



**American Water Works
Association**

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ANSI/AWWA C116/A21.16-15
(Revision of ANSI/AWWA C116/A21.16-09)

AWWA Standard

Protective Fusion-Bonded Coatings for the Interior and Exterior Surfaces of Ductile-Iron and Gray- Iron Fittings

Effective date: Nov. 1, 2015.

First edition approved by AWWA Board of Directors June 21, 1998.

This edition approved June 7, 2015.

Approved by American National Standards Institute July 31, 2015.



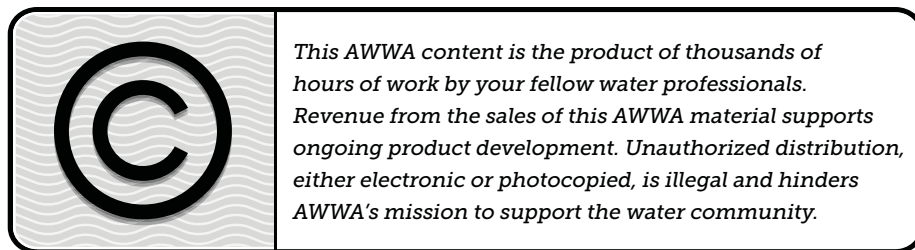
AWWA Standard

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ISBN-13, print: 978-1-62576-121-7

eISBN-13, electronic: 978-1-61300-350-3

DOI: <http://dx.doi.org/10.12999/AWWA.C116.15>

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Committee Personnel

The AWWA A21 Standards Subcommittee 4, Coatings and Linings, which reviewed and approved this standard, had the following personnel at the time of approval:

Gregg Horn, *Chair*

General Interest Members

D.H. Kroon, Corrpro Companies Inc., Houston, Texas	(AWWA)
J.R. Plattsmier, HDR Engineering Inc., Denver, Colo.	(AWWA)
E.S. Ralph,* Standards Engineer Liaison, AWWA, Denver, Colo.	(AWWA)
P.A. Selig, Consultant, Birmingham, Ala.	(AWWA)
K.E. Wilson, Ken Wilson Engineering, Valrico, Fla.	(AWWA)

Producer Members

C. Comins, Custom Fab Inc., Orlando, Fla.	(AWWA)
J.H. Eddings, Atlantic States Cast Iron Pipe Company, Phillipsburg, N.J.	(AWWA)
M.D. Gaston, American Ductile Iron Pipe Company, Birmingham, Ala.	(AWWA)
L.G. Horn, Ductile Iron Pipe Research Association, Birmingham, Ala.	(AWWA)
A.M. Horton, US Pipe & Foundry Company, Birmingham, Ala.	(AWWA)
H. Kennedy Jr., Harold Kennedy & Associates, Fuquay Varina, N.C.	(AWWA)
V. O'Dea, Themec Company, Kansas City, Mo.	(AWWA)
G. Oliver,† American Cast Iron Pipe Company, Birmingham, Ala.	(AWWA)

User Members

D.T. Bradley, Oak Lodge Water District, Portland, Ore.	(AWWA)
M.J. Britch, Tualatin Valley Water District, Beaverton, Ore.	(AWWA)
W.C. Duke, Bureau of Reclamation, Denver, Colo.	(AWWA)
J.M. Kennedy, Tampa Bay Water, Clearwater, Fla.	(AWWA)
R.L. Worden, COMCD, Norman, Okla.	(AWWA)

* Liaison, nonvoting

† Alternate

AWWA Standards Committee A21, Ductile-Iron Pipe and Fittings, which reviewed and approved this standard, had the following personnel at the time of approval:

