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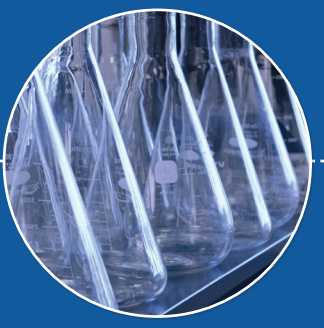
NSF/ANSI/CAN 61 - 2023

Drinking Water System Components - Health Effects (+ Errata)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NSF International Standard /
American National Standard /
National Standard of Canada
for Drinking Water Additives –

Drinking Water System Components – Health Effects

Standard Developer
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At the time of this publication, examples of programs and processes were provided for general guidance. This information is given for the convenience of users of this standard and does not constitute an endorsement by NSF International. Equivalent programs and processes may be used.

Unless otherwise referenced, the annexes are not considered an integral part of NSF standards. The annexes are provided as general guidelines to the manufacturer, regulatory agency, user, or certifying organization.

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Abbreviations

The following table is provided as a reference for unit abbreviations for common forms of measurement used within NSF documents.

time	second	s
	minute	min
	hour	h
	day	d
	week	wk
	month	mo
	year	yr
length	inch	in
	foot	ft
	yard	yd
	rod	rd
	mile	mi
	micrometer	µm
	nanometer	nm
	millimeter	mm
	centimeter	cm
	meter	m
	kilometer	km
liquid measure	milliliter	mL
	liter	L
	liters per day	LPD
	liters per minute	LPM
	ounce	oz
	pint	pt
	quart	qt
	gallon	gal
	gallons per minute	GPM
	gallons per day	GPD
weight	microgram	µg
	picogram	pg
	nanogram	ng
	milligram	mg
	centigram	cg
	gram	g
	kilogram	kg
	pounds	lb
	tons	t
	metric tons	mt

Contents

Foreword[2]

In response to a competitive request for proposals from the U.S. Environmental Protection Agency (U.S. EPA), 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 (WRF), the Association of State Drinking Water Administrators (ASDWA), the Conference of State Health and Environmental Managers (COSHEM), and the American Water Works Association (AWWA). (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 provides guidance on overall administration and management of the cooperative agreement. Currently, the member organizations remain active in an oversight role.

Two standards for additives products have been adopted. NSF/ANSI/CAN 60: *Drinking Water Treatment Chemicals — Health Effects* covers many of the water treatment chemicals, also known as direct additives. This standard, NSF/ANSI/CAN 61, covers all indirect additives products and materials. Testing to determine the potential of a product to impart taste and/or odor to drinking water is not included in this standard.

NSF/ANSI/CAN 61, and subsequent product certification against it, has replaced the U.S. EPA Additives Advisory Program for drinking water system components. U.S. EPA terminated its advisory role in April 1990. For more information with regard to U.S. EPA's actions, refer to the July 7, 1988 *Federal Register* (53FR25586).

NSF/ANSI/CAN 61 was developed to establish minimum requirements for the control of potential adverse human health effects from products that contact drinking water. It does not attempt to include product performance requirements that are currently addressed in other voluntary consensus standards established by such organizations as the AWWA, ASTM International, and the American National Standards Institute (ANSI). Because this standard complements the performance standards of these organizations, it is recommended that products also meet the appropriate performance requirements specified in the standards of such organizations.

Water age can be a major factor in the deterioration of water quality within plumbing systems affecting issues of both public health and aesthetic concerns. With increased water age is an increased potential for the formation of disinfection by-products, increased corrosion, and an increased potential for microbial regrowth. It can also lead to a loss in the effectiveness of corrosion control measures and an increased potential for nitrification of the water.

Within NSF/ANSI/CAN 61, most extraction protocols result in exposure periods between 12 to 24 hours. While these are appropriate for typical drinking water system use, they can be significantly less than in others. Examples of where high water age can occur include:

— water storage tanks in rain water catchment systems where the duration may be weeks or months;

— plumbing system designs in green buildings which result of overall reduction in water usage without a change in piping design to minimize stagnation;

— buildings where stagnant periods occur due to nonuse such as schools between semesters, vacation homes, or seasonal buildings; and

— products on isolated lines with either long or oversized piping resulting low water turnover.

[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. Therefore, 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.

NSF/ANSI/CAN 61 compliant products are often specified in these applications yet the potential accumulation of leachates over extended periods of exposure may or may not be addressed though this standard. It is important that the design of drinking water plumbing systems take into account potentials for extended aging of water. This may include the flushing of the water piping system after extended periods of nonuse. It is also important for managers of the drinking systems in buildings be aware of the potential for high water age and proactively manage the system to minimize it.

This 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. Product certification issues, including frequency of testing and requirements for follow-up testing, evaluation, enforcement, and other policy issues, are not addressed by this standard.

All references to gallons (gal) are in U.S. gallons.

This standard is designated as a National Standard of Canada (NSC) in compliance with requirements and guidance set out by the Standards Council of Canada (SCC).

This edition of the standard contains the following revisions:

Issue 164

This revision corrects an error in Section 5.7.2 by adding back Section 5.7.3: *Normalization for all other end uses,* which was inadvertantly ommitted since the 2017 edition.

Issue 165

This revision adds brass rod alloy (UNS C27550) to the list of acceptable materials for lead leaching under Annex N-2.

Issue 166

This revision add cesium (Cs) to the list of material-specific analyses under Table 3.1 for concrete and portland and hydraulic cements.

