

ANSI/AWWA **B300-24**
(Revision of ANSI/AWWA B300-18)

AWWA Standard

Hypochlorites

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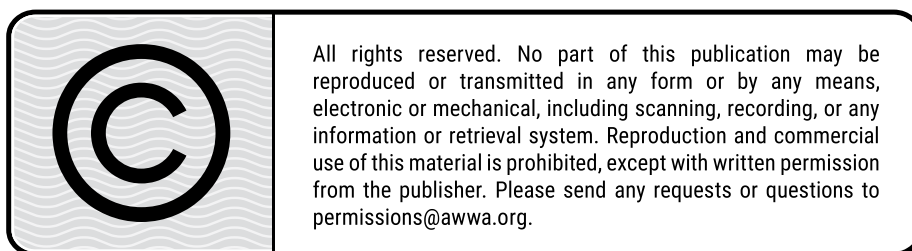
AWWA Standard

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Foreword

This foreword is for information only and is not a part of ANSI /AWWA B300.*

I. Introduction.

I.A. *Background.* “Hypochlorites” is used as an all-inclusive term for chlorinated lime, calcium hypochlorite, and sodium hypochlorite. A concise description of each chemical follows.

Chlorinated lime: 25 to 37 percent available chlorine. Other common names for chlorinated lime are bleaching powder and chloride of lime. Because it is an unstable material and is subject to deterioration from heat and moisture, it is not usually fed dry but as a 2-percent solution. Excess insolubles present in this solution must be separated by decantation before use. Storage in a cool, dry area, for no more than nine months, is advisable. Chlorinated lime is available in 100-lb (45.4-kg), 300-lb (136-kg), and 800-lb (363-kg) drums. Approximately 0.25 lb/gal (30 g/L) of chlorinated lime to water will produce a solution of approximately 1 percent available chlorine.

Calcium hypochlorite: 65 to 70 percent available chlorine. This material is unstable but more stable than the grade with 35 percent available chlorine. It is best fed as a solution. Its theoretical solubility is approximately 22 g/100 mL of water (18 percent) at room temperature; however, its practical solubility use is closer to 3 percent. Decantation is advisable before use because of the excess insolubles present. Storage in a cool, dry area is advisable, but storage periods should not exceed one year. Calcium hypochlorite can lose 3–10 percent available chlorine in one year. It is available in 3- to 5-lb (1.4- to 2.3-kg) cans, 2- to 9-lb (0.9- to 4.1-kg) plastic containers, and 100-lb (45.4-kg) steel drums and in granular powder, granule, and tablet form. Solubility tests that determine both rate and percentage should be conducted with particular emphasis on testing the tablets. Approximately 0.125 lb/gal (15 g/L) of calcium hypochlorite to water produces a solution of approximately 1 percent available chlorine.

Sodium hypochlorite: 12 to 20 percent available chlorine. Other common names for sodium hypochlorite are bleach, liquor, chlorine water, and Javelle water. Sodium hypochlorite will undergo some decomposition over time. There are numerous parameters that affect the rate of decomposition (see The Chlorine Institute[†] Pamphlet 96, *Sodium Hypochlorite Manual*).

* American National Standards Institute, 25 West 43rd Street, Fourth Floor, New York, NY 10036.

† The Chlorine Institute, Inc., 1300 Wilson Boulevard, Suite 525, Arlington, VA 22209.



Table F.1 Chlorine available in sodium hypochlorite

Available Chlorine g/L	Trade % Available Chlorine	Chlorine Equivalent lb/gal	Chlorine Equivalent kg/L	Gallons to Obtain 1 lb Chlorine	Liters to Obtain 1 kg Chlorine
200	20.0	1.630	0.200	0.610	5.000
160	16.0	1.333	0.160	0.752	6.250
150	15.0	1.200	0.150	0.800	6.667
120	12.0	1.000	0.120	1.000	8.333
50	5.0	0.417	0.050	2.400	20.000
10	1.0	0.083	0.010	12.000	100.000

Sample calculation:

12 trade percent available chlorine = 120 grams per liter (g/L) available chlorine

