ANSI/AWWA **C115/A21.15-25**

(Revision of ANSI/AWWA C115/A21.15-20)

AWWA Standard

Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges

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American Water Works Association

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STANDARD Since 1881

AWWA Standard

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Foreword

This foreword is for information only and is not a part of ANSI/AWWA C115/A21.15.*

I. Introduction

I.A. *Background.* American National Standards Institute (ANSI) Committee A21 on Cast-Iron Pipe and Fittings was organized in 1926 and sponsored by the American Gas Association (AGA), the American Society for Testing and Materials (ASTM), AWWA, and the New England Water Works Association (NEWWA). Between 1972 and 1984, the co-secretariats were AGA, AWWA, and NEWWA, with AWWA serving as administrative secretariat. In 1984, the committee became an AWWA committee with the name AWWA Standards Committee A21 on Ductile-Iron Pipe and Fittings. In 1988, NEWWA withdrew as a separate secretariat; however, it continues to maintain its representation on the A21 Committee. In 1997, AGA withdrew as co-secretariat.

The present scope of Committee A21 activity is the development of standards and manuals addressing ductile-iron pressure pipe for water and ductile-iron and gray-iron fittings for use with such pipe. These standards and manuals include topics such as design, dimensions, materials, coatings, linings, joints, accessories, methods of inspection and testing, and installation.

The work of Committee A21 is conducted by subcommittees. The scope of Subcommittee 1, Pipe, includes the periodic review of all current Committee A21 standards for pipe, the preparation of revisions and new standards, and other matters pertaining to pipe standards.

I.B. *History.* Flanged fittings, sizes 3 in. through 48 in. (75 mm through 1,200 mm), are described in ANSI/AWWA C110/A21.10, Ductile-Iron and Gray-Iron Fittings. Flanged fittings, sizes 54 in. through 64 in. (1,400 mm through 1,600 mm), are covered in ANSI/AWWA C153/A21.53, Ductile-Iron Compact Fittings. The flanged pipe used with these fittings has been purchased for many years in accordance with users', manufacturers', and fabricators' standards. An ANSI/AWWA standard was needed for flanged pipe. Consequently, Subcommittee 1 submitted a proposed standard for flanged pipe to Committee A21 in 1974.

The first edition of the standard was adopted in 1975. Subsequent revisions to ANSI/AWWA C115/A21.15 were prepared by the AWWA Standards Committee and

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approved by the AWWA Board of Directors in 1983, 1988, 1994, 1999, 2005, and 2010. Subcommittee 1 reviewed the 2010 edition and submitted a proposed revision to Committee A21 in 2019. The eighth edition of ANSI/AWWA C115/A21.15 was approved on Jan. 23, 2020. This edition of ANSI/AWWA C115/A21.15 was approved on Oct. 13, 2025.

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 Water Research Foundation (formerly AwwaRF) and the Conference of State Health and Environmental Managers (COSHEM). AWWA and the Association of State Drinking Water Administrators (ASDWA) joined later.

In the United States, authority to regulate products for use in, or in 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.

2. Four standards developed under the direction of NSF: NSF[‡]/ANSI/CAN[§] 60, Drinking Water Treatment Chemicals—Health Effects; NSF/ANSI/CAN 61, Drinking Water System Components—Health Effects; NSF/ANSI/CAN 372, Drinking Water System Components—Lead Content; and NSF/ANSI/CAN 600, Health Effects Evaluation and Criteria for Chemicals in Drinking Water.

3. Other references, including AWWA standards, *Food Chemicals 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/CAN 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.

[†] Persons outside the United States should contact the appropriate authority having jurisdiction.

[‡] NSF International, 789 North Dixboro Road, Ann Arbor, MI 48105.

[§] Standards Council of Canada, 55 Metcalfe Street, Suite 600, Ottawa, ON K1P 6L5 Canada.

[¶] Both publications available from National Academies Press, 500 Fifth Street NW, Washington, DC 20418.

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NSF/ANSI/CAN 600 (which formerly appeared in NSF/ANSI/CAN 60 and 61 as Annex A, "Toxicology Review and Evaluation Procedures") 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 NSF/ANSI/CAN 600 procedures may not always be identical, depending on the certifier.

ANSI/AWWA C115/A21.15 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. *Flange Material Properties.* Because this standard requires the material properties of gray-iron and ductile-iron flanges to comply with ANSI/AWWA C110/A21.10, the following material properties specified in ANSI/AWWA C110/A21.10 are listed for information purposes.

1. Gray-iron flanges, in accordance with ANSI/AWWA C110/A21.10, shall be manufactured of the following minimum tensile-strength iron listed in Table F.1.

