

NSF/ANSI 60 – 2003e

Drinking water treatment chemicals — Health effects

NSF International Standard/ American National Standard

Developed by a consortium of:

- NSF International
- The American Water Works Association Research Foundation
- The Association of State Drinking Water Administrators
- The American Water Works Association

With support from:

- The U.S. Environmental Protection Agency
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NSF/ANSI 60 – 2003e



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American National Standard
for Drinking Water Additives —

Drinking water treatment chemicals — Health effects

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Contents

Foreword	ix
Consortium Organizations.....	xi
1 Purpose, scope, and normative references	1
1.1 Purpose	1
1.2 Scope	1
1.3 Normative references	1
1.4 Alternate chemicals	2
2 Definitions.....	2
3 General requirements.....	3
3.1 General.....	3
3.2 Formulation submission and review	3
3.3 Sampling, preparation, and analysis of samples.....	4
3.4 Contaminant concentrations.....	4
3.5 Product labeling.....	4
Figure 3.1 – Product evaluation overview	5
4 Coagulation and flocculation chemicals	5
4.1 Coverage	5
4.2 Definitions.....	5
4.3 General requirements.....	6
4.4 Sample requirements	6
4.5 Sample preparation	6
4.6 Analysis	7
4.7 Normalization.....	7
4.8 Evaluation of contaminant concentrations.....	7
Table 4.1 – Coagulation and flocculation products – product identification and evaluation	8
5 Chemicals for corrosion and scale control, softening, precipitation, sequestering, & pH adjustment	12
5.1 Coverage	12
5.2 Definitions.....	12
5.3 General requirements.....	12
5.4 Sample requirements	12
5.5 Sample preparation	12
5.6 Analysis	13
5.7 Normalization.....	13
5.8 Evaluation of contaminant concentrations.....	13
Table 5.1 – Chemicals for corrosion and scale control, softening, sequestering,.....	14
6 Disinfection and oxidation chemicals	19
6.1 Coverage	19
6.2 Definitions.....	19
6.3 General requirements.....	19
6.4 Sample requirements	20
6.5 Sample preparation	20
6.6 Analysis	20
6.7 Normalization.....	20
6.8 Evaluation of contaminant concentrations.....	20
Table 6.1 – Disinfection and oxidation products – product identification, and evaluation	21

7	Miscellaneous treatment applications	23
7.1	Coverage	23
7.2	Definitions	23
7.3	General requirements	23
7.4	Sample requirements	23
7.5	Sample preparation	23
7.6	Analysis	24
7.7	Normalization	24
7.8	Evaluation of contaminant concentrations	24
	Table 7.1 – Miscellaneous treatment application products – product identification, and evaluation ..	25
8	Miscellaneous water supply products	27
8.1	Coverage	27
8.2	Definitions	27
8.3	General requirements	27
8.4	Sample requirements	28
8.5	Sample preparation	28
8.6	Analysis	28
8.7	Normalization of contaminant concentrations	28
8.8	Evaluation of contaminant concentrations	32
	Table 8.1 – Miscellaneous water supply products – Product identification and evaluation	33
	Table 8.2 – Example calculation of a residual contaminant level from a well drilling additive	34

Annexes

A	Toxicology review and evaluation procedures	A1
A.1	General requirements	A1
A.2	Definitions	A1
A.3	Data requirements for published risk assessments	A4
A.4	Data requirements for new or updated risk assessments	A5
A.5	Data requirements for evaluating short-term exposures	A6
A.6	Risk estimation for published assessments	A7
A.7	Risk estimation using new and updated risk assessments	A7
A.8	Risk estimation for short-term exposure (STEL calculation)	A14
A.9	Development of chemical class-based evaluation criteria	A15
A.10	Key elements of a risk assessment for drinking water additive chemicals	A16
	Figure A1 – Annex A toxicity data review process	A21
	Figure A2 – Graphical presentation of data and extrapolations	A22
	Table A1 – Qualitative risk assessment data requirements	A23
	Table A2 – Quantitative risk assessment data requirements	A24
	Table A3 – TACs for qualitative risk assessment	A26
	Table A4 – Uncertainty factors	A26
	References	A27
B	Sampling, preparation, and analysis of samples	B1
B.1	General	B1
B.2	Sampling	B1
B.3	Preparation of samples	B3
B.4	Analysis methods	B9
B.5	Estimated contaminant exposure concentration	B14
	Table B1 – Preservation of prepared sample solutions	B15

