ANSI/AWWA C223-19
(Revision of ANSI/AWWA C223-13)

American Water Works Association

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AWWA Standard

Fabricated-Steel and Stainless-Steel Tapping Sleeves

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AWWA Standard

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Committee Personnel

The Steel Water Pipe Manufacturers Technical Advisory Committee (SWPMTAC) Task Group for AWWA C223, which reviewed and revised this standard, had the following personnel at the time:

Phillip Ray, *Chair*

E. Bird, Smith-Blair Inc., Texarkana, Ark.
S. Bradberry, Ford Meter Box Company, Pell City, Ala.
R.R. Collins, JCM Industries Inc., Nash, Tex.
B. Dix, Felker Brothers Corp., Marshfield, Wis.
C. Dodson, Smith-Blair Inc., Texarkana, Ark.
J. Grocki, Nickel Institute, Enfield, Conn.
G. Hines, Mueller Company, Cleveland, Tenn.
M. Langenhan, Total Piping Solutions Inc., Olean, N.Y.
A. Lemke, Romac Industries, Bothell Wash.
M. Levine, Performance Coupling, National City, Calif.
S. Morrison, Victaulic, Atlanta, Ga.
E. Nunes, Krausz Industries, Ocala, Fla.
D. Piontek, Total Piping Solutions Inc., Olean, N.Y.
R.N. Satyarthi, Baker Coupling Company Inc., Los Angeles, Calif.
P. Ray, JCM Industries Inc., Nash, Tex
J. Reinheimer, Robar Industries LTD. Surrey, B.C.
M. Zimmerle, Cascade Waterworks Mfg. Co., 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*
Dennis Dechant, *Vice Chair*
John Luka, *Secretary*

General Interest Members

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

* Alternate

R.L. Coffey, HDR Engineering Inc., Omaha, Neb.
R.L. Gibson, Freese and Nichols Inc., Fort Worth, Tex.
M.D. Gossett,* HDR Engineering Inc., Denver, Colo.
M.B. Horsley,* Horsley Engineering LLC, Overland Park, Kan.
R. Issa,* AECOM, McKinney, Tex.
R.A. Kufaas, Norske Corrosion & Inspection Services Ltd., Surrey, B.C.
J.L. Mattson, Corrosion Control Technologies, Sandy, Utah
A. Murdock, Jacobs Engineering Group, Salt Lake City, Utah
R. Ortega,* Aurora Technical Services, Houston, Tex.
E.S. Ralph,† Standards Engineer Liaison, AWWA, Denver, Colo.
A.E. Romer, 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. Dechant, Dechant Infrastructure Service, Aurora, Colo
D. Dunker, Thompson Pipe Group, Grand Prairie, Tex
W.B. Geyer, Steel Plate Fabricators Association, Lake Zurich, Ill.
B.D. Keil, Northwest Pipe Company, Draper, Utah
J.L. Luka, American SpiralWeld Pipe Company, Columbia, S.C.
R.D. Mielke,* Northwest Pipe Company, Raleigh, N.C.
G.F. Ruchti,* Consultant, Punta Gorda, Fla.
B. Simpson,* American Cast Iron Pipe Company, Birmingham, Ala.
C.C. Sundberg, Victaulic, Issaquah, Wash.

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.
B. Fountain, San Diego County Water Authority, San Diego, Calif.

* Alternate
† Liaison, non-voting

M. Garcia,* Standards Council Liaison, Denver Water, Denver, Colo.
S. Hattan, Tarrant Regional Water District, Fort Worth, Tex.
P.K. Karna, Tacoma Water, Tacoma, Wash.
T.J. Jordan,† Metropolitan Water District of Southern California, La Verne, Calif.
M. Lobik, Springfield Water & Sewer Commission, Springfield, Mass.
K.R. Parbhoo, Los Angeles Department of Water & Power, Los Angeles, Calif.
T. Peng, Metropolitan Water District of Southern California, Los Angeles, Calif.
M. Turney,† Denver Water, Denver, Colo.

* Liaison, non-voting
† Alternate

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 C223.*

I. Introduction.

I.A. *Background.* Fabricated tapping sleeves are used to provide outlets on piping systems. They are made by several producers, and though details differ, all tapping sleeves provide similar features. They provide a means of attaching a tapping valve and tapping machine and a means of sealing onto or around the existing pipe.

Tapping sleeves are most often connected to tapping valves and therefore require an MSS SP-60 recess machined or cast into the design of the flange. This recess modifies the flange beyond the ANSI/AWWA C207/C228 Steel Pipe Flanges for Waterworks Service/Stainless-Steel Pipe Flanges for Water Service standards; however, flanges fabricated to ANSI/AWWA C207/C228 with an MSS SP-60 recess have been used successfully on tapping sleeves in the waterworks industry for more than 30 years. The use of an MSS SP-60 recess does not significantly affect the integral connection between the flange and the pipe/neck and is substantiated by more than 30 years of successful usage and service records of existing installations. To further substantiate the use of an MSS SP-60 recess in ANSI/AWWA C207/C228 flanges, the AWWA Stainless-Steel Pipe Committee conducted testing, performed a finite element analysis, and prepared a document of the findings on the integral flange connection. This document, titled "AWWA Steel Slip-On Ring Flange Pipe Insertion Analysis," was presented to the AWWA Steel Pipe Committee on June 12, 2018, and a copy was included in the meeting minutes.

