ANSI/AWWA C219-23

(Revision of ANSI/AWWA C219-17)

AWWA Standard

Bolted Sleeve-Type Couplings for Plain-End Pipe

Effective date: October 1, 2023.
First edition approved by Board of Directors June 23, 1991.
This edition approved June 9, 2023.
Approved by American National Standards Institute May 5, 2023.

American Water Works Association

Approved American National Standard ANSI

STANDARD Since 1881

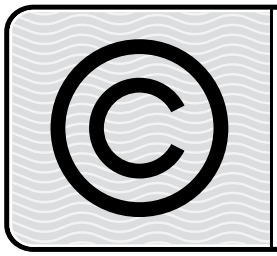
AWWA Standard

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. This standard does not supersede or take precedence over or displace any applicable law, regulation, or codes of any governmental authority. AWWA standards are intended to represent a consensus of the water industry that the product described will provide satisfactory service. When AWWA revises or withdraws this standard, an official notice of action will be placed in the Official Notice 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.

American National Standard

An American National Standard implies a consensus of those substantially concerned with its scope and provisions. An American National Standard is intended as a guide to aid the manufacturer, the consumer, and the general public. The existence of an American National Standard does not in any respect preclude anyone, whether that person has approved the standard or not, from manufacturing, marketing, purchasing, or using products, processes, or procedures not conforming to the standard. American National Standards are subject to periodic review, and users are cautioned to obtain the latest editions. Producers of goods made in conformity with an American National Standard are encouraged to state on their own responsibility in advertising and promotional materials or on tags or labels that the goods are produced in conformity with particular American National Standards.

Caution Notice: The American National Standards Institute (ANSI) approval date on the front cover of this standard indicates completion of the ANSI approval process. This American National Standard may be revised or withdrawn at any time. ANSI procedures require that action be taken to reaffirm, revise, or withdraw this standard no later than five years from the date of ANSI approval. Purchasers of American National Standards may receive current information on all standards by calling or writing the American National Standards Institute, 25 West 43rd Street, Fourth Floor, New York, NY 10036; 212.642.4900; or emailing info@ansi.org.



All rights reserved. No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including scanning, recording, or any information or retrieval system. Reproduction and commercial use of this material is prohibited, except with written permission from the publisher. Please send any requests or questions to permissions@awwa.org.

ISBN-13, print: 978-1-64717-146-9

ISBN-13, electronic: 978-1-61300-677-1

DOI: http://dx.doi.org/10.12999/AWWA.C219.23

All rights reserved. No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including scanning, recording, or any information or retrieval system. Reproduction and commercial use of this material is prohibited, except with written permission from the publisher. Please send any requests or questions to permissions@awwa.org.

Copyright © 2023 by American Water Works Association
Printed in USA

Copyright © 2023 by American Water Works Association. All Rights Reserved

Committee Personnel

The Steel Water Pipe Manufacturers Technical Advisory Committee (SWPMTAC) Task group for C219, which updated this standard, had the following personnel at the time:

Ram N. Satyarthi, *Chair*

Jay Forni, Jr., *Vice-Chair*

L. Aulich, Mueller Company, Chattanooga, Tenn.
E. Bird, Smith-Blair Inc., Texarkana, Tex.
W. Biery, Victaulic, Center Valley, Pa.
S. Bradberry, Ford Meter Box Company Inc., Pell City, Ala.
R.J. Card, Manufacturers Consultant, Sugar Hill, Ga.
R. Collins, JCM Industries Inc., Nash, Tex.
J. Forni, Jifco Inc., Livermore, Calif.
B.D. Keil, Northwest Pipe Company, Draper, Utah
A. Lemke, Romac Industries Inc., Bothell, Wash.
M. Levine, Straub Coupling, Scottsdale, Ariz.
J.L. Luka, American SpiralWeld Pipe Company, Columbia, S.C.
D. Piontek, Total Piping Solutions Inc., Olean, N.Y.
J. Reinheimer, Robar Industries, Surrey, B.C., Canada
R.N. Satyarthi, Baker Coupling Company Inc., Los Angeles, Calif.
A. Steffan, Dresser Inc., Bradford, Pa.
G. Tate, Viking Johnson/Crane, Hitchin, United Kingdom
M. Zimmerle, Cascade Waterworks Manufacturing Company, Yorkville, Ill.