Issue 167

This revision moves all definitions throughout the individual sections of NSF/ANSI/CAN 61 to Section 2.

Issue 168

This revision adds a reference to Section 3.1.4 in Annex N-1 for most rigorous conditions.

Issue 169

This revision consolidates duplicate language regarding the multiple timepoint protocol to general requirements under Section 3.

Issue 170

This revision consolidates RVCM requirements under Section 3, which applies to all products.

Issue 171

This revision moves general bracketing requirements to Section 3.1.

Issue 172

This revision updates the maximum lead test statistic Q value from 5.0 µg to 1.0 µg for Section 9: Endpoint Devices and from 1.0 µg to 0.5 µg for supply stops, flexible plumbing connectors and miscellaneous components.

Issue 173

This revision clarifies that refrigerator water dispensers are included in the scope of Section 9 and defines which components of refrigerator ice makers and water dispensers are considered subject to evaluation under standard. Language is also added to include standalone residential plumbed-in ice makers in the scope of Section 9.

The interpretations annex contains responses to interpretation requests. The responses will be published in each version of the standard until such time that the interpretation response is no longer applicable.

This standard was developed by the NSF Joint Committee on Drinking Water Additives – System Components using the consensus process described by the American National Standards Institute and the Standards Council of Canada's *Requirements and Guidance*. At the time of approval, the Joint Committee consisted of 9 public health / regulatory, 11 industry, 7 product certifier / testing lab, and 7 user representatives.

Suggestions for improvement of this standard are welcome. This standard is maintained on a continuous maintenance schedule and can be opened for comment at any time. Comments should be sent to: Chair, Joint Committee on Drinking Water Additives – System Components at standards@nsf.org, or c/o NSF International, Standards Department, P.O. Box 130140, Ann Arbor, Michigan 48113-0140, U.S.A.

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SCC Foreword

A National Standard of Canada is a standard developed by a Standards Council of Canada (SCC) accredited standards development organization, in compliance with requirements and guidance set out by the SCC. More information on National Standards of Canada can be found at <www.scc.ca>.

SCC is a Crown corporation within the portfolio of Innovation, Science and Economic Development (ISED) Canada. With the goal of enhancing Canada's economic competitiveness and social well-being, SCC leads and facilitates the development and use of national and international standards. SCC also coordinates Canadian participation in standards development, and identifies strategies to advance Canadian standardization efforts.

Accreditation services are provided by SCC to various customers, including product certifiers, testing laboratories, and standards development organizations. A list of SCC programs and accredited bodies is publicly available at <www.scc.ca>.

Consortium organizations

NSF International

Popularly referred to as NSF, NSF International is a noncommercial 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 American Water Works Association Research Foundation (now the Water Research Foundation), is to sponsor practical, applied research on 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. Water Research Foundation (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 nonprofit 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 (U.S. EPA), 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, radiology, 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 of the American Water Works Association (AWWA) is to promote public health, safety, and welfare by improving the quality and increasing the quantity of water delivered to the public, and to developing and furthering an understanding of the problems relating thereto by:

— advancing the knowledge of the design, construction, operation, water treatment, and management of water utilities;

— 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 with 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 membership that includes utilities, consultants, manufacturers / distributors / agents, contractors, and other organizations with a direct interest in drinking water.

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NSF/ANSI/CAN Standard
for Drinking Water Additives –

Drinking Water System Components – Health Effects

1 General

1.1 Purpose

This standard establishes minimum health effects requirements for the chemical contaminants and impurities that are indirectly imparted to drinking water from products, components, and materials used in drinking water systems. This standard does not establish performance, taste and odor, or microbial growth support requirements for drinking water system products, components, or materials.

1.2 Scope

1.2.1 This standard is intended to cover specific materials or products that come into contact with: drinking water, drinking water treatment chemicals, or both. The focus of the standard is evaluation of contaminants or impurities imparted indirectly to drinking water. The products and materials covered include, but are not limited to, process media (e.g., carbon, sand), protective materials (e.g., coatings, linings, liners), joining and sealing materials (e.g., solvent cements, welding materials, gaskets), pipes and related products (e.g., pipes, tanks, fittings), mechanical devices used in treatment / transmission / distribution systems (e.g., valves, chlorinators, separation membranes, point-of-entry (POE) drinking water treatment systems), and mechanical plumbing devices (e.g., faucets, endpoint control valves).

1.2.2 Point-of-use (POU) drinking water treatment devices are not covered by the scope of this standard.

1.3 Normative references

The following documents contain requirements that, by reference in this text, constitute requirements of this standard. At the time this standard was balloted, the editions listed below were valid. All documents are subject to revision, and parties are encouraged to investigate the possibility of applying the recent editions of the documents indicated below. The most recent published edition of the document shall be used for undated references.

21 C.F.R. Part 58, *Good Laboratory Practice for Nonclinical Laboratory Studies*[3]

40 C.F.R. Part 136, *Guidelines Establishing Test Procedures for the Analysis of Pollutants*[3]

40 C.F.R. Part 141, *National Primary Drinking Water Regulations*[3]

40 C.F.R. Part 160, *Good Laboratory Practice Standards*[3]

40 C.F.R. Part 798, *Health Effects Testing Guidelines*[3]

[3] National Archives and Records Administration, Office of the Federal Register. 7 G Street NW, Suite A-734, Washington, DC 20401. <www.ecfr.gov>