ANSI/AWWA C206-23

*(Revision of AWWA C206-17)*

AWWA Standard

# Field Welding of Steel Water Pipe



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American Water Works Association

Approved American National Standard ANSI

STANDARD Since 1881

## AWWA Standard

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# Committee Personnel

The Steel Water Pipe Manufacturers Technical Advisory Committee (SWPMTAC) Task Group for updating ANSI/AWWA C206 had the following personnel at the time:

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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.*

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# Foreword

*This foreword is for information only and is not a part of ANSI*/AWWA C206.*

## I. Introduction.

I.A. *Background*. The provisions of this standard describe the requirements for welding steel water pipe joints in water transmission and distribution lines. The purchaser for each project is responsible for determining if any unusual circumstances related to the project require additional provisions that are not included in the standard.

The design of field-welded joints is not discussed in this standard. Useful information on this subject may be found in AWWA Manual M11, *Steel Pipe—A Guide for Design and Installation,*[†] and in *Useful Information on the Design of Plate Structures* (American Iron and Steel Institute[‡]).

In addition, manufacture and installation of field-welded joints are discussed in ANSI/AWWA C200, Steel Water Pipe, 6 In. (150 mm) and Larger, and ANSI/AWWA C604, Installation of Buried Steel Water Pipe—4 In. (100 mm) and Larger, respectively.

After the welded field joint has been completed, if the pipe has been coated or lined, the joint shall be coated and lined with a coating system compatible with that on the body of the pipe, in accordance with the requirements for field repairs stated in the appropriate AWWA coating or lining standard.

For lap-welded pipe with an inside diameter equal to or exceeding 48 in. (1,200 mm) and where the purchaser deems single welding to be acceptable, inside welding is recommended. Safety precautions shall be utilized in all pipe sizes, although when pipe with inside diameters less than 48 in. (1,200 mm) down to 27 in. (675 mm) is welded from the inside, additional safety precautions shall be observed. Interior welding on pipe diameters less than 27 in. (675 mm) is not recommended.

Pipe requiring inside welds with limited access should be supplied with typical 3-in. (75-mm) diameter weld lead pass holes at approximately 400-ft (122-m) centers to allow passage of welding leads to the joint location. Shorter distances between pass holes may be required, depending on actual project conditions. Pass holes in the pipe will permit shorter welding leads and thus avoid erratic voltage drops caused

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

† AWWA Manual M11. *Steel Pipe—A Guide for Design and Installation.* Denver, CO: AWWA.

‡ *Useful Information on the Design of Plate Structures,* Steel Plate Engineering Data, Vol. 2, American Iron and Steel Institute, 1101 17th Street, NW, Suite 1300, Washington, DC 20036.

by excessively long welding leads. The pass hole is fabricated using a weldable-grade inside-threaded pipe half-coupling or a flange with a short flange neck welded to a hole cut through the pipe wall. After using the pass hole, a weldable-grade plug shall be threaded into the opening and seal-welded to secure or a blind flange can be bolted over the flange opening.

I.B. *History.* This standard was first approved as tentative by AWWA in January 1946 and by the American Welding Society (AWS) in October 1945. It was advanced to standard status by AWWA in 1950 and by AWS in 1951. The joint AWWA–AWS activity continued through revisions in 1957 (AWWA C206-57, AWS D7.0-57) and 1962 (AWWA C206-62, AWS D7.0-62a). The joint committee was dissolved in 1971, and the standard was assigned to the AWWA Standards Committee on Steel Pipe. Subsequent editions of the standard were published in 1975, 1982, 1988, 1991, 1997, 2003, 2011, and 2017. This edition was approved by the AWWA Board of Directors 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). 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.

[§] 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.

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 jurisdiction. Accreditation of certification organizations may vary from jurisdiction to jurisdiction.

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 contaminant.

ANSI/AWWA C206 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.** This standard has no applicable information for this section.

**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 C206, Field Welding of Steel Water Pipe, of latest revision.
2. Whether compliance with NSF/ANSI/CAN 61, Drinking Water System Components—Health Effects, is required.
3. Details of federal, state, provincial, territorial, and local requirements (Sec. 4.1.1).

[‡‡] Both publications available from National Academies Press, 500 Fifth Street, NW, Washington, DC 20001.

4. Provisions for alleviation of thermal stresses (Sec. 4.2.6).

5. Type of joint (Sec. 4.3).

6. Lap joint (Sec. 4.3.2).

7. Butt joint (Sec. 4.3.3).

8. Option regarding backing rings (Sec. 4.3.3.1).

9. Seal weld of butt straps to facilitate an air test (Sec. 4.3.4).

10. Notch tough weld criteria, if required; temperature of test; and test values (Sec. 4.6.10).

11. Weld inspection, if required (Sec. 5.1.3).

12. Testing methods, if required (Sec. 5.2).

13. Nondestructive testing of welded joints if substituted for hydrostatic tests (Sec. 5.2.2).

14. Affidavit of compliance (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 changes made to the standard in this revision include the following:

1. Additional wording was added to the Foreword to reference applicable standards for manufacture and installation of field-welded joints.

2. 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.

3. In Section 3, the definition of *Seal weld* was added to provide clarification. The definitions for *potable water*, *reclaimed water*, and *wastewater* were also added based on the Standards Council boilerplate.

4. Updated Sec. 4.1 Materials with the latest Standards Council boilerplate language.

5. In Sec. 5.2.2.1, Testing field-butt joints with or without backing rings, ultrasonic testing was added as an acceptable verification method, and a note was added addressing ultrasonic testing of butt joints on material thickness less than 5⁄16 in. (8 mm).

**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.

ANSI/AWWA C206-23
(Revision of AWWA C206-17)

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

AWWA Standard

# Field Welding of Steel Water Pipe

## SECTION 1: GENERAL

### Sec. 1.1 Scope

This standard describes manual, semiautomatic, and automatic field welding by the metal arc-welding processes for steel water pipe manufactured in accordance with ANSI*/AWWA C200, Steel Water Pipe—6 In. (150 mm) and Larger. This standard describes field-performed full circumferential welding of three types of pipe joints: (1) lap joints, (2) butt joints, and (3) butt-strap joints. This standard also applies to other welding required in field fabrication and installation of specials and appurtenances. However, when possible, pipe fabrications and fittings should be performed by the manufacturer at a manufacturing facility. The design of field-welded joints is not covered within this standard.

This standard recognizes AWS† D1.1 as the supporting document. ANSI/AWWA C206 references subclauses within the AWS D1.1 clauses on Prequalification of WPSs, Qualification, Fabrication, Inspection, and Tubular Structures. When ANSI/AWWA C206 is silent regarding a requirement listed in AWS D1.1, such requirement is not required in ANSI/AWWA C206. Although AWS D1.1 supports ANSI/AWWA C206 in many sections, when there is a conflict between these documents then ANSI/AWWA C206 shall govern.

* American National Standards Institute, 25 West 43rd Street, Fourth Floor, New York, NY 10036.
† American Welding Society, 8669 NW 36 Street, No. 130 Miami, FL 33166.