2. Ductile-iron flanges made in accordance with ANSI/AWWA C110/A21.10 shall be manufactured of grades of ductile iron with the following minimum physical properties:

- 70,000 psi (483,000 kPa) tensile strength,
- 50,000 psi (345,000 kPa) yield strength, and
- 5 percent elongation;

or

- 65,000 psi (448,000 kPa) tensile strength,
- 45,000 psi (310,000 kPa) yield strength, and
- 12 percent elongation;

or

- 60,000 psi (414,000 kPa) tensile strength,
- 42,000 psi (290,000 kPa) yield strength, and
- 10 percent elongation.

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Table F.1 Gray-iron flange minimum tensile strength

Nominal Size*	Minimum Tensile Strength	
in.†	***psi***	***(kPa)***
3–12	25,000	(172,000)
14–24	30,000	(207,000)

* Purchasers of gray-iron flanges greater than 24 in. should contact the manufacturer or fabricator for strength requirements.

† *Metric conversions:* Dimensions: in. × 25.4 = mm.

II.B. *Special Service Requirements.* Special service conditions, such as elevated temperatures, the conveyance of acids or chemicals, and the application of a glass lining, may require special thread compounds. Special service requirements must be specified by the purchaser.

Please note the apparent conflict between this standard and ASME B16.1** with regard to pressure ratings for pipe flanges.

All flanges provided in accordance with ANSI/AWWA C115/A21.15 are rated†† for water service of 250 psi (1,720 kPa) or greater working pressure. These flanges have facing and drilling identical to ASME B16.1, Class 125 flanges. ASME B16.1, Class 125 flanges for service at temperatures ranging from 20°F to 150°F (-6.7°C to 65.6°C) are pressure–temperature rated for 150 psi to 200 psi (1,030 kPa to 1,380 kPa), depending on the flange size, class or grade of iron, and fluid temperature. ASME B16.1 covers both flanges and flanged fittings for service at both ambient and elevated temperatures.

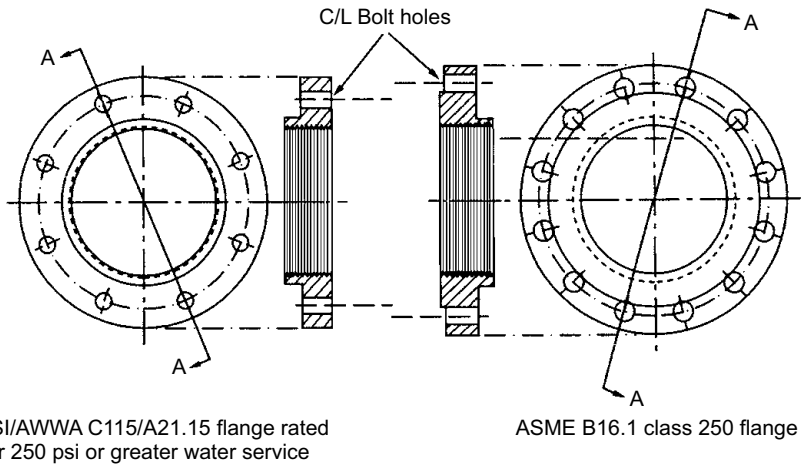
ASME B16.1 also describes Class 250 flanges that are heavier, have a larger bolt circle, and use larger bolts than Class 125 flanges or the flanges described in ANSI/AWWA C115/A21.15 and ANSI/AWWA C110/A21.10. Class 250 flanges will not bolt to ASME B16.1, Class 125, ANSI/AWWA C115/A21.15, or ANSI/AWWA C110/A21.10 flanges. (See the example illustrated in Figure F.1.)

Dimensions of ANSI/AWWA C115/A21.15 flanges correspond to those of ANSI/AWWA C207, Class E flanges. They also have the same outside diameter (OD), bolt

** ASME B16.1, Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250. Available from ASME, Two Park Avenue, New York, NY 10016.

†† The 250-psi (1,720-kPa) joint rating is dependent on gaskets, installation, and other factors beyond the scope of this standard and has evolved over an extended period of time of satisfactory performance. This rating was developed before the use of ductile-iron flanges. Ductile-iron pipe with ductile-iron screwed-on flanges can now be rated for a working pressure of 350 psi (2,413 kPa) for 24-in. (610-mm) and smaller sizes, and 250 psi (1,720 kPa) for 30-in. (762-mm) to 64-in. (1,626 mm) sizes. A surge allowance of 100 psi (689 kPa) may be added to these working pressures. Refer to ANSI/AWWA C150/A21.50 for calculation methods for pipe barrels. Special gaskets are required for flanged joints with working pressures above 250 psi (1,720 kPa). Note that the strength of all ductile-iron flanges will be greater than that of gray-iron flanges.

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A—cross section A-A; C/L—centerline

Figure F.1 Comparison of flange dimensions

circle diameter, and number of bolts as ANSI/AWWA C207, Class B and D flanges, but bolt sizes and holes or flange thicknesses are different. Also, they will not match ANSI/AWWA C207, Class F flanges.