C	Evaluation of microbiological growth potential	C1
C.1	Background	C1
C.2	Products covered.....	C1
C.3	Inoculum	C1
C.4	Product exposure	C2
C.5	Evaluation.....	C2
D	Normative drinking water criteria.....	D1
D.1	General.....	D1
D.2	USEPA and Health Canada drinking water criteria.....	D1
D.3	NSF International peer-reviewed drinking water criteria	D2
D.4	Drinking water criteria based on USEPA guidance concentrations	D2
D.5	Threshold of evaluation (TOE) chemical list.....	D2
	Table D1 – U.S. Environmental Protection Agency and Health Canada	D3
	Table D2 – NSF International peer-reviewed drinking water criteria	D8
	Table D3 – Drinking water criteria based on USEPA guidance concentrations	D10
	Table D4 – Threshold of evaluation chemicals1	D16
E	Informational drinking water criteria	E1
E.1	General.....	E1
E.2	NSF International drinking water criteria (not externally peer reviewed)	E1
E.3	Informational threshold of evaluation chemicals	E2
	Table E1 – NSF International drinking water criteria (not externally peer reviewed).....	E3
	Table E2 – Threshold of evaluation chemicals having datasets	E6
F	Chemical product index.....	F1
	Table F1 – Chemical product index	F1

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Foreword²

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 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 – 2003e contains editorial corrections to tables in annexes D and E due to inconsistencies between tables that were balloted by the Joint Committee, Technical Committee and Council of Public Health Consultants and tables included in NSF/ANSI 60 – 2003.

The NSF/ANSI 60 – 2003 version of the Standard includes the following revisions:

- Representatives of Health Canada and US EPA reviewed the harmonized evaluation criteria for use in NSF drinking water standards. In Table D1, a Single Product Allowable Concentration (SPAC) of 1.2 mg/L (no multiple source factor) since the use of supplemental fluoride chemicals would be the only anticipated source of fluoride in the drinking water treatment system. The value of 1.2 mg/L is an optimum level based on benefit and is the highest regulated value used by the U.S. Public Health Service. It is based on the development of dental fluorosis (an aesthetic outcome), versus the US EPA MCL of 4 mg/L, which is protective of skeletal fluorosis. The EPA also recently revised the arsenic MCL to 10 ppb, and this change is reflected in this Standard to the SPAC for this analyte.

² 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.

- A value for N-nitrosodimethylamine (NDMA) in Table D3, which is an emerging drinking water contaminant of concern, has been established. The same value has been added to Table D3 of NSF/ANSI 60 as is already established in Annex D of NSF/ANSI 61.
- Additional entries to Table D4 for Threshold of evaluation chemicals are also included.
- In an effort to ensure the hypochlorite products are certified to a reasonable use level and to reduce the amount of bromate added to drinking water, a lowest maximum use level of 2 mg/L as chlorine has been established.
- The requirements of NSF/ANSI 60, Annex A were revised in 2000 to remove the tiered approach to establishing pass/fail criteria that had been in effect since the Standard was first adopted, and to replace that approach with one based on use of uncertainty factors to account for uncertainties and deficiencies in the toxicological database. Some of the criteria in Table E1 had been based on USEPA guidance concentrations, but were lowered by the tier limitations. Those tier limitations have now been removed in accordance with the revised Annex A. The revisions have updated tables D3 & E1 to the requirements of NSF/ANSI 60, Annex A, as adopted in 2000.
- Pass/fail criteria that have completed external peer review by the NSF Health Advisory Board has been incorporated into table D2.

This Standard was developed by the NSF Joint Committee on Drinking Water Additives 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).

AWWA Research Foundation

The mission of the American Water Works Association Research Foundation (AWWARF) 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. AWWARF 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.

AWWARF'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.

APHA, *Standard Methods for the Examination of Water and Wastewater*, twentieth edition³

ASTM E506-98. *Standard Test Method for Mercury in Liquid Chlorine*⁴

ASTM G22-76 (1996). *Standard Practice for Determining Resistance of Plastics to Bacteria*⁴

CGA G-6.2-1994. *Commodity Specification for Carbon Dioxide*⁵

³ American Public Health Association (APHA), 800 I Street NW, Washington, DC 20001

⁴ American Society for Testing and Materials (ASTM), 100 Barr Harbor Drive, West Conshohocken, PA 19428-2859

⁵ Compressed Gas Association (CGA), 1725 Jefferson Davis Highway, Suite 1004, Arlington, VA 22202-4102