



*NSF International Standard /  
American National Standard*

## NSF/ANSI 60 - 2011

Drinking Water Treatment Chemicals -  
Health Effects



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**NSF/ANSI 60 – 2011**

NSF International Standard/  
American National Standard  
for Drinking Water Additives —

# **Drinking water treatment chemicals — Health effects**

Standard Developer

**NSF International**

**NSF International Board of Directors**

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## Foreword<sup>2</sup>

In response to a competitive request for proposals from the U.S. Environmental Protection Agency (USEPA), a Consortium led by NSF International (NSF) agreed to develop voluntary third-party consensus standards and a certification program for all direct and indirect drinking water additives. Other members of the Consortium include the Water Research Foundation (formerly the American Water Works Association Research Foundation), the Association of State Drinking Water Administrators, the Conference of State Health and Environmental Managers, and the American Water Works Association. (COSHEM has since become inactive as an organization.) Each organization was represented on a steering committee with oversight responsibility for the administration of the cooperative agreement. The Steering Committee provided guidance on overall administration and management, and the member organizations will remain active after the expiration of the cooperative agreement.

The standards were developed using a voluntary consensus process. All parties at interest were represented, including regulatory agencies, industry, and water suppliers; consultants; and other users of products covered by the standards.

Two standards for additives products have been adopted. NSF/ANSI 61: *Drinking water system components - Health effects* currently covers indirect additives. NSF/ANSI 60, and subsequent product certification against it, will replace the USEPA Additives Advisory Program for drinking water treatment chemicals. For more information with regard to USEPA's actions, refer to the July 7, 1988 *Federal Register* (53FR25586).

NSF/ANSI 60 has been developed to establish minimum requirements for the control of potential adverse human health effects from products added to water for its treatment. It does not attempt to include product performance requirements, which are currently addressed in standards established by such organizations as the American Water Works Association, the American Society for Testing and Materials, and the American National Standards Institute. Because this Standard complements the standards of these organizations, it is recommended that products also meet the appropriate requirements specified in the standards of such organizations.

The Standard and the accompanying text are intended for voluntary use by certifying organizations, utilities, regulatory agencies, and/or manufacturers as a basis of providing assurances that adequate health protection exists for covered products.

This version of NSF/ANSI 60 – 2011 includes the following revisions:

- Issue 39: It was established that the Single Product Allowable Concentration (SPAC) for bromate will be lowered from 0.005 mg/L to 0.003 mg/L on January 1, 2013. An informational annex (Annex G) was created to address this requirement until the implementation date. In addition, the bromate acceptance criteria for low-bromate hypochlorites was raised from 0.001 mg/L to 0.003 mg/L.
- Issue 46: Requirements for the evaluation of perchlorate in hypochlorites were added. This includes establishment of SPAC's, criteria for analytical methods, sample requirements, and requirements to inform the user of production date and provide references to recommended handling and storage requirements.
- Issue 47: This issue added the requirement of tamper resistant/ tamper-evident seals on all containers of water treatment chemicals sold to water suppliers under 3.9.

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<sup>2</sup> The information contained in this Foreword is not part of this American National Standard (ANS) and has not been processed in accordance with ANSI's requirements for an ANS. As such, this Foreword may contain material that has not been subjected to public review or a consensus process. In addition, it does not contain requirements necessary for conformance to the Standard.

- Issue 49: This issue included revisions to multiple sections of the Standard. The definition of “typical use level” was added and the definition of “maximum use level” was revised for clarification under 2. 3.2.1 was revised to clarify that toxicology studies for each product submission are not required if SPACs are established for each chemical contaminant of concern under Annex A. Method E was updated in Annex B (B.3.6) to reference the specific analysis methods with regards to sample preservation and storage instruction. The remaining references to mercury testing were deleted from Annex B (B.3.6 and B.4.2.3) (The requirement for mercury analysis of elemental chlorine was removed from Table 6.1 in an earlier version of the Standard). An editorial revision was made to Method E (B.3.6), correcting a typo in which a multiple factor of “100” was incorrectly shown to reflect 100 times the evaluation dose. The value was revised to reflect the correct number “10.”

Please note that the footnote in Table D1 that states that the Single Product Acceptable Concentration (SPAC) for bromate will be lowered to 0.003 mg/L is still under evaluation by the NSF Joint Committee on Drinking Water Treatment Chemicals. At this time, it has not been demonstrated that the drinking water industry demand for hypochlorite chemicals cannot be adequately met at the lower SPAC. The next revision of this standard will be made up to date with the decision of the Joint Committee.

This Standard was developed by the NSF Joint Committee on Drinking Treatment Chemicals using the consensus process described by the American National Standards Institute.

Suggestions for improvement of this Standard are welcome. Comments should be sent to Chair, Drinking Water Additives, c/o NSF International, Standards Department, PO Box 130140, Ann Arbor, Michigan 48113-0140, USA.

## **Consortium Organizations**

### **NSF International**

Popularly referred to as NSF, NSF International is a non-commercial agency. It is incorporated under the laws of Michigan as a not-for-profit organization devoted to research, education, and service. It seeks to solve problems involving man and his environment. It wishes to promote health and enrich the quality of life through conserving and improving that environment. Its fundamental principle of operation is to serve as a neutral medium in which business and industry, official regulatory agencies, and the public come together to deal with problems involving products, equipment, procedures, and services related to health and the environment. It is conceived and administered as a public service organization.

