American Water Works Association

Erratum to
ANSI/AWWA C220-07
Standard
For

Stainless-Steel Pipe, ½ In. (13 mm) and Larger

(February 2008)

1. Change Section 1.1 Scope, page 1, to read:

This standard pertains to austenitic stainless-steel pipe that is longitudinal-seam or spiral-seam welded, ½ in. (13 mm) in nominal diameter and larger, intended for the transmission and distribution of water and for use in other water-supply system facilities. These materials are especially suited for the handling of high-purity, deionized, and ozonated water.

AWWA C220-07
(Revision of ANSI/AWWA C220-98)

American Water Works Association

The Authoritative Resource on Safe Water®

AWWA Standard

Stainless-Steel Pipe, ½ in. (13mm) and Larger

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First edition approved by AWWA Board of Directors June 12, 1992.
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Sections

AWWA Standard

This document is an American Water Works Association (AWWA) standard. It is not a specification. AWWA standards describe minimum requirements and do not contain all of the engineering and administrative information normally contained in specifications. The AWWA standards usually contain options that must be evaluated by the user of the standard. Until each optional feature is specified by the user, the product or service is not fully defined. AWWA publication of a standard does not constitute endorsement of any product or product type, nor does AWWA test, certify, or approve any product. The use of AWWA standards is entirely voluntary. AWWA standards are intended to represent a consensus of the water supply industry that the product described will provide satisfactory service. When AWWA revises or withdraws this standard, an official notice of action will be placed on the first page of the classified advertising section of *Journal AWWA*. The action becomes effective on the first day of the month following the month of *Journal AWWA* publication of the official notice.

Science and Technology

AWWA unites the entire water community by developing and distributing authoritative scientific and technological knowledge. Through its members, AWWA develops industry standards for products and processes that advance public health and safety. AWWA also provides quality improvement programs for water and wastewater utilities.

Committee Personnel

The Steel Water Pipe Manufacturer's Technical Advisory Committee (SWPMTAC) Task Group on updating AWWA C220 had the following personnel at the time:

Gary Kohlbeck, *Chair*

C.J. Anderson, Douglas Brothers, Portland, Maine	(AWWA)
D.Y. Bridges, Victaulic Depend-O-Lok Inc., Atlanta, Ga.	(AWWA)
J.A. Fox, Fox Inspections & Testing LLC, Front Royal, Va.	(AWWA)
Gary Kohlbeck, Felker Fabrication, Marshfield, Wis.	(AWWA)
Stephen Lamb, Nickel Development Institute, Huntington, W.V.	(AWWA)
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D.R. Wagner, Consultant, St. Louis, Mo.	(AWWA)

The Standards Committee on Stainless Steel Pipe, which reviewed and approved this standard, had the following personnel at the time of approval:

J. Warren Green, *Chair*

General Interest Members

R.L. Coffey, Kirkham Michael & Associates, Omaha, Neb.	(AWWA)
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Producer Members

R.J. Card, Victaulic Depend-O-Lok Inc., Atlanta, Ga. (AWWA)
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User Members

J.H. Bambei,* Denver Water, Denver, Colo. (AWWA)
G.R. Carlyon, Flint Water Plant, Flint, Mich. (AWWA)
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K.S. Taylor, Green Bay Water Department, Green Bay, Wis. (AWWA)

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Contents

All AWWA standards follow the general format indicated subsequently. Some variations from this format may be found in a particular standard.

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Foreword

This foreword is for information only and is not part of AWWA C220.

I. Introduction.

I.A. *Background.* Stainless steel is a standard material used to construct pipe. It offers low corrosion rates, which makes it suitable for the handling of potable water while maintaining water purity and quality. In 1996, stainless steel was approved as a material suitable to meet the NSF*/ANSI† 61, Drinking Water Treatment Components—Health Effects, Addendum C requirement.

I.B. *History.* In 1987, the AWWA Standards Council directed the Standards Committee on Steel Pipe to develop a standard for stainless-steel pipe used in water treatment or conveying facilities. The first edition of AWWA C220, Standard for Stainless-Steel Pipe, 4 In. (100 mm) and Larger was approved by the AWWA Board of Directors on June 18, 1992. The second edition was approved Jan. 25, 1998. This third edition was approved by the AWWA Board of Directors on Jan. 16, 2005.

I.C. *Acceptance.* In May 1985, the US Environmental Protection Agency (USEPA) entered into a cooperative agreement with a consortium led by NSF International (NSF) to develop voluntary third-party consensus standards and a certification program for direct and indirect drinking water additives. Other members of the original consortium included the American Water Works Association Research Foundation (AwwaRF) and the Conference of State Health and Environmental Managers (COSHEM). The American Water Works Association (AWWA) and the Association of State Drinking Water Administrators (ASDWA) joined later.