John R. Plattsmier, *Chair*

General Interest Members

M.B. Horsley, Horsley Engineering LLC, Overland Park, Kan.	(AWWA)
D.H. Kroon, Corrpro Companies Inc., Houston, Texas	(AWWA)
D.D. Lary,* Wright-Pierce, Topsham, Maine	(NEWWA)
G.E. Laverick, Underwriters Laboratories Inc., Northbrook, Ill.	(AWWA)
P.J. Mourt, Hatch Mott MacDonald, Milburn, N.J.	(AWWA)
J.R. Plattsmier, HDR Engineering Inc., Denver, Colo.	(AWWA)
S. Pool,* HDR Engineering, Denver, Colo.	(AWWA)
E.S. Ralph,† Standards Engineer Liaison, AWWA, Denver, Colo.	(AWWA)
T.M. Stinson, Kleinfelder SEA Company, Holbrook, Mass.	(NEWWA)
L.C. Yates, McGoodwin, Williams & Yates, Fayetteville, Ark.	(AWWA)

Producer Members

L.R. Dunn, US Pipe & Foundry Company, Birmingham, Ala.	(DIPRA)
J.H. Eddings, Atlantic States Cast Iron Pipe Company, Phillipsburg, N.J.	(AWWA)
J.A. Fancher,* American Cast Iron Pipe Company, Birmingham, Ala.	(AWWA)
M.D. Gaston, American Ductile Iron Pipe Company, Birmingham, Ala.	(AWWA)
L.G. Horn, Ductile Iron Pipe Research Association, Birmingham, Ala.	(AWWA)
J.C. Jones, RCT, Los Angeles, Calif.	(AWWA)
H. Kennedy Jr., Harold Kennedy & Associates, Fuquay Varina, N.C.	(AWWA)
J. Lambert,* US Pipe & Foundry Company, Birmingham, Ala.	(AWWA)
T.J. Muntz, Fab Pipe Inc., Rogers, Minn.	(AWWA)

User Members

D.T. Bradley, Oak Lodge Water District, Portland, Ore.	(AWWA)
M.J. Britch, Tualatin Valley Water District, Beaverton, Ore.	(AWWA)
A.J. DeBoy,* Indiana American Water, Greenwood, Ind.	(AWWA)
W.C. Duke, Bureau of Reclamation, Denver, Colo.	(AWWA)

* Alternate

† Liaison, nonvoting

M.W. Griffin, American Water Company, St. Louis, Mo.	(AWWA)
J.M. Kennedy, Tampa Bay Water, Clearwater, Fla.	(AWWA)
D.D. Montgomery, Independence Water Department, Independence, Mo.	(AWWA)
K.C. Morgan,* Standards Council Liaison, Town of Gilbert, Gilbert, Ariz.	(AWWA)
G.M. Page, Cobb County–Marietta Water Authority, Marietta, Ga.	(AWWA)
C.J. Patla, Connecticut Water Service Inc., Clinton, Conn.	(AWWA)
T.J. Roode, Denver Water, Denver, Colo.	(AWWA)
P.A. Shively, City of Kansas City, Kansas City, Mo.	(AWWA)
R.L. Worden, COMCD, Norman, Okla.	(AWWA)

* Liaison, nonvoting

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Foreword

This foreword is for information only and is not a part of ANSI/AWWA C116/A21.16-15.*

I. Introduction.

I.A. *Background.* Ductile-iron and gray-iron fittings used for water service are normally furnished with a cement–mortar lining in accordance with ANSI/AWWA C104/A21.4, Cement–Mortar Lining for Ductile-Iron Pipe and Fittings, for internal corrosion protection. Additionally, polyethylene encasement in accordance with ANSI/AWWA C105/A21.5, Polyethylene Encasement for Ductile-Iron Pipe Systems, is normally used for external corrosion protection of ductile-iron and gray-iron fittings for buried applications in corrosive environments.

The purpose of this standard is to provide purchasers and manufacturers with the minimum requirements for protective fusion-bonded coatings and linings for the interior and exterior surfaces of ductile-iron and gray-iron fittings used for water service. The standard describes the material, application, and performance requirements for these coatings and linings and can be referenced in specifications for purchasing fittings with an interior and exterior fusion-bonded epoxy or polyolefin coating.