II.C. *Advisory Information.* Purchasers of pipe conforming to this standard are advised that the purchaser's specification or purchase order should address delivery instructions and acceptance. Normally, the purchaser examines the pipe at the point of delivery to verify conformance with the specification or purchase order and inspects for damage. The purchaser should carefully document any nonconformance or damage and promptly notify the appropriate parties (manufacturer, fabricator, supplier, carrier, etc.) because these parties may not be liable if nonconformance or damage is discovered later. The purchaser should also require the carrier's agent to record shortages or damage on the delivery receipt before leaving the point of delivery.

This standard defines both manufacturer and fabricator. A manufacturer may manufacture the pipe or the flange and fabricate the finished product and, therefore, be identified by both terms. A fabricator may procure the pipe and flanges and fabricate the finished product and, therefore, would not be labelled a manufacturer for the purposes of this standard.

II.D. *Chlorine and Chloramine Degradation of Elastomers*. The selection of materials is critical for water service and distribution piping in locations where there is a possibility that elastomers will be in contact with chlorine or chloramines. Documented research has shown that elastomers such as those used for gaskets, seals, valve seats, and encapsulations may be degraded when exposed to chlorine or chloramines. The impact of degradation is a function of the type of elastomeric material, chemical concentration,

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contact time, contact surface area, elastomer cross section, environmental conditions as well as temperature. Careful selection of and specifications for elastomeric materials and the specifics of their application for each water system component should be considered to provide long-term usefulness and minimum degradation (swelling, loss of elasticity, or softening) of the elastomer specified.

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, ANSI/AWWA C115/A21.15, Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges, of latest revision.
2. Whether compliance with NSF/ANSI/CAN 61, Drinking Water System Components—Health Effects, is required.
3. Required information
    a. Size.
    b. Finished length.
    c. Linings.
        (1) Cement–mortar lining (Sec. 4.5.2). Experience has indicated that asphaltic inside coating is not complete protection against loss in pipe capacity because of tuberculation. Cement–mortar linings are recommended for most waters.
        (2) Asphaltic lining (Sec. 4.5.3).
        (3) Special linings (Sec. 4.5.5).
        (4) No lining.
    d. Working pressure, if higher than 250 psi (1,720 kPa).
    e. Details of federal, state, provincial, territorial, and local requirements (Sec. 4.1.1).
    f. For applications other than potable water, whether compliance with NSF/ANSI/CAN 61, Drinking Water System Components—Health Effects, is required (Sec. 4.1.2).
4. Optional information.
    a. Pipe wall thickness, if greater than shown in Table 1 of the standard (Sec. 4.2.2).
    b. Solid or hollow-back flange (Sec. 4.3.1).
    c. Type of material to be used in the flanges (Sec. 4.3.3).

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d. Flanges tapped for studs and stud bolt dimensions (Sec. 4.3.4).
e. Bolt-hole alignment (Sec. 4.4.4).
f. Outside coating (Sec. 4.5.1).
g. Special coatings (Sec. 4.5.5).
h. Inspection by purchaser (Sec. 5.2.1). If the purchaser wishes to inspect flanged pipe at the manufacturer's or fabricator's plant, the purchaser shall specify the conditions (such as time and the extent of inspection) under which the inspection shall be made.
i. Affidavit of compliance (Sec. 5.3). If required by the purchaser, the manufacturer or fabricator shall provide an affidavit of compliance that the flanged pipe complies with the requirements of this standard.
j. Special elastomer gaskets, if required for wastewater, reclaimed water, or other special service applications (Foreword Sec. II.D and Appendix A.2).

III.B. *Modification of 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 the standard in this edition include the following:

1. Updated boilerplate language in accordance with AWWA Standards Council requirements.

2. Clarified iron-grade physical property requirements in Sec. II.A of the Foreword.

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

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AWWA Standard

Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges

SECTION 1: GENERAL

Sec. 1.1 Scope

This standard describes 3-in. through 64-in. (80-mm through 1,600-mm) flanged ductile-iron pipe with ductile-iron or gray-iron threaded flanges for potable water, wastewater, and reclaimed water service. Flanged pipe and flanges are rated for a maximum working pressure of 250 psi (1,720 kPa). However, 24-in. (600-mm) and smaller flange joints with ductile-iron flanges may be rated for a maximum working pressure of 350 psi (2,413 kPa), as noted in the footnote of Table 1.

Sec. 1.2 Purpose

The purpose of this standard is to provide the minimum requirements for flanged ductile-iron pipe with ductile-iron or gray-iron threaded flanges.

Sec. 1.3 Application

This standard or sections of this standard can be referenced in documents for purchasing and receiving flanged ductile-iron pipe. This standard can be used as a guide for casting, fabricating, and inspecting flanged ductile-iron pipe. The

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