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(Revision of ANSI/AWWA C621-18)

AWWA Standard

Internal Pipe Joint Seal Assemblies for Water Service

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American Water Works Association

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STANDARD Since 1881

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Foreword

This foreword is for information only and is not a part of ANSI/AWWA C621.*

I. Introduction.

I.A. *Background*. Internal joint pipe repair or sealing is a method for no-dig rehabilitation of leaky joints in water transmission mains. This method of joint repair can be used to correct leaking pipe joints, strengthen weak joints, seal leaks at cracks, or prevent infiltration or exfiltration. Joint repair consists of bridging the existing pipe joint with a rubber seal and a corrosion-resistant band allowing continued movement of the pipe joint. This pipe rehabilitation method has a wide range of applications from circular pipe to square or box shapes and is available in a variety of widths. Custom seals can be designed for large widths via the use of rubber sleeves. Because joint seals included in this standard are installed via man-entry, they are not typically manufactured for circular pipes that are less than 36 in. in diameter. (Note: Some manufacturers/constructors provide seals smaller than this depending on the access and pipeline configuration. Local and federal safety standards, such as but not limited to 29 CFR Parts 1910 and 1926, should be consulted during the planning phase of the field work. Occupational Safety and Health Administration [OSHA] work requirements concerning safe and adequate access, confined space entry, and minimum required safety equipment should be evaluated before performing field and construction work.) These joint seals can be designed and manufactured to withstand internal working pressures up to 300 psi and to address joint gaps or leaks up to 2 in. in width. Exact limitations of each product vary depending on the type of seal and manufacturer. Purchaser should consult with the manufacturer to confirm the limitations of the seal to be used in a project.

I.B. *History*. The AWWA Standards Committee for Pipe Rehabilitation was formed in 1998 to develop standards on the topic. Development of this standard was authorized and initiated in 2009 in response to the water industry's request for a standard on internal joint pipe repair. The first edition was approved by the AWWA Board of Directors on June 11, 2018. This edition was approved on Jan. 23, 2025.

I.C. *Acceptance*. In May 1985, the US Environmental Protection Agency (USEPA) entered into a cooperative agreement with a consortium led by NSF

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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.
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 certifier.

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

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

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

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

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ANSI/AWWA C621 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. 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 materials, 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. *Advisory Information on Material Application*. This standard defines the materials and methods for installation of flexible internal joint seals used in water transmission mains. Though some details may vary, all of the joint seals available on the market are applied in a similar fashion and have similar components as depicted in this standard. Internal pipe joint seal manufacturers should be contacted regarding the capabilities of the joint seals supplied and proper methods of installation.

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 C621, Internal Pipe Joint Seal Assemblies for Water Service, of latest revision
2. Joint type
3. Internal pipe diameter
4. Pipe material
5. Quantity
6. Rated pressure, including transient and test pressure

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7. Details of federal, state, provincial, territorial, and local requirements regarding materials (Sec. 4.2.1.1)

8. Whether compliance with NSF/ANSI/CAN 61, Drinking Water System Components—Health Effects, is required (Sec 4.2.1.2)

9. Whether certification of workers/workmanship is required (Sec 4.2.1.3)

10. Service conditions if other than potable water (Sec 4.2.2.2)

11. Water quality conditions, such as pH, affecting retainer band design (Sec 4.2.3)

12. Joint condition including any offset, cracking, and gap at the joint

13. If watertight and/or rigid seal is required (Sec 4.3.1)

14. Number of flexible or rigid seal assemblies required for the application (Sec 4.3.1.1)

15. Field records required (Sec. 4.4.1)

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. Added references to OSHA safety guidance for man-entry to pipe (Foreword I.A.).

2. Added hole and gap size limitations and special considerations (Foreword I.A. and Sec. 4.3).

3. Revised Scope to clarify that the covered seals are not designed to repair structural defects (Sec. 1.1).

4. Clarified definitions to reflect that some terms may differ by manufacturer (Sec. 3).

5. Added a definition for *pipe joint* (Sec. 3).

6. Removed minimum time associated with last expansion and replaced with a reference to the manufacturer's recommended schedule (Sec. 4.5.9.5 and Sec. 5.2).

7. Changed interlocking seals for adjoining assemblies from required to optional (Sec. 4.5.10).

8. Clarified the testing is intended for external pressure only and hydrostatic pressure may be required before return to service (Sec. 5.2.1).

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 e-mail at standards@awwa.org.

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(Revision of ANSI/AWWA C621-18)

AWWA Standard

Internal Pipe Joint Seal Assemblies for Water Service

SECTION 1: GENERAL

Sec. 1.1 Scope

This standard describes the selection and installation requirements for field-applied, mechanical, internal pipe joint seal assemblies for water service. Internal joint sealing is a method of in-situ pipe joint rehabilitation that is used to correct leaking pipe joints; to strengthen weak joints or localized wall pitting and other minor defects at joints; to seal leaks at cracks; to prevent exfiltration or infiltration; or used in concert with other nonjoint specific methods of pipe rehabilitation (cement–mortar lining, cured-in-place pipe lining, etc.).

Sec. 1.2 Purpose

The purpose of this standard is to provide the minimum requirements for selection and installation of internal pipe joint seal assemblies, including materials, dimensions, tolerances, and testing/verification procedures.

Sec. 1.3 Application

This standard can be referenced in specifications for selecting or installing internal pipe joint seal assemblies for water piping. The stipulations of this standard apply when this document has been referenced and then only to field-applied internal joint and wall seal assemblies for drinking water piping.

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