

American Water Works Association
ANSI/AWWA C115/A21.15-99
(Revision of ANSI/AWWA C115/A21.15-94)



AMERICAN NATIONAL STANDARD
FOR
FLANGED DUCTILE-IRON PIPE
WITH DUCTILE-IRON OR GRAY-IRON
THREADED FLANGES



Administrative Secretariat
AMERICAN WATER WORKS ASSOCIATION

Co-secretariat
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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.

SEC.	PAGE	SEC.	PAGE
Foreword		5 Verification	
I	Introduction..... vi	5.1	Quality Control and Inspection 7
I.A	Background..... vi	5.2	Inspection by Purchaser 7
I.B	History vi	6 Delivery 7	
I.C	Acceptance vi	Appendixes	
II	Special Issues vii	A	Bolts, Gaskets, and Installation..... 9
II.A	Flange Material Properties vii	B	Typical Pipe/Flange Thread Construction 11
II.B	Special Service Requirements..... viii	C	Wall Pipe 12
II.C	Advisory Information..... viii	Figures	
III	Use of This Standard..... ix	F.1	Comparison of Flange Dimensions ix
III.A	Purchaser Options and Alternatives..... ix	1	Solid Flange Details 4
III.B	Modification of Standard..... x	2	Hollow-Back Flange Details 5
IV	Major Revisions..... x	B.1	Typical Pipe and Flange Thread Construction 11
V	Comments x	C.1	Typical Flanged Wall Pipe Installations 13
Standard		Tables	
1 General		1	Ductile-Iron Pipe for Use With Threaded Flanges 2
1.1	Scope 1	2	Solid Gray- or Ductile-Iron Flange Dimensions..... 4
1.2	Purpose 1	3	Hollow-Back Ductile-Iron Flange Dimensions..... 5
1.3	Application..... 1	A.1	Flange Gasket Details..... 10
2 References 2		C.1	Collar Dimensions 12
3 Definitions 3		C.2	Suggested Minimum “Face to Wall” Dimensions 13
4 Requirements			
4.1	Pipe Barrel 3		
4.2	Flanges..... 3		
4.3	Fabrication 6		
4.4	Coatings and Linings..... 6		
4.5	Marking 7		

Foreword

This foreword is for information only and is not 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 named AWWA Standards Committee A21 on Ductile-Iron Pipe and Fittings. Committee A21 develops standards and manuals addressing ductile-iron pressure pipe for water and other liquids; and ductile-iron and gray-iron fittings for use with this type of pipe. These standards and manuals include design, dimensions, materials, coatings, linings, joints, accessories, and methods of inspection and testing.

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. (76 mm through 1,219 mm) are described in ANSI/AWWA C110/A21.10, American National Standard for Ductile-Iron and Gray-Iron Fittings, 3 In. Through 48 In. (76 mm Through 1,219 mm), for Water. Flanged fittings sizes 54 In. Through 64 In. (1,400 mm Through 1,600 mm) are covered in ANSI/AWWA C153/A21.53, American National Standard for Ductile-Iron Compact Fittings, 3 In. Through 24 In. (76 mm Through 610 mm) and 54 In. Through 64 In. (1,400 mm Through 1,600 mm), for Water Service. The flanged pipe used with these fittings has been purchased for many years in accordance with users', manufacturers', and fabricators' standards. An ANSI 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, with subsequent editions published in 1983, 1988, and 1994. Subcommittee 1 reviewed the 1994 edition and submitted a proposed revision to Committee A21 in 1999. This edition was approved on June 20, 1999.

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 all 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 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

*Persons in Canada, Mexico, and non-North American countries should contact the appropriate authority having jurisdiction

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.
2. Specific policies of the state or local agency.
3. Two standards developed under the direction of NSF, ANSI*/NSF† 60, Drinking Water Treatment Chemicals—Health Effects, and ANSI/NSF 61, Drinking Water System Components—Health Effects.
4. 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 ANSI/NSF 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.

Appendix A, “Toxicology Review and Evaluation Procedures,” to ANSI/NSF 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 Appendix A procedures may not always be identical, depending on the certifier.

ANSI/AWWA C115/A21.15 does not address additives requirements. Therefore, 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. *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 below 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.

Nominal Size* <i>in.</i> †	Minimum Tensile Strength	
	<i>psi</i>	<i>(kPa)</i>
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.

† To convert inches to millimetres, multiply by 25.4.

* American National Standards Institute, 11 W. 42nd St., New York, NY 10036.

† NSF International, 3475 Plymouth Rd., Ann Arbor, MI, 48106.

‡ Both publications available from National Academy of Sciences, 2102 Constitution Ave. N.W., Washington, DC 20418.

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

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

II.B. *Special Service Requirements.* Special service conditions, such as elevated temperatures, the conveyance of acids or chemicals, and the application of 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/ANSI 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/ANSI B16.1, class 125 flanges. ASME/ANSI B16.1, class 125 B16.1 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/ANSI B16.1 covers both flanges and flanged fittings for service at both ambient and elevated temperatures.

ASME/ANSI 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/ANSI 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 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,

*ASME/ANSI B16.1, Cast-Iron Pipe Flanges and Flanged Fittings. Available from American National Standards Institute, 11 W. 42nd St., New York, NY 10036; or American Society of Mechanical Engineers, 345 E. 47th St., New York, NY 10017.

†The 250 psi 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 prior to 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 for 12" and smaller sizes, and 250 psi for 14"–64" sizes. A surge allowance of 100 psi 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. Note that the strength of all ductile-iron flanges will be greater than that of gray-iron flanges.