

American Water Works Association

ANSI/AWWA B404-98

(Revision of ANSI/AWWA B404-92)



AWWA STANDARD
FOR
LIQUID SODIUM SILICATE



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AMERICAN WATER WORKS ASSOCIATION

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Foreword

This foreword is for information only and is not a part of AWWA B404-98.

I. Introduction.

I.A. *Background.* Sodium silicate solutions have application in the water treatment industry as an ingredient of activated silica coagulant aids, for the control of corrosion, and as a stabilizing agent for iron and manganese.

Sodium silicates are water-soluble glasses, manufactured by fusing soda ash (Na_2CO_3) and specially selected silica sands at high temperatures. These products can be identified by the formula $\text{Na}_2\text{O} \cdot (\text{SiO}_2)_x$, where x can range from 0.5 to 4.0. Sodium silicate solutions (liquid sodium silicates) are usually identified by the weight ratio of their components, which is x in the formula, and their density is frequently reported in degrees Baumé (Bé).*

Commercial liquid sodium silicates include a variety of products ranging in ratio from 1.8 to 3.75, and in density from 35°Bé to approximately 60°Bé (20°C). The most commonly used product for water treatment is a 3.2 weight ratio liquid, usually sold at 40° to 41°Bé, which represents the least expensive source of soluble silica. For use in low pH waters, a lower ratio (more alkaline) silicate is sometimes more useful.

I.B. *History.* The first edition of this standard for liquid sodium silicate was prepared under the direction of the AWWA Water Purification Division. The standard was approved by the Executive Committee of the Water Purification Division and by the Water Works Practice Committee and received the approval of the AWWA Board of Directors on Aug. 5, 1955. The text was approved as tentative on Aug. 5, 1955, and was made standard on Jan. 26, 1958. Subsequent editions were approved by the AWWA Board of Directors on June 15, 1980, June 14, 1987, and June 18, 1992.

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 all direct and indirect drinking water additives. Other members of the original consortium included the American Water Works Association Research Foundation (AWWARF) and the Conference of State Health and Environmental Managers (COSHEM). The American Water Works Association (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 agencies may use various references, including two standards developed under the direction of NSF, ANSI‡/NSF§ 60, Drinking Water Treatment Chemicals—Health Effects, and ANSI/NSF 61, Drinking Water System Components—Health Effects.

*The conversion from degrees Baumé to specific gravity is outlined in Sec. 5.3.4 of the standard.

†Persons in Canada, Mexico, and non-North American countries should contact the appropriate authority having jurisdiction.

‡American National Standards Institute, 11 W. 42nd St., New York, NY 10036.

§NSF International, 3475 Plymouth Rd., Ann Arbor, MI 48106.

Various certification organizations may be involved in certifying products in accordance with ANSI/NSF 60 (61). 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.

Appendix A, "Toxicology Review and Evaluation Procedures," to ANSI/NSF 60 (61) 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 Appendix A procedures may not always be identical, depending on the certifier.

AWWA B404-98 addresses additives requirements in Sec. 4.3.2 of the standard. The transfer of contaminants from chemicals to processed water or the residual solids is becoming a problem of greater 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 ANSI/NSF Standard 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 all 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. Discussion. Liquid sodium silicate is generally shipped in metal drums, tank trucks, or railroad tank cars. Most grades are fluid enough to be pumped easily. These liquids should be stored in closed, vented tanks. Storage tanks should have provisions for keeping the silicate from freezing.

Sodium silicates are normally added to water by means of a chemical feed pump. Diaphragm and piston pumps are satisfactory, but piston pumps should have lantern-ring water glands around the pistons. For some uses, the silicate solutions can be diluted with fresh water before use; this is especially advisable if the silicate is being fed into a brine.

Silica is found to some extent in all natural waters and is believed to be ecologically harmless. The addition of sodium silicate tends to slightly increase the pH and alkalinity of water.

II.B. Safety. Sodium silicate solutions are moderately alkaline. They are not explosive or flammable and are not classified as hazardous in US Department of Transportation (DOT) shipping regulations.

The principal danger of silicate solutions involves contact with the eyes. Protective goggles or face shields should be worn when handling these products. If silicate is splashed into the eyes, flush immediately for 15 min and seek medical attention.

If splashed on the skin, sodium silicate solution should be washed off with water—preferably warm water. If allowed to remain in contact with the skin, irritation may result. Dried deposits of the liquid should be treated with care, since they can cause skin cuts similar to those inflicted by broken glass. Such cuts should be washed with water and given appropriate medical attention to prevent infection.