



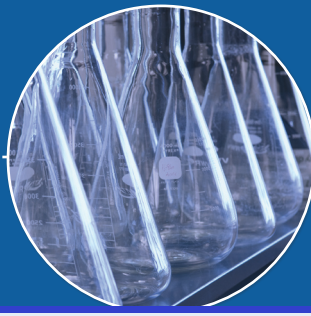
Standards Council of Canada
Conseil canadien des normes



*NSF International Standard /
American National Standard /
National Standard of Canada*

NSF/ANSI/CAN 60 - 2019

Drinking Water Treatment Chemicals - Health Effects



This is a preview. [Click here to purchase the full publication.](#)

NSF International, an independent, not-for-profit, nongovernmental organization, is dedicated to being the leading global provider of public health and safety-based risk management solutions while serving the interests of all stakeholders.

This Standard is subject to revision.
Contact NSF to confirm this revision is current.

Users of this Standard may request clarifications and interpretations, or propose revisions by contacting:

Chair, Joint Committee on Drinking Water Additives – Treatment Chemicals
c/o NSF International
789 North Dixboro Road, PO Box 130140
Ann Arbor, Michigan 48113-0140 USA
Phone: (734) 769-8010 Telex: 753215 NSF INTL
Fax: (734) 769-0109
E-mail: info@nsf.org
Web: www.nsf.org

NSF International Standard /
American National Standard /
National Standard of Canada
for Drinking Water Additives –

Drinking Water Treatment Chemicals – Health Effects

Standard Developer
NSF International

ICS 13.060.20; 71.100.80

Designated as an ANSI Standard
July 18, 2019
American National Standards Institute

Designated as a National Standard of Canada
November 19, 2019
Standards Council of Canada

Prepared by
The NSF Joint Committee on Drinking Water Treatment Chemicals

Recommended for adoption by
The NSF Council of Public Health Consultants

Adopted by
NSF International
December 1987

Revised June 1988
Revised November 1996
Revised May 2000
Addendum September 2001
Revised September 2003
Revised November 2005
Revised May 2011
Revised January 2014
Revised October 2015
Revised October 2017

Revised October 1988
Revised September 1997
Revised November 2000
Revised June 2002
Editorial Revision October 2003
Revised May 2009
Addendum March 2012
Revised September 2014
Revised September 2016
Revised February 2019

Revised May 1996
Revised October 1999
Revised February 2001
Addendum August 2002
Addendum December 2003
Revised December 2009
Revised August 2012
Revised February 2015
Addendum February 2017
Revised October 2019

Published by
NSF International
PO Box 130140, Ann Arbor, Michigan 48113-0140, USA

For ordering copies or for making inquiries with regard to this Standard, please reference the designation "NSF/ANSI/CAN 60 – 2019".

Cette Norme Nationale du Canada est disponible en versions Française et Anglaise.

Copyright 2019 NSF International

Previous editions © 2019, 2017, 2016, 2015, 2014, 2013, 2012, 2011, 2010, 2009, 2005, 2004, 2003, 2002, 2001, 2000, 1999, 1997, 1996, 1988, 1987

Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from NSF International.

Printed in the United States of America.

Disclaimers¹

NSF International (NSF), in performing its functions in accordance with its objectives, does not assume or undertake to discharge any responsibility of the manufacturer or any other party. The opinions and findings of NSF represent its professional judgment. NSF shall not be responsible to anyone for the use of or reliance upon this Standard by anyone. NSF shall not incur any obligation or liability for damages, including consequential damages, arising out of or in connection with the use, interpretation of, or reliance upon this Standard. It is the responsibility of the user of this standard to judge the suitability of the ANS/NSC for the user's purpose.

NSF Standards provide basic criteria to promote sanitation and protection of public health and the environment. Provisions for mechanical and electrical safety have not been included in this Standard because governmental agencies or other national standards-setting organizations provide safety requirements.

Participation in NSF Standards development activities by regulatory agency representatives (federal, local, state) shall not constitute their agency's endorsement of NSF or any of its Standards.

Preference is given to the use of performance criteria measurable by examination or testing in NSF Standards development when such performance criteria may reasonably be used in lieu of design, materials, or construction criteria.

The illustrations, if provided, are intended to assist in understanding their adjacent standard requirements. However, the illustrations may not include all requirements for a specific product or unit, nor do they show the only method of fabricating such arrangements. Such partial drawings shall not be used to justify improper or incomplete design and construction.

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.

¹ The information contained in this Disclaimer 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 Disclaimer 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.

This page is intentionally left blank.