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

John H. Bambei Jr., *Chair*

Bob J. Card, *Vice-Chair*

John L. Luka, *Secretary*

General Interest Members

S.A. Arnaout (*alternate*), Stantec, Dallas, Tex.
J.H. Bambei Jr., Bambei Engineering Services, Arvada, Colo.
R.J. Card, Lockwood, Andrews & Newnam Inc., Houston, Tex.

Copyright © 2023 by American Water Works Association. All Rights Reserved

R.L. Gibson, Freese and Nichols Inc., Fort Worth, Tex.
M.D. Gossett, HDR, Denver, Colo.
M.B. Horsley (*alternate*), Horsley Engineering LLC, Overland Park, Kans.
R. Issa, AECOM, McKinney, Tex.
C.H. Kirby (*alternate*), Lockwood, Andrews & Newnam Inc., Houston, Tex.
R.A. Kufaas, Norske Corrosion & Inspection Services Ltd., Surrey, B.C., Canada
D.L. McPherson (*alternate*), HDR, Charlotte, N.C.
A. Murdock, Jacobs Engineering, Salt Lake City, Utah
R. Ortega, Aurora Technical Services, Houston, Tex.
E.S. Ralph (*liaison, nonvoting*), Standards Engineer Liaison, AWWA, Denver, Colo.
A.E. Romer (*alternate*), AECOM, Orange, Calif.
J.R. Snow, Stantec, Denver, Colo.
A.M. Stanton, Black & Veatch, Los Angeles, Calif.
W.R. Whidden, Woolpert, Winter Park, Fla.

Producer Members

H.H. Bardakjian, Consultant, Glendale, Calif.
D.A. Dechant, Dechant Infrastructure Service, Aurora, Colo.
D.W. Dunker, Thompson Pipe Group, Grand Prairie, Tex.
W.B. Geyer, Steel Plate Fabricators Associates, Lake Zurich, Ill.
B.D. Keil, Northwest Pipe Company, Salt Lake City, Utah
J.L. Luka, American SpiralWeld Pipe Company, Columbia, S.C.
R.D. Mielke (*alternate*), Northwest Pipe Company, Raleigh, N.C.
G.F. Ruchti (*alternate*), Consultant, Punta Gorda, Fla.
B.P. Simpson (*alternate*), American Cast Iron Pipe Company, Birmingham, Ala.
C.C. Sundberg, Victaulic, Issaquah, Wash.
R. Wu (*alternate*), Thompson Pipe Group, Grand Prairie, Tex.

User Members

L. Adams, US Bureau of Reclamation, Denver, Colo.
G.A. Andersen, New York City Bureau of Water Supply, Little Neck, N.Y.
B. Cheng, Metro Vancouver, Burnaby, B.C., Canada
B. Fountain, San Diego County Water Authority, San Diego, Calif.
J. Fox, Tampa Bay Water, Clearwater, Fla.
J. Garcia (*alternate*), Metropolitan Water District of Southern California, Los Angeles, Calif.

Copyright © 2023 by American Water Works Association. All Rights Reserved

S. Hattan, Tarrant Regional Water District, Fort Worth, Tex.

M. Lobik, Springfield Water & Sewer Commission, Springfield, Mass.

T. Peng, Metropolitan Water District of Southern California, Los Angeles, Calif.

G. Ramon (*liaison, nonvoting*), Standards Council Liaison, Little Rock Water Reclamation Authority, Little Rock, Ark.

V. Scutelnicu, Los Angeles Department of Water and Power, Los Angeles, Calif.

M. Turney (*alternate)*, Denver Water, Denver, Colo.

Copyright © 2023 by American Water Works Association. All Rights Reserved

This page intentionally blank.

