

American Water Works Association

ANSI/AWWA C950-01

(Revision of ANSI/AWWA C950-95)



AWWA STANDARD
FOR
FIBERGLASS PRESSURE PIPE



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AMERICAN WATER WORKS ASSOCIATION

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Foreword

This foreword is for information only and is not part of ANSI/AWWA C950.

I. Introduction.

I.A. *Background.* This standard provides direction and guidance in selecting and purchasing fiberglass pipe for use as pressure pipe in water distribution (including services) and transmission systems for both aboveground and belowground installations.

This standard describes 1-in. through 144-in. (25-mm through 3,600-mm) diameter pressure pipes. The primary materials used are thermosetting polyester or epoxy resins, glass-fiber reinforcement, and, if used, aggregate. There are five pressure classes, which range from 50 psi through 250 psi (345 kPa through 1,724 kPa), in 50-psi (345-kPa) increments. Stiffness classes described are 9, 18, 36, and 72 psi (62, 124, 248, and 496 kPa). This standard may be used to the extent applicable for other sizes, pressure classes, and stiffness classes.

I.B. *History.* In June 1971, the AWWA Engineering and Construction Technical and Professional Committee organized the Reinforced Plastics Committee to evaluate both the use of reinforced plastics in the water-supply industry and the need for appropriate AWWA standards. The Reinforced Plastics Committee found sufficient use and interest to support a recommendation that a standard be developed for fiberglass pipe. The Standards Council authorized the formation of the Standards Committee on Thermosetting Fiberglass Reinforced Plastic Pipe in October 1972, and committee organization was completed in December 1974. The first edition of the standard was approved by the AWWA Board of Directors on Jan. 25, 1981. The second edition was approved on June 23, 1988. The third edition was approved on Jan. 22, 1995. This edition was approved on June 17, 2001.

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 all direct and indirect drinking water additives. Other members of the original consortium included the American Water Works Association Research Foundation (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. An advisory program formerly administered by USEPA, Office of Drinking Water, discontinued on Apr. 7, 1990.
2. Specific policies of the state or local agency.
3. Two standards developed under the direction of NSF, ANSI[†]/NSF[‡] 60, Drinking Water Treatment Chemicals—Health Effects, and ANSI/NSF 61, Drinking Water System Components—Health Effects.
4. 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 ANSI/NSF 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 ANSI/NSF 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 C950-01 does not address additives requirements. Thus, 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 all parties offering to certify products for contact with, or treatment of, drinking water.
3. Determine current information on product certification.

*Persons in Canada, Mexico, and non-North American countries should contact the appropriate authority having jurisdiction.

†American National Standards Institute, 25 W. 43rd St., New York, NY 10036.

‡NSF International, 789 N. Dixboro Rd., Ann Arbor, MI 48105.

§Both publications available from National Academy of Sciences, 2102 Constitution Ave. N.W., Washington, DC 20418.

II. Special Issues.

II.A. *Nominal Metric Pipe Sizes, Dimensions, and Tolerances.* Nominal metric pipe sizes, dimensions, and tolerances were obtained from International Organization for Standardization (ISO) specification 7370, Glass Fibre Reinforced Thermosetting Plastics (GRP) Pipes and Fittings—Nominal Diameters, Specified Diameters, and Standard Lengths, and proposed addenda to that document.

III. **Use of This Standard.** AWWA has no responsibility for the suitability or compatibility of the provisions of this standard to any intended application by any user. Accordingly, each user of this standard is responsible for determining that the standard's provisions are suitable for and compatible with that user's intended application.

III.A. *Purchaser Options and Alternatives.* The following items should be covered in the purchaser's specifications:

1. Standard used—that is, ANSI/AWWA C950, Standard for Fiberglass Pressure Pipe, of latest revision.
2. Pipe diameter size and series (Sec. 4.5.1).
3. Pressure classes (Sec. 4.6).
4. Stiffness classes (Sec. 4.7).
5. Specific service and installation considerations.
6. Lineal feet of each pressure and stiffness class and size.
7. Whether plant inspection is required (Sec. 5.1.1).