Contents

1	General	1
1.1	Purpose.....	1
1.2	Scope	1
1.3	Normative references	1
1.4	Alternate chemicals.....	2
1.5	Significant figures and rounding	2
2	Definitions	3
3	General requirements	5
3.1	General	5
3.2	Formulation submission and review	5
3.3	Sampling, preparation, and analysis of samples	6
3.4	Contaminant concentrations	6
3.5	Product labeling	6
3.6	Formulation control	7
3.7	Product traceability	8
3.8	Conformity assessment requirements	8
3.9	Product security	8
4	Coagulation and flocculation chemicals	10
4.1	Coverage	10
4.2	Definitions	10
4.3	General requirements	11
4.4	Sample requirements.....	11
4.5	Sample preparation.....	12
4.6	Analysis.....	12
4.7	Normalization	12
4.8	Evaluation of contaminant concentrations	13
5	Chemicals for corrosion and scale control, softening, precipitation, sequestering, and pH adjustment	19
5.1	Coverage	19
5.2	Definitions	19
5.3	General requirements	19
5.4	Sample requirements.....	20
5.5	Sample preparation.....	20
5.6	Analysis.....	20
5.7	Normalization	20
5.8	Evaluation of contaminant concentrations	21
6	Disinfection and oxidation chemicals	28
6.1	Coverage	28
6.2	Definitions	28
6.3	General requirements	28
6.4	Sample requirements.....	28
6.5	Sample preparation.....	29
6.6	Analysis.....	29
6.7	Normalization	29
6.8	Evaluation of contaminant concentrations	30
7	Miscellaneous treatment applications.....	34
7.1	Coverage	34
7.2	Definitions	34
7.3	General requirements	34

7.4	Sample requirements.....	35
7.5	Sample preparation.....	35
7.6	Analysis.....	35
7.7	Normalization	35
7.8	Evaluation of contaminant concentrations	35
7.9	Sodium chloride evaluated for use in electrolytic sodium hypochlorite generators.....	35
8	Miscellaneous water supply products.....	40
8.1	Coverage	40
8.2	Definitions	40
8.3	General requirements	40
8.4	Sample requirements.....	41
8.5	Sample preparation.....	41
8.6	Analysis.....	41
8.7	Normalization of contaminant concentrations.....	41
8.8	Evaluation of contaminant concentrations.....	45
Normative Annex 1	Sampling, preparation, and analysis of samples	49
N-1.1	General	49
N-1.2	Sampling.....	49
N-1.3	Preparation of samples.....	51
N-1.4	Analysis methods	58
N-1.5	Estimated contaminant exposure concentration	73
Informative Annex 1	Toxicology review and evaluation procedures.....	75
Informative Annex 2	Normative drinking water criteria	77
Informative Annex 3	Chemical product index	79
Informative Annex 4	Revisions to the evaluation of bromate.....	85
Informative Annex 5	Examples of tamper evidence for bulk shipments	87
I-5.1	Loading ports	88
I-5.2	Typical off-loading ports	89
I-5.3	Areas of a truck trailer not normally requiring tamper evident measures.....	90
I-5.4	Examples of tamper evidence for outer packed shipments	94

Foreword²

In response to a competitive request for proposals from the US Environmental Protection Agency (US 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 61: *Drinking Water System Components – Health Effects* currently covers indirect additives products and materials. This Standard, NSF/ANSI/CAN 60, and subsequent product certification against it, will replace the US EPA Additives Advisory Program for drinking water treatment chemicals. For more information with regard to US EPA's actions, refer to the July 7, 1988 *Federal Register* (53FR25586).

NSF/ANSI/CAN 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 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.

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.

All references to gallons (gal) are in US gallons.

This Standard was developed by the NSF Joint Committee on Drinking Water Additives – Treatment Chemicals using the consensus process described by the Standards Council of Canada's *Requirements and Guidance*. At the time of approval, the Joint Committees consisted of 9 public health / regulatory, 11 industry, 4 product certifier / testing lab, and 7 user representatives.

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 80

This revision raises the typical use level (TUL) of sodium silicate from 16 mg/L to 100 mg/L in Tables 4.1 and 5.1. It also makes a correction to the synonyms used for sodium silicate.

² The information contained in this Disclaimer 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 Disclaimer 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 81

This revision is intended to clarify the use and fate of chlorate & chlorite used in drinking water treatment under Section 6.

Issue 82

This revision adds language to Annex N-1, Section N-1.4.4 (formerly Annex B, Section B.4.4) to provide guidance on how the potassium-40 correction method is conducted for radionuclide analysis, and standardizes the threshold for conducting gross beta particle speciation.

Issue 83

This revision adds remineralization to the scope of the processes covered by drinking water treatment chemicals under Section 5.

Issue 84

This revision lowers the typical use level (TUL) for fluoride products from 1.2 mg/L to 1.0 mg/L in Table 7.1.

This revision also includes an editorial update to the names of the Annexes within. The Annexes are being changed from alpha characters to numeric, preceded by a 'Normative' or 'Informative'. The table below shows the previous name of the Annex with the corresponding new name of the Annex:

Previously known as:	Now known as:
Annex A	Informative Annex 1 (I-1)
Annex B	Normative Annex 1 (N-1)
Annex C	Informative Annex 2 (I-2)
Annex D	Informative Annex 3 (I-3)
Annex E	Informative Annex 4 (I-4)
Annex F	Informative Annex 5 (I-5)

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 Committees on Drinking Water Additives at standards@nsf.org, or c/o NSF International, Standards Department, PO Box 130140, Ann Arbor, Michigan 48113-0140, USA.

SCC Foreword³

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>.

³ The information contained in this Disclaimer 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 Disclaimer 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.