Copyright © 2023 by American Water Works Association. All Rights Reserved

Contents

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

SEC. PAGE

Foreword

I Introduction. ix
I.A Background ix
I.B History ix
I.C Acceptance ix
II Special Issues. x
II.A Advisory Information on Product Application x
II.B Chlorine and Chloramine Degradation of Elastomers x
II.C Gasket Degradation Study xi
III Use of This Standard xi
III.A Purchaser Options and Alternatives xi
III.B Modification to Standard xii
IV Major Revisions xii
V Comments xiii

Standard

1 General

1.1 Scope 1
1.2 Purpose 1
1.3 Application 1

2 References 2

3 Definitions 4

4 Requirements

4.1 Permeation 7
4.2 Materials of Construction 7
4.3 Design of Bolted Couplings 9
4.4 Detailed Design and Manufacture 11
4.5 Performance 12
4.6 Coatings 13
4.7 Installation 14

5 Verification

5.1 Inspection 16
5.2 Tests 16
5.3 Nonconformance 18

6 Delivery

6.1 Marking 18
6.2 Packaging and Shipping 18
6.3 Affidavit of Compliance 18

Figures

1 Typical Straight Coupling 4
2 Typical Coupling Configurations 5

Tables

1 Minimum Physical Properties of Gasket Material 8
2 Minimum Center-Sleeve Length 10
3 Maximum Angular Deflection 13
4 Pipe-End Diameter Tolerances 14
5 Recommended Centerline Gaps 15

Copyright © 2023 by American Water Works Association. All Rights Reserved

This page intentionally blank.

Copyright © 2023 by American Water Works Association. All Rights Reserved

Foreword

This foreword is for information only and is not a part of ANSI/AWWA C219.*

I. Introduction.

I.A. *Background.* This standard describes bolted sleeve-type couplings, reducing or transition couplings, and flanged coupling adapters used to join plain-end pipe. It also includes materials of construction, inspection, and testing.

I.B. *History.* The first edition of ANSI/AWWA C219 was approved by the AWWA Board of Directors on June 23, 1991. Subsequent editions were approved on June 15, 1997, Jan. 21, 2001, Feb. 12, 2006, Jan. 23, 2011, and Jan. 14, 2017. This edition was approved on June 9, 2023.

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. 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.

---

* 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.

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

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

Copyright © 2023 by American Water Works Association. All Rights Reserved

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.

NSF/ANSI/CAN 600, (which formerly appeared in NSF/ANSI/CAN 60 & 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 C219 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. *Advisory Information on Product Application.* Bolted sleeve-type couplings have been used for joining plain-end pipe since the latter part of the nineteenth century. Currently, there are several manufacturers that produce these couplings. Though details differ, couplings of this type work the same way and have similar components: a center sleeve (sometimes called a "middle ring"), end rings (sometimes called "followers"), and threaded fasteners (bolts and nuts) that when tightened, pull the end rings together. These components compress elastomeric gaskets in the space formed between the end rings, center sleeve, and pipes being joined, thereby sealing the coupling-and-pipe combination.

II.B. *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.

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

Copyright © 2023 by American Water Works Association. All Rights Reserved

Documented research has shown that elastomers such as 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, contact surface area, elastomer cross section, and 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.

II.C. *Gasket Degradation Study.* A pipe gasket, having the hardness of a compressed elastomer with a large mass relative to the small, exposed surface area, experiences minimal degradation. This was validated in a research paper reported in the *Journal AWWA,*** where the pipe gasket degradation in a 110 mg/L chloramine solution was found to degrade just the exposed surface.

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 C219, Bolted Sleeve-Type Couplings for Plain-End Pipe, of latest revision.
2. Quantity.
3. Wall thickness, schedule, or class.
4. Flange specification for flanged coupling adapters.
5. For applications other than potable water, whether compliance with NSF/ANSI/CAN 61, Drinking Water System Components—Health Effects, is required.
6. Actual outside diameter(s) (OD) of pipe ends, including any coatings (Section 3 [Item 1]).
7. Nominal pipe size(s) (Section 3 [Item 12] and Table 4).
8. Rated pressure, including transient pressure, and the test pressure (Section 3 [Items 15, 19, and 20] and Sec. 4.3.1).
9. Details of federal, state, provincial, territorial, and local requirements (Sec. 4.2.1).
10. Operating temperature range (Sec. 4.2.3.1 and 4.2.3.2).
11. Type of service (Sec. 4.2.3.2 and 4.2.3.3).