The purchaser may also specify the following:

1. Cell classification (Sec. 4.3).
2. Standard laying lengths (Sec. 4.5.2).
3. Joint configuration (Sec. 4.9).
4. Line layout showing pressure zones, including applicable design and transient pressures within zones and points of change between zones.

III.B. *Manufacturer Options and Alternatives.* The following items should be provided in the manufacturer's specifications:

1. Cell classification (Sec. 4.3).
2. Stiffness class (Sec. 4.7).
3. Joint details (Sec. 4.9).
4. Nominal wall thickness.
5. Weight.
6. Total quantity of jointing materials and field allowances.

When requested by the purchaser, it is understood that the manufacturer also will supply the following:

1. Special design calculations.
2. Special lengths (Sec. 4.5.2).
3. Special preparations needed for shipment (Sec. 6.2).
4. Affidavit of compliance (Sec. 6.3).

III.C. *Modification to Standard.* Any modifications to the provisions, definitions, or terminology in this standard must be provided in the purchaser's or manufacturer's specifications.

IV. Major Revisions. Major revisions made to the standard in this edition include the following:

1. Flexible joint has been included in the definitions (Sec. 3).
2. A statement on materials has been included which references the Safe Drinking Water Act (Sec. 4.4.1).
3. External pipe dimensions for metric outside diameter (OD) series pipe have been updated (Table 5 and Table 6).
4. Joint descriptions and performance requirements have been clarified (Sec. 4.9).
5. Deflection levels for stiffness tests have been clarified (Sec. 5.1.2.2.2).
6. Methods of computing appropriate deflection values for other pipe stiffness levels have been added (Sec. 5.1.2.2.2.1).
7. Information on proportionally adjusting deflections to maintain equivalent in-use safety margins have been added (5.1.2.2.2.2).
8. Modifications to the axial tensile strength tests have been made to exclude the provisions for maximum thickness in ASTM D638, the minimum axial elongation to failure has been set at 0.25 percent, and a note added requiring higher axial strength for pipes subject to beam bending, longitudinal thrust loads, or any unusual axial tensile forces (Sec. 5.1.2.4 and Sec. 5.1.2.4.1).

V. Comments. If you have any comments or questions about this standard, please call the AWWA Volunteer & Technical Support Group, (303) 794-7711 ext. 6283, FAX (303) 794-6303, or write to the group at 6666 W. Quincy Ave., Denver, CO 80235.



AWWA STANDARD FOR

FIBERGLASS PRESSURE PIPE

SECTION 1: GENERAL

Sec. 1.1 Scope

This standard describes the fabrication and the testing of nominal 1-in. through 144-in. (25-mm through 3,600-mm) fiberglass pipe and joining systems for use in both aboveground and belowground water systems. Service and distribution piping systems and transmission piping systems are included.

Both glass-fiber-reinforced thermosetting-resin pipe (RTRP) and glass-fiber-reinforced polymer mortar pipe (RPMP) are fiberglass pipes. Epoxy-resin and polyester-resin systems are described, and commercial-grade E-type glass is specified as the glass-fiber reinforcement material in the pipe wall. Liner materials incorporated include thermosetting or thermoplastic resin, reinforced or unreinforced, with or without fillers. Pressure classes described are 50, 100, 150, 200, and 250 psig (345, 689, 1,034, 1,379, and 1,724 kPa). Stiffness classes described are 9, 18, 36, and 72 psi (62, 124, 248, and 496 kPa). This standard may be used to the extent applicable for other diameters, pressure classes, and stiffness classes. For information on design, hydraulics, and installation, refer to AWWA Manual M45, *Fiberglass Pipe Design*.

Sec. 1.2 Purpose

The purpose of this standard is to provide the minimum requirements for fiberglass pressure pipe, including design, fabrication, and testing requirements.