In the United States,‡ authority to regulate products for use in, or contact with, drinking water rests with individual states. Local agencies may choose to impose requirements more stringent than those required by the state. To evaluate the health effects of products and drinking water additives from such products, state and local agencies may use various references, including

1. An advisory program formerly administered by USEPA, Office of Drinking Water, discontinued on Apr. 7, 1990.

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*NSF International, 789 North Dixboro Road, Ann Arbor, MI 48113.

†American National Standards Institute, 25 West 43rd Street, Fourth Floor, New York, NY 10036.

‡Persons outside the United States should contact the appropriate authority having jurisdiction.

2. Specific policies of the state or local agency.

3. Two standards developed under the direction of NSF, NSF/ANSI 60, Drinking Water Treatment Chemical—Health Effects, and NSF/ANSI 61, Drinking Water System Components—Health Effects.

4. Other references, including AWWA standards, *Food Chemical Codex*, *Water Chemicals Codex*,* and other standards considered appropriate by the state or local agency.

Various certification organizations may be involved in certifying products in accordance with NSF/ANSI 61. Individual states or local agencies have authority to accept or accredit certification organizations within their jurisdiction. Accreditation of certification organizations may vary from jurisdiction to jurisdiction.

Annex A, "Toxicology Review and Evaluation Procedures," to NSF/ANSI 61 does not stipulate a maximum allowable level (MAL) of a contaminant for substances not regulated by a USEPA final maximum contaminant level (MCL). The MALs of an unspecified list of "unregulated contaminants" are based on toxicity testing guidelines (noncarcinogens) and risk characterization methodology (carcinogens). Use of Annex A procedures may not always be identical, depending on the certifier.

AWWA C220 does not address additives requirements. Users of this standard should consult the appropriate state or local agency having jurisdiction in order to

1. Determine additives requirements, including applicable standards.

2. Determine the status of certifications by all parties offering to certify products for contact with, or treatment of, drinking water.

3. Determine current information on product certification.

II. Special Issues.

II.A. *Basis of Design.* AWWA C220 pertains to the manufacture and testing of the stainless-steel pipe cylinder. AWWA C220 includes all types and classes of stainless-steel pipe, ½ in. (13 mm) in diameter and larger, typically used in the water industry, regardless of pipe-manufacturing source.

The wall thickness of stainless-steel pipe is determined by (1) internal pressures, including static and transient pressures; (2) external pressure, including trench loading and earth fill; (3) special physical loading, such as continuous-beam loading with saddle supports or ring girders, vacuum conditions, type of joint used, and

*Both publications available from National Academy of Sciences, 500 Fifth Street N.W., Washington, DC 20418.

variations in operating temperature; and (4) practical considerations for handling, shipping, lining and coating, or similar operations.

The design techniques described in AWWA Manual M11, *Steel Water Pipe—A Guide for Design and Installation*, are used to determine the minimum wall thicknesses of steel pipe. The purchaser shall establish and specify the wall thickness determined to be satisfactory for conditions, including internal pressure. The purchaser should consider the properties of the lining and coating materials, if used, when selecting design stresses and deflection limits. Alternatively, the purchaser shall establish and specify the minimum wall thickness that will satisfy conditions of external pressure, trench loadings, and special physical loadings. The manufacturer may select materials and manufacturing processes within the limitations of this standard to produce pipe of the wall thickness required to additionally satisfy specified internal pressure. The purchaser shall specify the internal design pressure and show the depth of cover over the pipe together with installation conditions. The manufacturer shall select and furnish pipe that has a wall thickness that meets the requirements of the internal design pressure and external load design. This thickness shall govern if it exceeds the minimum thickness specified by the purchaser. Pipe-wall thickness to meet the design requirements will be determined by the appropriate formulas in AWWA Manual M11.

II.A.1. Application. The provisions of this standard cover the requirements for stainless-steel pipe for use in water treatment plants, water transmission and distribution systems, and other water facilities. The purchaser is responsible for determining whether any unusual circumstances related to the project require additional provisions that are not included in the standard. Such special conditions might affect design, manufacture, quality control, corrosion protection, or handling requirements.

II.A.2. Testing of special sections. Section 5.2.2.1 provides for nondestructive testing of the seams of specials. Section 5.2.2.2 describes test methods that may be necessary if, in the opinion of the purchaser, unusually severe conditions exist, such as surge or transient pressures that cause stresses exceeding 75 percent of yield. The requirement for this special testing should be specified at the time of purchase.

II.A.3. Roundness of pipe. The roundness of pipe during handling, shipping, joint makeup, and backfilling should be specified by the purchases. Pipe may have to be stulled to remain round during transportation, installation, and backfilling.

