ANSI/AWWA **C230-22**

(Revision of ANSI/AWWA C230-16)

AWWA Standard

Stainless-Steel Full-Encirclement Repair and Service Connection Clamps for 2-in. Through 12-in. (50-mm Through 300-mm) Pipe

Effective date: May 1, 2022.
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American Water Works Association

AWWA Standard

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Committee Personnel

The Steel Water Pipe Manufacturer's Technical Advisory Committee (SWPMTAC) Task Group for AWWA C230, which updated this standard, 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 C230.*

I. Introduction.

I.A. *Background.* Stainless-steel full-encirclement (360-degree) repair clamps are used to provide a simple and economical means of repairing holes, cracks, or breaks in water or wastewater mains. The stainless-steel full-encirclement service connection clamp includes a branch outlet and mat gasket that provides a full-encirclement (360-degree) seal around the existing pipe. The full-encirclement service connection clamp outlet is an effective means of attaching a tapping valve and tapping machine for main-line tapping.

I.B. *History.* This is the third edition of this standard. This standard was prepared in response to requests from users of stainless-steel full-encirclement repair and service connection clamps for various pipe materials. The first edition was approved by the AWWA Board of Directors on Jan. 23, 2011. The second edition was approved on June 19, 2016. This edition was approved on Jan. 13, 2022.

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.

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

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

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

2. Two standards developed under the direction of NSF: NSF/ANSI/CAN[§] 60, Drinking Water Treatment Chemicals—Health Effects, and NSF/ANSI/CAN 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/CAN 60 or 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.

Annex A, "Toxicology Review and Evaluation Procedures," to NSF/ANSI/CAN 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.

AWWA/ANSI C230 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 Performance.* Repair clamp applications for pipeline repairs are wide and varied and can be used for temporary or long-term service. The service performance of the full-encirclement repair clamp depends on several variables, including size and type of repair; the structural integrity of the pipe; pipe material; pipe dimensions; the pipeline content; surface finish; temperature; and working pressure of the piping system. Because of the number of variables involved, it is recommended that the repair clamp manufacturer be consulted regarding model selection, proper application, and the anticipated performance of the repair clamp for specific end-user pipe repair needs before product purchase and usage. When significant

[§] Standards Council of Canada, 55 Metcalf Street, Suite 600, Ottawa, ON K1P 6LS Canada.

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

damage to the pipe is encountered, the manufacturer should be consulted to determine whether a repair clamp is appropriate for the repair.

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. 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 plasticity, 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 in *Journal AWWA***, where the pipe gasket degradation in a 1.0 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 C230, Stainless-Steel Full-Encirclement Repair and Service Connection Clamps for 2-in. Through 12-in. (50-mm Through 300-mm) Pipe, of latest revision.
2. Quantity and type.
3. Materials of construction.
4. Type of pipe(s), including specification to which it is made, or specification and tolerance of outside diameter.
5. Nominal pipe size(s) and range.
6. Actual outside diameter (OD) of pipe, including any coatings.
7. Wall thickness or class of pipe.

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

8. Type of service, including line content; above or below ground; type and concentration level of disinfectant or other chemical constituents; and so on.

9. System pressure requirements.

10. Operating temperature range.

11. Special requirements, such as gasket material, gaskets for electrical conductivity, corrosive environment, coatings, etc.

12. Tapping outlet specifications (if required), including thread type and size.

13. Width of full-encirclement repair clamp band desired.

14. Inspection by the purchaser.

15. Documentation requirements, including material certifications and certificate of compliance.

16. Hydrostatic proof test.

17. Whether compliance with NSF/ANSI/CAN 61, Drinking Water System Components—Health Effects, is required.

18. Details of federal, state, provincial, territorial, and local requirements (Sec. 4.1.1).

19. Whether conductivity buttons or strips are required (Sec. 4.2.2.2)

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. Gasket degradation studies was added to Foreword II.C.

2. Sec. 2 References were updated.

3. The term "rated pressure" was replaced with "working pressure" and the definition was revised (Sec. 3).

4. The definitions for the terms "test pressure" and "transient pressure" were revised (Sec. 3).

5. The gasket composition and physical requirements were revised (Sec. 4.1.5.1).

6. A sentence was added to Sec. 4.1.6 Fasteners for other grades of bolts and nuts.

7. Post-weld cleaning requirements were revised (Sec. 4.3.4).

8. Previous Sec. 4.3.5 Manufacturing quality was removed since it was redundant with Sec. 5.2.

9. Under Sec. 5.3.1 Manufacturer's proof-of-design tests, Sec. 5.3.1.1 and Sec. 5.3.1.3 were revised.

10. New Sec. 5.4 Proof Test for Purchaser-Specified Conditions was added.

11. Sec. 6.1 Marking was updated to include an item for working pressure if applicable.

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

AWWA Standard

Stainless-Steel Full-Encirclement Repair and Service Connection Clamps for 2-in. Through 12-in. (50-mm Through 300-mm) Pipe

SECTION 1: GENERAL

Sec. 1.1 Scope

This standard describes fabricated full-encirclement stainless-steel clamps for use in the repair or tapped service connection of potable water, wastewater, and reclaimed water piping systems. They are intended for nominal pipe sizes 2 in. (50 mm) through 12 in. (300 mm). Full-encirclement repair clamps shall be manufactured completely from stainless steel or a combination of stainless-steel band and cast ductile-iron lug, along with stainless-steel or low-alloy carbon steel bolts and nuts, depending on service requirements and the purchaser's documents. Tapped service connection outlets may be provided and shall range from ½-in. through 3-in. (12-mm through 75-mm) sizes. This standard does not cover stainless-steel tapping saddles, the seal of which is not fully circumferential. Repair clamps for larger than 12-in. (300-mm) nominal pipe diameters are available from various manufacturers but are not covered by this standard.