120 g/L $\times$ 3.785 L/gal $\times$ 2.205 lb/1,000 g = 1 lb/gal available chlorine

Sodium hypochlorite is miscible in any proportion with water. It should be stored in a dark area where the temperature does not exceed 80°F (27°C). A 12- to 20-percent solution is still liquid at 0°F (–17.8°C) but is a slush at –20°F (–28.9°C). It is available in 5- and 13-gal (19- and 49-L) carboys (glass or polyethylene), 30-gal (113.6-L) drums, and approximately 5,000-gal (18,926-L) tank trucks. The available chlorine content is as indicated in Table F.1.

I.B. History. The original AWWA Standard for Hypochlorites, prepared for the AWWA Water Purification Division, was approved by the Executive Committee of the Water Purification Division and by the Water Works Practice Committee and received approval by the AWWA Board of Directors on June 2, 1953. It was designated ANSI/AWWA B300-53T.

The initial document was reaffirmed without revision on June 17, 1955, and the designation was changed from ANSI/AWWA B300-53T to ANSI/AWWA B300-55. Subsequent revisions were adopted on June 5, 1964; Jan. 26, 1975; June 15, 1980; and June 14, 1987. This standard was revised by the AWWA Standards Committee on Disinfectants, and ANSI/AWWA B300-99 was approved by the AWWA Board of Directors on June 20, 1999. Subsequent revisions were adopted on June 13, 2004; Jan. 17, 2010; and March 30, 2018. This edition was approved on Jan. 11, 2024.

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 AwwaRE)

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, all hypochlorites used in water disinfection are required to be registered with USEPA under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). Individual states[‡] and local agencies may choose to impose requirements more stringent than those required by USEPA. To evaluate the health effects of products and drinking water additives from such products, state and local 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 B300 addresses additives requirements in Sec. 4.3 of the standard. The transfer of contaminants from chemicals to processed water or the residual solids is becoming a problem of great concern. The language in Sec. 4.3.2 is a recommendation only 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.

[‡] Persons outside the United States should contact the appropriate authority having jurisdiction.

[§] NSF International, 789 North Dixboro Road, Ann Arbor, MI 48105.

[¶] Standards Council of Canada, 55 Metcalfe Street, Suite 600, Ottawa, ON K1P 6L5 Canada.

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. *Storage and Handling Precautions.* Light, heat, organic matter, and certain heavy-metal cations—such as copper, nickel, and cobalt—accelerate the decomposition of hypochlorites. Dampness appreciably decreases the life of metal containers in which the powdered forms are shipped. Hypochlorites should be stored in a cool, dry place, preferably in the dark or out of direct sunlight. They are very active chemically and should be stored in a manner that prevents any possible contact with other materials that are flammable, such as oil, grease, glycerine, or printed matter. When removing hypochlorite from a drum, never use a scoop or vessel that is contaminated with organic matter.

All hypochlorite solutions are corrosive to some degree and will affect the skin and eyes on contact. Any affected areas should be washed with copious amounts of water. Personnel are advised to use caution and to wear protective clothing (i.e., gloves, apron, goggles, and a suitable vapor mask) when handling the solutions. Personnel should refer to the manufacturer's safety data sheets (SDSs) for recommendations regarding personal protective equipment.

Because chlorine gas can be released, never acidify a hypochlorite solution.

Hypochlorite solutions can add chlorate/chlorite ions to potable water. There is some concern about the health effects of chlorate/chlorite. Utilities using these products are advised to test for chlorate/chlorite ions in their water supply.

Perchlorate is another possible contaminant in hypochlorites.

II.B. *Strength of Solutions.* There are several common ways that the concentration of sodium hypochlorite may be expressed. These are listed subsequently with explanations.

1. Available chlorine. The term *available chlorine* came into usage as a means of comparing oxidizers in different applications.

Because chlorine was among the first widely used oxidizers, it became the standard against which other oxidizers were measured. As shown in the following equations, sodium hypochlorite can oxidize the same amount of iodide ion as the chlorine (Cl₂) that it takes to manufacture the sodium hypochlorite.