III. Use of This Standard. It is the responsibility of the user of an AWWA standard to determine that the products described in that standard are suitable for use in the particular application being considered.

III.A. *Purchaser Options and Alternatives.* The following items should be provided by the purchaser:

1. Standard used—that is, AWWA C220, Stainless-Steel Pipe, ½ In. (13 mm) and Larger, of latest revision.
2. Whether compliance with NSF/ANSI 61, Drinking Water System Components—Health Effects, is required, in addition to the requirements of the Safe Drinking Water Act.
3. A description of drawings detailing the total quantity of pipe required for each diameter.
4. Internal design pressure, if the manufacturer is required to design the pipe.
5. Design stress in the pipe wall at specified internal design pressure (as a percentage of minimum yield point of the stainless steel), if the manufacturer is required to design the pipe.
6. Minimum wall thickness required by considerations other than internal design pressure, if the manufacturer is required to design the pipe.
7. Details of other federal, state, local, and provincial requirements.
8. Specification of pipe standard or stainless-steel grade, if there is a preference (Sec. 4.2.2), or desired physical properties for "ordering to chemistry only" (Sec. 3[3], 3[18], 4.2.3.2, and 4.2.4).
9. Drawings and calculations to be furnished by the manufacturer, when required (Sec. 4.3.1), if the manufacturer is required to design the pipe.
10. Protective lining and coating, if required (Sec. 4.3.3).
11. Welding (Sec. 4.4.2 and 4.4.3).
12. Qualification code for welding operators, if different from Sec. 4.4.3.4.1.
13. Length of pipe sections; random or specified lengths (Sec. 4.5.4).
14. Type of pipe ends; description or drawings (Sec. 4.6).
15. Drawing of butt straps and instructions as to whether or not butt straps are to be supplied separately or attached to the pipe (Sec. 4.6.5).
16. Requirements for reports of tests of rubber-gasket materials (Sec. 4.6.7.1.3).
17. Requirements for cleaning and descaling (Sec. 4.8).
18. All special sections, indicating for each component part the dimensions or standard designation (Sec. 4.9.1) and the grade of material required (Sec. 4.9.2).

19. Type of flange, pressure rating, class, and inside diameter (ID) (Sec. 4.9.2.1).
20. Instructions regarding inspection at the place of manufacture (Sec. 5.l).
21. Minimum hydrostatic test pressure, if required and different from Sec. 5.2.1.
22. Method of nondestructive testing to be used for special sections (Sec. 5.2.2.1) or, in the case of severe service conditions, the requirements for hydrostatic testing of special sections (Sec. 5.2.2.2).
23. Requirements of marking, line diagrams, or laying schedules (Sec. 6.1).
24. Special handling and capping requirements (Sec. 6.2).
25. Certification of compliance, if required (Sec. 6.3).

III.B. *Modification to Standard.* Any modification of the provisions, definitions, or terminology in this standard must be provided by the purchaser.

IV. Major Revisions. Major revisions made to this standard in this edition include the following:

1. The standard now includes ½ in. (13 mm) and larger pipe.
2. ASTM A790/A790M was added.
3. ASTM A240/240M-Alloys 2205 and 2304 were added.
4. Welding procedures and qualifications were changed to AWS D1.6.
5. MSS SP-119 belled-end-socket fittings were added.
6. Hydrostatic testing was changed to a purchaser-specified requirement.
7. Additional requirements were added to Sec. 6.2.

V. Comments. If you have any comments or questions about this standard, please call the AWWA Volunteer & Technical Support Group at 303.794.7711, FAX 303.795.7603, write to the group at 6666 West Quincy Avenue, Denver, CO 80235-3098, or e-mail at standards@awwa.org.

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American Water Works Association

AWWA C220-07
(Revision of ANSI/AWWA C220-98)

AWWA Standard

Stainless-Steel Pipe, ½ In. (13 mm) and Larger

SECTION 1: GENERAL

Sec. 1.1 Scope

This standard pertains to unannealed austenitic stainless-steel pipe that is longitudinal-seam or spiral-seam welded, 1/2 in. (13 mm) in nominal diameter and larger, intended for the transmission and distribution of water and for use in other water-supply system facilities. These materials are especially suited for the handling of high-purity, deionized, and ozonated water.

Sec. 1.2 Purpose

The purpose of this standard is to provide purchasers, manufacturers, and constructors with the minimum requirements for stainless-steel pipe, 1/2 in. (13 mm) and larger, including fabrication and testing requirements.

Sec. 1.3 Application

This standard can be referenced in specifications for purchasing and receiving stainless-steel pipe, 1/2 in. (13 mm) and larger. This standard can be used as a guide for manufacturing this type of stainless-steel pipe. The stipulations of this standard