

NSF/ANSI 61 – 2007a  
Addendum 1.0

# Drinking water system components 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  
under cooperative agreement #CR-812144



*NSF International, an independent, not-for-profit, non-governmental 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  
c/o NSF International  
789 North Dixboro Road, P. O. 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](mailto:info@nsf.org)  
Web: <http://www.nsf.org>

**NSF/ANSI 61 – 2007a  
Addendum 1.0**

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

**Drinking water system components —  
Health effects**

Standard Developer  
NSF International

Adopted October 4, 2007  
**NSF International Board of Directors**

**Designated as an ANSI Standard**  
October 4, 2007  
**American National Standards Institute**

Prepared by  
**The NSF Joint Committee on Drinking Water Additives**

Recommended for Adoption by  
**The NSF Council of Public Health Consultants**

Adopted by  
**The NSF Board of Directors**  
**June 1988**

|                        |                                  |
|------------------------|----------------------------------|
| Revised October 1988   | Revised September 2000           |
| Revised May 1990       | Revised November 2000            |
| Revised May 1991       | Revised February 2001            |
| Revised May 1992       | Addendum September 2001          |
| Revised September 1994 | Revised July 2002                |
| Revised January 1995   | Addendum August 2002             |
| Revised July 1996      | Editorial Revision February 2002 |
| Revised September 1996 | Revised September 2003           |
| Revised November 1996  | Editorial Revision October 2003  |
| Revised January 1997   | Revised November 2004            |
| Revised January 1997   | Addendum March 2005              |
| Revised March 1997     | Revised October 2005             |
| Revised July 1997      | Addendum April 2006              |
| Revised November 1998  | Revised March 2007               |
| Revised January 1999   | Revised July 2007                |
| Revised November 1999  | Addendum October 2007            |

Published by

**NSF International**  
P. O. 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 61 – 2007a Addendum 1.0."

Copyright 2008 NSF International  
Previous editions © 2007, 2005, 2004, 2003, 2002, 2001, 2000, 1999, 1998, 1997, 1996, 1995, 1994, 1992, 1991, 1990, 1988

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.

## Disclaimers<sup>1</sup>

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.

NSF Standards provide basic criteria to promote sanitation and protection of the public health. 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.

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.

---

<sup>1</sup> 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

|         |  |    |
|---------|--|----|
| 4       | Pipes and related products.....  | 1  |
| 4.1     | Scope .....  | 1  |
| 4.5     | Extraction procedures.....   | 1  |
| 4.5.2   | Preparation of test samples .....  | 2  |
| 5       | Barrier materials .....  | 3  |
| 5.1     | Scope .....  | 3  |
| 5.2     | Definitions .....  | 3  |
| 5.3     | General requirements .....   | 4  |
| 5.4     | Sample requirements .....  | 4  |
| 5.5     | Extraction procedures.....   | 5  |
| 5.6     | Analysis of extraction water .....   | 9  |
| 5.7     | Normalization .....  | 9  |
| 5.8     | Evaluation of contaminant concentrations.....                                | 10 |
|         | Table 5.1 – Paint and coating system sample preparation.....                 | 12 |
|         | Table 5.2 – Single time point exposure sequence .....                        | 12 |
|         | Table 5.3 – Multiple time point exposure sequence .....                      | 12 |
|         | Table 5.4 – Surface area-to-volume ratios for tanks or storage vessels ..... | 13 |
| Annex B | .....  | 14 |
| B.4     | Mechanical devices .....   | 14 |

This page is intentionally left blank.



## 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 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 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 were developed. NSF/ANSI 60: – *Drinking water treatment chemicals — Health effects* covers many of the water treatment chemicals, also known as direct additives. This Standard, NSF/ANSI 61: *Drinking water system components — Health effects*, 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 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 American Water Works Association, the American Society for Testing and Materials, and the American National Standards Institute. 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.

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

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.

This version includes the following revisions:

- An update Section 5, adding “immediate return to service paint/coating systems” to the definition section, and adding language providing transparency regarding product testing and certification of coatings. (Joint Committee Issue 75)
- An updated to Sections 4 and 8 to standardize the testing of metallic products and components by addition of specific instructions for assembly of samples so that the laboratory surface area-to-volume ratio is equal to or greater than the surface area-to-volume ratio at which the product is intended to be used in the field. (Joint Committee Issue 76)

---

<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. 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.

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, Joint Committee on Drinking Water Additives, c/o NSF International, Standards Department, P.O. Box 130140, Ann Arbor, Michigan 48113-0140, USA.

### **Consortium organizations<sup>3</sup>**

#### **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).

#### **AWWA Research Foundation**

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

---

<sup>3</sup> The information contained in this section 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 section 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.

### 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 decisionmakers.

### 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.

Revisions to NSF/ANSI 61-2007a are shown in this addendum as ~~crossouts~~ for deletions and highlights for additions.

---

© 2008 NSF

NSF/ANSI 61 – 2007a  
Addendum 1.0

---

## NSF/ANSI Standard for Drinking Water Additives —

# Drinking water system components – Health effects

- 
- 
- 

## 4 Pipes and related products

### 4.1 Scope

**4.1.1** The requirements in this section apply to pipes and pipe-related products and the water-contact materials associated with these products. Pipe-related products include, but are not limited to, the following items: fittings, couplings, flexible and rigid tubing, riser tubing, dip tubes, hoses, well casings, drop pipes and well screens, ~~and pipe-related coatings~~.

**4.1.2** Coatings and other barrier materials requested to be evaluated on their own that are intended for application to pipes or pipe-related products shall be evaluated under 5. ~~Coatings and other barrier materials not exclusively intended for application to pipes or pipe-related products are evaluated under 5.~~

NOTE – Coatings and other barrier materials, which meet the requirements of 5 at a specific surface area-to-volume ratio, shall be considered to meet the requirements of a pipe or pipe-related product application for a surface area-to-volume ratio less than or equal to the ratio accepted under the 5 evaluation.

**4.1.3** Individual ingredients of cement-based pipes and related products (including Portland and blended hydraulic cement and admixtures) are evaluated under 5.

**4.1.4** Products and materials intended to join or seal pipes or pipe-related products are evaluated under 6.

- 
- 
- 

### 4.5 Extraction procedures

#### 4.5.1 Analytical summary

An analytical summary shall be prepared for each product or material. The analytical summary shall consist of the formulation-dependent analytes identified in 3.2 and the applicable material-specific analytes listed in table 3.1.