NSF is perhaps best known for its role in developing Standards and Criteria for equipment, products, and services that bear upon health. NSF was the lead organization in the Consortium responsible for developing this Standard. NSF conducts research; tests and evaluates equipment, products, and services for compliance with standards and criteria; and grants and controls the use of NSF registered Marks.

NSF offers product certification (Listing Services) for all products covered by its Standards. Each program has established policies governing the associated product evaluation, Listing Services, follow-up and enforcement activities. The NSF Listing Mark is widely recognized as a sign that the product or service to which it relates complies with the applicable NSF Standard(s).

### **Water Research Foundation**

The mission of the Water Research Foundation (WRF) is to sponsor practical, applied research in behalf of the drinking water industry of North America. The scope of the research program embraces all aspects of water supply operation, from development and maintenance of water resources to treatment technologies and water quality issues, from storage and distribution system operations to health effects studies and utility planning and management activities. WRF serves as the centralized industry institution for planning, managing, and funding cooperative research and development in drinking water, including the subsequent transfer of technology and results for practical application by the water utility community.

WRF's purpose in this cooperative program is to provide a communication link with the water utilities throughout North America and serve as the focal point for identification of research needs of the water supply industry with respect to the additives program.

### **The Association of State Drinking Water Administrators**

The Association of State Drinking Water Administrators (ASDWA) is a non-profit organization whose eligible membership is comprised of drinking water program administrators in each of the 50 states and seven U.S. territories. Through the organization, representatives speak with a collective voice to Congressional committees, the United States Environmental Protection Agency, professional and trade associations, water utilities, and the general public on issues related to state drinking water programs. With its mission of protecting the public health through assurance of high quality drinking water, and promoting responsible, reasonable, and feasible drinking water programs at the state and federal levels, the Association is a valued contributor to the consortium and to the program. It provides the link between the additives program and the state drinking water programs.

### The Conference of State Health and Environmental Managers

The Conference of State Health and Environmental Managers (COSHEM), known formerly as the Conference of State Sanitary Engineers (CSSE), is currently inactive as an organization. It brought to the consortium expertise and involvement of state health and environmental program managers. The Conference was the focal point for health concerns of all state environmental programs, including drinking water, wastewater, air, solid and hazardous wastes, radiological, occupational, health, and food. A standing committee on water supply focused on drinking water issues and kept the membership informed. The Conference played an important role early in the program through two-way communication with state health and environmental program decision makers.

### American Water Works Association

The purpose for which the American Water Works Association (AWWA) is formed is to promote public health, safety, and welfare through the improvement of the quality and quantity of water delivered to the public and the development and furtherance of understanding of the problems relating thereto by:

- advancing the knowledge of the design, construction, operation, water treatment and management of water utilities, and developing standards for procedures, equipment, and materials used by public water supply systems;
- advancing the knowledge of problems involved in the development of resources, production, and distribution of safe and adequate water supplies;
- educating the public on the problems of water supply and promoting a spirit of cooperation between consumers and suppliers in solving these problems; and
- conducting research to determine the causes of problems of providing a safe and adequate water supply and proposing solutions thereto in an effort to improve the quality and quantity of the water supply provided to the public.

AWWA brings to the Consortium its established position as the largest public drinking water association in North America, with a broad range of membership, including utilities, consultants, manufacturers/distributors/ agents, contractors, and other organizations with a direct interest in drinking water.

## NSF/ANSI Standard for Drinking Water Additives —

# Drinking water treatment chemicals — Health effects

## 1 Purpose, scope, and normative references

### 1.1 Purpose

This Standard establishes minimum health effects requirements for the chemicals, the chemical contaminants, and the impurities that are directly added to drinking water from drinking water treatment chemicals. This Standard does not establish performance or taste and odor requirements for drinking water treatment chemicals.

### 1.2 Scope

This Standard contains health effects requirements for drinking water treatment chemicals that are directly added to water and are intended to be present in the finished water. This Standard also contains health effects requirements for other chemical products that are directly added to water but are not intended to be present in the finished water. Chemicals covered by this Standard include, but are not limited to, coagulation and flocculation chemicals, softening, precipitation, sequestering, pH adjustment, and corrosion/scale control chemicals, disinfection and oxidation chemicals, miscellaneous treatment chemicals, and miscellaneous water supply chemicals.

Contaminants produced as by-products through reaction of the treatment chemical with a constituent of the treated water are not covered by this Standard.

### 1.3 Normative references

The following documents contain requirements, which by reference in this text, constitute requirements of this Standard.

21 CFR 587, *Good Laboratory Practice for Non-Clinical Laboratory Studies*<sup>3</sup>

40 CFR Part 160, *Good Laboratory Practice Standards*<sup>4</sup>

40 CFR Part 798, *Health Effects Testing Guidelines*<sup>4</sup>

APHA, *Standard Methods for the Examination of Water and Wastewater*, twentieth edition<sup>5</sup>

ASTM E29-02, *Standard Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications*<sup>6</sup>

<sup>3</sup> US Food and Drug Administration, 5600 Fishers Lane, Rockville, MD 20857 <[www.fda.gov](http://www.fda.gov)>.

<sup>4</sup> Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402 <[www.gpo.gov](http://www.gpo.gov)>.

<sup>5</sup> American Public Health Association, 800 I Street NW, Washington, DC 20001 <[www.apha.org](http://www.apha.org)>.

<sup>6</sup> ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2859 <[www.astm.org](http://www.astm.org)>.