ANSI/AWWA C220-17
(Revision of ANSI/AWWA C220-12)

American Water Works Association

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AWWA Standard

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

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STANDARD
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AWWA Standard

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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.

Foreword

This foreword is for information only and is not a part of ANSI/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 ANSI/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. The third edition was approved on Jan. 16, 2005. The fourth edition was approved on Jan. 22, 2012. This fifth edition was approved on June 11, 2017.

I.C. *Acceptance.* In May 1985, the U.S. 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 Water Research Foundation (formerly 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. Specific policies of the state or local agency.

* American National Standards Institute, 25 West 43rd Street, Fourth Floor, New York, NY 10036.
† NSF International, 789 North Dixboro Road, Ann Arbor, MI 48113.
‡ Persons outside the United States should contact the appropriate authority having jurisdiction.

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

3. 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 jurisdictions. 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.

ANSI/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 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.* ANSI/AWWA C220 pertains to the manufacture and testing of the stainless-steel pipe cylinder. ANSI/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; (2) external pressure; (3) special physical loading, such as continuous-beam loading with saddle supports or ring girders, vacuum conditions, type of joint used, and variations in operating temperature; and (4) practical considerations for handling, shipping, or similar operations.

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

The design techniques described in AWWA Manual M11, *Steel Pipe—A Guide for Design and Installation*, are used to determine the minimum wall thicknesses of steel pipe. Pipe-wall thickness to meet the design requirements will be determined by the appropriate formulas in AWWA Manual M11 using stainless-steel material properties. The purchaser shall establish and specify the minimum wall thickness determined to be satisfactory for the service conditions of the pipe. Alternatively, the purchaser may provide the performance criteria for the pipeline and request the manufacturer to design the pipe for purchaser acceptance. The purchaser should consider the properties of the lining and coating materials, if specified, when selecting design stresses and deflection limits. The manufacturer may select materials and manufacturing processes within the limitations of this standard to produce pipe of the minimum wall thickness as specified or approved by the purchaser.

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. Sec. 5.2.2.1 describes nondestructive testing methods for weld seams of special sections that may be necessary by request of the purchaser. 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 purchaser. Pipe may have to be stulled to remain round.

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 information 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.

3. A description and/or drawings detailing the total quantity of pipe required for each diameter.

4. Internal design pressure and other service conditions, 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 strength of the stainless steel), if the manufacturer is required to design the pipe.

6. Details of other federal, state or provincial, and local requirements (Sec. 4.2.1).

7. Specification of pipe standard and stainless-steel grade, if there is a preference (Sec. 4.2.2).

8. Drawings and calculations to be furnished by the manufacturer (Sec. 4.3.1 and Sec. 4.3.2), if the manufacturer is required to design the pipe.

9. Protective lining and coating, if required (Sec. 4.3.3).

10. Welding requirements (Sec. 4.4.2 and 4.4.3).

11. Qualification code for welding operators, if different from Sec. 4.4.3.1.1.

12. Length of pipe sections; random or specified lengths (Sec. 4.5.4).

13. Type of pipe ends; description or drawings (Sec. 4.6).

14. 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).

15. Requirements for cleaning and descaling (Sec. 4.8).

16. 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).

17. Type of flange, pressure rating, class, and inside diameter (ID) (Sec. 4.9.2.1).

18. Instructions regarding inspection at the place of manufacture (Sec. 5.l).

19. Minimum hydrostatic test pressure, if required and different from Sec. 5.2.1.

20. 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).

21. Requirements of marking, line diagrams, or laying schedules (Sec. 6.1).

22. Special handling and capping requirements (Sec. 6.2).

23. Affidavit 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. In the foreword, the third paragraph of Sec. II.A, Basis of Design, was updated to remove redundancies.

2. Sec. II.A.2 was slightly revised to remove the specific defining conditions.

3. Definitions for the terms *Butt Strap* and *Out-of-Roundness* were added in Section 3.

4. Sec. 4.3.3, Protective Lining and Coating, was revised to reflect industry practice.

5. Sec. 4.4.2, Fabrication of Pipe, was revised for clarity.

6. A sentence was added to Sec. 4.6.2, Ends for Mechanically Coupled Field Joints, addressing plain-end preparation.

7. In Sec. 5.2.1.1, Hydrostatic Test, a minimum time requirement for test pressure was added.

8. A requirement was added to Sec. 5.2.2.2, Hydrostatic Testing, for the required pressure to be maintained not less than 30 seconds.

9. In Sec. 6.2.3, Finished Pipe at Delivery Destination, a sentence regarding photos and other documentation was added.

V. Comments. If you have any comments or questions about this standard, please call AWWA Engineering and Technical Services at 303.794.7711, FAX at 303.795.7603; write to the department at 6666 West Quincy Avenue, Denver, CO 80235-3098; or email at standards@awwa.org.

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AWWA Standard

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

SECTION 1: GENERAL

Sec. 1.1 Scope

This standard pertains to stainless-steel pipe that is seamless, longitudinal-seam, or spiral-seam welded; ½ in. (13 mm) in nominal diameter and larger; and intended for the transmission and distribution of potable water, wastewater, and reclaimed water, and for use in other water-supply system facilities.

Sec. 1.2 Purpose

The purpose of this standard is to provide the minimum requirements for stainless-steel pipe, ½ in. (13 mm) and larger, including materials and quality of work, fabrication of pipe, specials and fittings, testing and inspection, and marking requirements.

Sec. 1.3 Application

This standard can be referenced in documents for purchasing and receiving, as well as serving as a guide for manufacturing, stainless-steel pipe, ½ in. (13 mm) and larger. The stipulations of this standard apply when this document has been referenced and then only to stainless-steel pipe, ½ in. (13 mm) and larger.