drinking Water Treatment Chemicals—Health Effects, is required.

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4. Details of federal, state, provincial, territorial, and local requirements (Section 4).

5. Type of material—anhydrous or liquid (Sec. 4.1).

6. For liquid sodium hydroxide, the percentage of sodium hydroxide (Sec. 4.2.2).

7. Whether the purchaser will reject product from containers or packaging with missing or damaged seals. The purchaser may reject product from bulk containers or packages with missing or damaged seals unless the purchaser's tests of representative samples, conducted in accordance with Sec. 5.2 through Sec. 5.5, demonstrate that the product meets the standard. Failure to meet the standard or the absence of, or irregularities in, seals may be sufficient cause to reject the shipment.

8. Form of shipment—bulk or package, type, and size (Sec. 6.2).

9. Whether alternative security measures have been adopted to replace or augment the security measures set out in Sec. 6.2.5 and Sec. 6.2.6.

10. Affidavit of compliance, or certified analysis, if required (Sec. 6.3).

III.B. *Modification to Standard.* Any modification to the provisions, definitions, or terminology in this standard must be provided by the purchaser.

IV. Major Revisions. Major revisions made to the standard in this edition include the following:

1. Updates to boilerplate language in the following sections:
   - I.C Acceptance
   - III.A Purchaser Options and Alternatives
   - Section 2 References
   - Section 3 Definitions
   - Section 4 Requirements
   - Sec. 4.3 Impurities

V. Comments. If you have any comments or questions about this standard, please call AWWA Standards and Optimization Programs at 303.794.7711; write to the department at 6666 West Quincy Avenue, Denver, CO 80235-3098; or email standards@awwa.org.

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(Revision of ANSI/AWWA B501-19)

AWWA Standard

Sodium Hydroxide (Caustic Soda)

SECTION 1: GENERAL

Sec. 1.1 Scope

This standard describes sodium hydroxide, anhydrous and liquid, for use in the treatment of potable water, wastewater, and reclaimed water.

Sec. 1.2 Purpose

The purpose of this standard is to provide the minimum requirements for sodium hydroxide, including physical, chemical, sampling, testing, packaging, and shipping requirements.

Sec. 1.3 Application

This standard can be referenced in documents for purchasing and receiving sodium hydroxide and can be used as a guide for testing the physical and chemical properties of sodium hydroxide samples. The stipulations of this standard apply when this document has been referenced and then only to sodium hydroxide used in the treatment of potable water, wastewater, and reclaimed water.

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