I.B. *History.* The first edition was approved by the Board of Directors on June 16, 2002. Subsequent editions were approved on June 24, 2007 and June 9, 2013. This edition was approved on Feb. 1, 2019.

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.

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

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. 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 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 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.

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 C223 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. *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.

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

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

‡ Both publications available from The National Academies Press, 500 Fifth Street NW, Keck 360, Washington, DC 20001.

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, environmental conditions, and 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.B. *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 *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 information should be provided by the purchaser.

1. Standard used—that is, ANSI/AWWA C223, Fabricated-Steel and Stainless-Steel Tapping Sleeves, of latest revision.
2. Whether compliance with NSF/ANSI 61, Drinking Water System Components—Health Effects is required.
3. Quantity.
4. Type of pipe(s), including specification to which it is made, or specification and tolerance of outside diameter.
5. Nominal pipe size(s).
6. Wall thickness or class of pipe.
7. Type of service (i.e., line content, aboveground or belowground, etc.)
8. Working pressure, transient pressure, and test pressure.
9. Operating temperature range.
10. Flange specification, including dimensions for accommodating tapping valve fit-up (Sec. 4.2.3.1 and Sec. 4.2.3.2).
11. Tapping sleeve and tapping-sleeve flange material.
12. Documentation requirements.

* Volume 96, Number 4, April 2004, pages 153-160.

13. Requirements for test connections and post-installation pressure testing.

14. Outlet size and type (Flanged, MJ adaptor, etc.).

15. Actual outside diameter of pipe, including any coatings and pipe length available for installation of tapping sleeve (Section 3).

16. Details of federal, state, and local requirements (Sec. 4.2.1).

17. Special requirements, such as coatings, gasket material, and bolting (Sec. 4.3.1).

18. Inspection by the purchaser (Sec. 5.1.2).

III.B. *Purchaser's Proof Test.* The purchaser may specify individual hydrostatic proof testing. If individual hydrostatic proof testing is required, the assembled fabricated tapping sleeve shall be shop tested at a maximum of 1.5 times the working pressure. The test shall be considered successful if no leakage is detected during 1 h of sustained pressure at this level.

III.C. *Modification to Standard.* Any modification of the provisions, definitions, or terminology in this standard must be provided by the purchaser.

IV. Major Revisions. Major changes made to the standard in this revision include the following:

1. A statement was added in the Foreword (Sec. I.A) to give an operational history and design basis for the use of a flange with a MSS SP-60 recess.

2. An advisory statement was added in the Foreword (Sec. II.A and Sec. II.B) regarding chlorine and chloramine degradation of elastomers.

3. The term "rated pressure" was replaced with "working pressure" in Foreword Sec. III.A and III.B and Sec. 4.3.1 to be consistent with industry terminology.

4. Section 2, References, has been updated.

5. In Section 3, Definitions, the definition for rated pressure was deleted and definitions of shop test pressure and working pressure were added. The definition of transient pressure was slightly revised. These changes were made to make the pressure definitions consistent with AWWA M11, *Steel Pipe—A Guide for Design and Installation*.

6. Sec. 4.2.3.1, Tapping flanges for steel tapping sleeves, was revised to remove the requirement for the flange class to be specified by the purchaser and added a recommendation that other materials can be specified by the purchaser.

7. Sec. 4.2.3.2, Tapping flanges for stainless-steel tapping sleeves, was revised to remove the requirement for the flange class to be specified by the purchaser. A number of references were also deleted, and a reference to AWWA C228 was added.

8. In Sec. 4.2.5, Bolting, the ASTM metric standards which have been withdrawn were deleted and replaced with reference to ISO standards. A requirement for washers was added to meet ASTM F436.

9. In Sec. 4.3.3.1, the withdrawn ASME metric standard was replaced with a reference to ISO 8678 for carriage heads.

10. In Sec. 4.4.2.4, Stainless-steel weldments, a clarification for low-carbon grade stainless-steel was added as less than 0.03% C.

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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Fabricated-Steel and Stainless-Steel Tapping Sleeves

SECTION 1: GENERAL

Sec. 1.1 Scope

This standard describes fabricated steel and stainless-steel tapping sleeves used to provide outlets and branches on existing pipe with or without interruption of service. They are intended for pipe sizes 4 in. (100 mm) through 48 in. (1,200 mm) with branch outlets through 36 in. (900 mm). This standard includes requirements for materials, dimensions, tolerances, finishes, and testing. This standard is not intended to apply to tapping sleeves welded to pipe. Fabricated tapping sleeves are intended for the transmission and distribution of water, reclaimed water, and wastewater, and for use in other water-supply system facilities. For outlets and main sizes greater than those specified, consult the manufacturer.

Sec. 1.2 Purpose

The purpose of this standard is to provide the minimum requirements for fabricated tapping sleeves for various pipe materials, including components, testing, and marking requirements.