I.B. *History.* American National Standards Committee A21 on Cast-Iron Pipe and Fittings was organized in 1926 under the sponsorship of the American Gas Association (AGA), the American Society for Testing and Materials (ASTM), the American Water Works Association (AWWA), and the New England Water Works Association (NEWWA). Between 1972 and 1984, the cosecretariats were AGA, AWWA, and NEWWA, with AWWA serving as administrative secretariat. In 1984, the committee became an AWWA committee called AWWA Standards Committee A21 on Ductile-Iron Pipe and Fittings.

The present scope of Committee A21 activity is to develop standards and manuals that address ductile-iron pressure pipe for water supply service and ductile-iron and gray-iron fittings for use with such 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 4, Coatings and Linings, includes the periodic review of current A21 standards for interior and exterior protection of ductile-iron pipe and ductile-iron and gray-iron

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

fittings, the preparation of revisions and new standards when needed, and the examination of other matters pertaining to standards for interior and exterior protection of pipe and fittings.

In 1994, the AWWA Standards Council approved the development of an AWWA standard for protective fusion-bonded epoxy coatings for the interior and exterior surfaces of ductile-iron and gray-iron fittings for water service and assigned this project to Committee A21. Consequently, Subcommittee 4 submitted a proposed standard for fusion-bonded coatings to Committee A21 in 1997. The first edition of the standard was adopted in 1998. Subsequent revisions to ANSI/AWWA C116/A21.16 were approved by the AWWA Board of Directors in 2003 and 2009. This fourth edition of C116 was approved on June 7, 2015.

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). 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 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: NSF/ANSI 60, Drinking Water Treatment Chemicals—Health Effects, and NSF/ANSI 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.

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

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

‡ Both publications available from National Academy of Sciences, 500 Fifth Street, NW, Washington, DC 20001.

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 C116 does not address additives requirements. Thus, 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. Holiday testing requires special handling and treatment of fittings and is not a routine production test. If experience indicates that severe service conditions exist that justify the added expense, the purchaser documents shall request a coating tested in accordance with ASTM G62 method A or method B, at the discretion of the applicator (low voltage, wet sponge).

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 covered by the purchaser:

1. Standard used—that is, ANSI/AWWA C116/A21.16, Protective Fusion-Bonded Coatings for the Interior and Exterior Surfaces of Ductile-Iron and Gray-Iron Fittings, of latest revision.
2. Details of other federal, state or provincial, and local requirements (Sec. 4.1.1).
3. For applications other than potable water, whether compliance with NSF/ANSI 61, Drinking Water System Components—Health Effects, is required (Sec. 4.1.3).
4. Holiday testing, if required (Sec. 5.3).
5. Inspection by purchaser (Sec. 5.4).
6. Affidavit of compliance, if required (Sec. 6.3).

III.B. *Modification to Standard.* Any modification to 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. The standard was revised to incorporate fusion-bonded polyolefin coatings and linings in addition to the original fusion-bonded epoxy coatings and linings.
2. The scope was expanded to include raw water applications.
3. Definitions were added to Section 3 for potable water, raw water, reclaimed water, and wastewater to be consistent with Standards Council boilerplate.
4. A new Sec. 4.1.3, Certification, was added to include a requirement for NSF/ANSI 61 certification on products if they will be in contact with potable water.

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

Protective Fusion-Bonded Coatings for the Interior and Exterior Surfaces of Ductile-Iron and Gray-Iron Fittings

SECTION 1: GENERAL

Sec. 1.1 Scope

This standard describes protective fusion-bonded coatings for the interior and exterior surfaces of ductile-iron and gray-iron fittings used for raw water, potable water, reclaimed water systems, and nonaggressive wastewaters. The standard describes the material, application, and performance requirements for these coatings.

This standard does not describe coatings agreed on between the purchaser and the manufacturer for special service conditions, such as saltwater, sewers, acid, high temperature, and so forth.

Sec. 1.2 Purpose

The purpose of this standard is to provide purchasers, manufacturers, and applicators with the minimum requirements for fusion-bonded coatings and linings for the interior and exterior of fittings.

Sec. 1.3 Application

This standard, or sections of this standard, can be referenced in the purchaser's documents for fittings with an interior and exterior fusion-bonded coating. For