** R.W. Bonds. 2004. Effect of Chloramines on Ductile-Iron Pipe Gaskets of Various Elastomer Compounds. *Jour. AWWA,* 96(4):153–160.

Copyright © 2023 by American Water Works Association. All Rights Reserved

12. Length and thickness of center sleeve where special performance or installation requirements exist (Sec. 4.3.2 and Table 2).

13. Anticipated angular deflection of pipes (Sec. 4.5 and Table 3).

14. Special requirements, such as coatings (Sec. 4.6.2), gasket material (Sec. 4.2.3 and 4.2.3.1), gaskets for electrical insulation (Sec. 4.2.3.3), and special type of bolting (Sec. 4.2.5).

15. Type of pipe(s), including specification to which the pipe is made or specification and tolerance of pipe ends (Sec. 4.7.2 and Table 4).

16. Purchaser's pipe-end preparation requirements (Sec. 4.7.2).

17. Additional nondestructive weld evaluation (Sec. 5.1.1.1.1).

18. Material certifications (Sec. 5.1.1.3).

19. Purchaser's inspection requirements (Sec. 5.1.2).

20. Hydrostatic test data report (Sec. 5.2.2.2).

21. Purchaser's proof test requirements (Sec. 5.2.4).

22. Marking of rated pressure (Sec. 6.1, Item 4).

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 the standard in this edition include the following:

1. Updated Sec. I.C. Acceptance in the Foreword with the latest Standards Council language reflecting the addition of reference to NSF/ANSI/CAN 372 and NSF/ANSI/CAN 600.

2. The scope was updated to include wastewater and reclaimed water since the standard is applicable to these (Sec. 1.1 and Sec. 4.2.3.1).

3. Updated Sec. 4.1 Permeation and Sec. 4.2.1 Materials compliance with the latest Standards Council boilerplate language

4. In Sec. 4.4.1.1 Steel center sleeves, the option to examine welds by radiography or ultrasonics in lieu of hydrostatic testing was moved to Sec. 5.2.3.1.

5. Sec. 4.4.2.1 Steel end rings was expanded to include information on permanent expansion, and the information on weld examination by radiography or ultrasonics was moved to Sec. 5.2.3.1 to avoid redundancy.

6. A new Sec. 4.4.4 Welding was added to address welding procedures.

7. A minimum hold time for test pressure was added to Sec. 5.2.1 Test pressures.

8. In Sec. 5.2.3.1 under Sec. 5.2.3, the subheading was revised to more accurately portray this section's intent. Production hydrostatic test was rewritten, and information

Copyright © 2023 by American Water Works Association. All Rights Reserved

on the options other than hydrostatic testing was moved here from Sec. 4.4.1.1 and Sec. 4.4.2.1 to avoid redundancy.

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

Copyright © 2023 by American Water Works Association. All Rights Reserved

This page intentionally blank.

Copyright © 2023 by American Water Works Association. All Rights Reserved

ANSI/AWWA C219-23
(Revision of ANSI/AWWA C219-17)

American Water Works Association
Dedicated to the World's Most Vital Resource®

AWWA Standard

Bolted Sleeve-Type Couplings for Plain-End Pipe

SECTION 1: GENERAL

Sec. 1.1 Scope

This standard describes bolted sleeve-type couplings, reducing or transition couplings, and flanged coupling adapters (couplings) used to join plain-end pipes. Couplings may be manufactured from carbon steel, stainless steel, or ductile iron and are intended for use in systems conveying potable water, wastewater, and reclaimed water. This standard describes nominal coupling sizes ½ in. (13 mm)* and larger.

Sec. 1.2 Purpose

The purpose of this standard is to provide the minimum requirements for couplings of plain-end pipe, including requirements for materials, design, testing and inspection, installation, and shipping.

Sec. 1.3 Application

This standard can be referenced in documents for purchasing the described couplings. The stipulations of this standard apply when this document has been referenced.

* Metric conversions given in this standard are direct conversions of US customary units and are not those specified in International Organization for Standardization (ISO) standards.

Copyright © 2023 by American Water Works Association. All Rights Reserved