

American Water Works Association

ANSI/AWWA B701-99

(Revision of ANSI/AWWA B701-94)



AWWA STANDARD
FOR
SODIUM FLUORIDE



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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 B701.

I. Introduction.

I.A. *Background.* Sodium fluoride (NaF) is one of several fluoride compounds presently being added to drinking water to reduce the incidence of dental caries. Since the first fluoridation installation in 1945, studies have shown that dental decay can be reduced by 20 to 40 percent among children who have consumed fluoridated water since birth. Sodium fluoride is a white, odorless material available as a coarse crystalline material or as free-flowing crystals or a combination of both. It is stable at temperatures up to and beyond its melting point (990°C), is nonflammable, and does not react with air or moisture. Its formula weight is 42.00; its specific gravity is 2.79; and its solubility is practically constant at 4g/100 mL of water at the temperatures generally encountered in water treatment plants. The pure material produces solutions with pH values close to 7.0.

Sodium fluoride is generally produced by neutralizing hydrofluoric acid with caustic soda or soda ash. The various particle sizes are obtained by grinding and screening the dried crystals.

Sodium fluoride is proportionally added to the water being treated as a dry, coarse crystalline material or as a solution of varying strength. Its constant solubility is particularly valuable in producing, automatically and continuously, a saturated solution in a tank specially designed for this purpose. This tank does require a water meter to measure the amount of water that is used to make up a solution of known strength.

Refer to AWWA Manual M4, *Water Fluoridation Principles and Practices*,* for additional technical information concerning the use of sodium fluoride.

I.B. *History.* The AWWA Standard for Sodium Fluoride was tentatively approved by the AWWA Board of Directors on July 21, 1950. The second, third, fourth, fifth, and sixth editions were approved on May 15, 1960; Jan. 24, 1971; Jan. 28, 1978; Jan. 30, 1984; Jan. 29, 1989; and Jan. 30, 1994, respectively. This edition was prepared by the AWWA Standards Committee on Fluorides and was approved on June 20, 1999.

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 these products, state

* *Water Fluoridation Principles and Practices*, AWWA Manual M4, AWWA, Denver, Colo. (1995).

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

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.

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 B701-99 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 greater concern. The language in Sec. 4.3.5 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. *Storage and Handling Precautions.* Sodium fluoride chemicals must be stored in a clean, dry location that is well ventilated. Sodium fluoride has a tendency to compact or cake when exposed to moisture, when bags are stacked too high, or during long periods of storage. Bags of sodium fluoride should be stored on pallets in stacks not more than six bags high.

Sodium fluoride is hazardous if swallowed or inhaled in large amounts. Ingestion of 4 to 5 g of fluoride ion (F⁻) per 150 lb (69 kg) body weight may be fatal. The inhalation of sodium fluoride dust should be avoided. Protective safety gear should be worn when handling sodium fluoride. The following protective clothing and equipment should be the minimum available:

1. A National Institute for Occupational Safety and Health/Mine Safety Health Administration (NIOSH/MSHA) approved, high-efficiency dust respirator (chemical mask) with a soft rubber face-to-mask seal and replaceable cartridges.[‡]

^{*}American National Standards Institute, 11 W. 42nd St., New York, NY 10036.

[†]NSF International, 3475 Plymouth Rd., Ann Arbor, MI 48106.

[‡]NIOSH/MSHA approval is given to various masks. Each brand is evaluated by NIOSH/MSHA for the proposed use and conditions. Available from the National Institute of Occupational Safety and Health, 4676 Columbia Parkway, Cincinnati, OH 45226; or Mine Safety Health Administration, 4015 Wilson Boulevard, Arlington, VA 22203.