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American Water Works Association

The Authoritative Resource on Safe Water℠

AWWA Standard

Sodium Fluoride

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AWWA Standard

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Committee Personnel

The AWWA Standards Committee on Fluorides, which reviewed and approved this standard, had the following personnel at the time of approval:

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All AWWA standards follow the general format indicated subsequently. Some variations from this format may be found in a particular standard.

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Foreword

This Foreword is for information only and is not a part of ANSI/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, 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 4 g/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. Subsequent revisions to ANSI/AWWA B701were approved by the AWWA Board of Directors on May 15, 1960; Jan. 24, 1971; Jan. 28, 1978; Jan. 30, 1984; Jan. 29, 1989; Jan. 30, 1994; and

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

June 20, 1999. This ninth edition was prepared by the AWWA Standards Committee on Fluorides and was approved on Feb. 12, 2006.

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 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 and local agencies may use various references, including two standards developed under the direction of NSF, NSF†/ANSI‡ 60, Drinking Water Treatment Chemicals—Health Effects, and NSF/ANSI 61, Drinking Water System Components—Health Effects.

Various certification organizations may be involved in certifying products in accordance with NSF/ANSI 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.

Annex A, "Toxicology Review and Evaluation Procedures," to NSF/ANSI 60 does not stipulate single product allowable concentration (SPAC) values of a contaminant for substances not regulated by a USEPA final maximum contaminant level (MCL). The SPACs of an unspecified list of "unregulated contaminants" are based on toxicity testing guidelines (noncarcinogens) and risk characterization methodology (carcinogens). Use of Annex A procedures may not always be identical, depending on the certifier.

ANSI/AWWA B701 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. 4.3.3 is a

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

†NSF International, 789 N. Dixboro Road, Ann Arbor, MI 48105.

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

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 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 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.*
2. Gauntlet neoprene gloves (12-in. [300-mm] minimum glove length).
3. Heavy-duty neoprene aprons.

Spills should be cleaned up immediately. Personnel should wash thoroughly after handling fluoride chemicals. For additional safety aspects, refer to material safety data sheets (MSDS) available from the chemical supplier or manufacturer.

*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.

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 items should be provided by the purchaser:

1. Standard used—that is, ANSI/AWWA B701, Standard for Sodium Fluoride, of latest revision.
2. Whether the recommended compliance with NSF/ANSI 60, Drinking Water Treatment Chemicals—Health Effects, is required.
3. Quantity required.
4. Additional impurity limits if required. If additional impurity limits are required by the purchaser, the purchaser must state the test procedures to be used to determine compliance with the limits (Sec. I.C and Sec. 4.3.4).
5. Physical form desired—coarse crystalline—and required mesh sizes (Sec. 4.1).
6. If an analysis by a referee laboratory is required, the assignment of testing costs should be addressed (Sec. 5.2.9.1).
7. Form of shipment—bulk or package (type and size) (Sec. 6.2).
8. Affidavit of compliance or certified analyses if required (Sec. 6.3).

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

IV. Major Revisions. Major changes made to the standard in this revision include the following:

1. Impurity requirements have been tied to the SPACs listed in NSF/ANSI 60 (Sec. 4.3.3).
2. Turbidity requirements have been added (Sec. 4.3.5).
3. Test procedures for impurities have been defined and referenced (Sec. 5.2.7 and Table 1).
4. A test procedure for turbidity has been added (Sec. 5.2.8).
5. A table showing SPACs for impurities regulated under NSF/ANSI 60 has been added as an appendix (Appendix A).

V. Comments. If you have any comments or questions about this standard, please call the AWWA Volunteer & Technical Support group, 303.794.7711, FAX 303.795.7603, write to the group at 6666 West Quincy Avenue, Denver, CO 80235-3098, or e-mail at standards@awwa.org.

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AWWA Standard

Sodium Fluoride

SECTION 1: GENERAL

Sec. 1.1 Scope

This standard describes sodium fluoride (NaF), coarse crystalline grade, for water supply service application.

Sec. 1.2 Purpose

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

Sec. 1.3 Application

This standard can be referenced in specifications for purchasing and receiving sodium fluoride and can be used as a guide for testing the physical and chemical properties of sodium fluoride samples. The stipulations of this standard apply when this document has been referenced and only to sodium fluoride used in water supply service applications.