

American Water Works Association

ANSI/AWWA C950-95

(Revision of ANSI/AWWA C950-88)



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 covers 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 covered 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.

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.

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

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.

Appendix 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 Appendix A procedures may not always be identical, depending on the certifier.

ANSI/AWWA C950-95 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.

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.

*American National Standards Institute, 11 W. 42nd St., New York, NY 10036.

[†]NSF International, 3475 Plymouth Rd., Ann Arbor, MI 48106.

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

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 changes made to the standard in this revision include the following:

1. Tables 1, 3, 4, 7, and 8 through 13 were metricized.
2. The format has been changed to AWWA standard style.
3. The acceptance clause (Sec. I.C.) and the definitions of parties (Sec. 3) have been revised to approved wording.
4. Section 4.9, Joint Types and Requirements, was revised.
5. The information in Appendixes A through D on design, testing, installation, shipping, handling, and storage has been removed from the standard and included in AWWA Manual M45, Fiberglass Pipe Design.

V. Comments. If you have any comments or questions about this standard, please call the AWWA Standards and Materials Development Department, (303) 794-7711 ext. 6283, FAX (303) 795-1440, or write to the department at 6666 W. Quincy Ave., Denver, CO 80235.



AWWA STANDARD FOR

FIBERGLASS PRESSURE PIPE

SECTION 1: GENERAL

Sec. 1.1 Scope

This standard covers 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 plastic-mortar pipe (RPMP) are fiberglass pipes. Epoxy-resin and polyester-resin systems are covered, 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 covered are 50, 100, 150, 200, and 250 psig (345, 689, 1,034, 1,379, and 1,724 kPa). Stiffness classes covered 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 main purpose of this standard is to provide the minimum requirements for fiberglass pressure pipe, including design, fabrication, and testing requirements.

Sec. 1.3 Application

This standard can be referenced in specifications for purchasing and receiving fiberglass pressure pipe. This standard can be used as a guide for manufacturing this type of fiberglass pressure pipe. The stipulations of this standard apply when this document has been referenced and then only to fiberglass pressure pipe.

SECTION 2: REFERENCES

This standard references the following documents. In their latest editions, these documents form a part of this standard to the extent specified within the standard. In case of conflict, the requirements of this standard shall prevail.

ASTM* C33—Standard Specification for Concrete Aggregates.

ASTM D638—Standard Test Method for Tensile Properties of Plastics.

ASTM D695—Standard Test Method for Compressive Properties of Rigid Plastics.

ASTM D1599—Standard Test Method for Short-Time Hydraulic Failure Pressure of Plastic Pipe, Tubing, and Fittings.

ASTM D2105—Standard Test Method for Longitudinal Tensile Properties of 'Fiberglass' (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe and Tube.

ASTM D2290—Standard Test Method for Apparent Tensile Strength of Ring or Tubular Plastics and Reinforced Plastics by Split Disk Method.

ASTM D2412—Standard Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading.

ASTM D2992—Standard Practice for Obtaining Hydrostatic or Pressure Design Basis for 'Fiberglass' (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe and Fittings.

ASTM D3517—Standard Specification for 'Fiberglass' (Glass-Fiber-Reinforced Thermosetting-Resin) Pressure Pipe.

ASTM D3567—Standard Practice for Determining Dimensions of 'Fiberglass' (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe and Fittings.

ASTM D3681—Standard Test Method for Chemical Resistance of 'Fiberglass' (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe in a Deflected Condition.

ASTM D4161—Standard Specification for 'Fiberglass' (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe Joints Using Flexible Elastomeric Seals.

ASTM D5365—Standard Test Method for Long-Term Ring-Bending Strain of 'Fiberglass' (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe.

ASTM F477—Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

SECTION 3: DEFINITIONS

The following definitions shall apply in this standard:

1. *Aggregate*: Siliceous sand conforming to ASTM C33, except that the requirements for gradation need not apply.

2. *Centrifugal casting*: A process used to manufacture tubular goods by applying resin and reinforcement to the inside of a mold that is rotated and heated, subsequently polymerizing the resin system. The outside diameter (OD) of the finished pipe is determined by the inside diameter (ID) of the mold tube. The ID of the finished pipe is determined by the amount of material introduced into the mold.

*American Society for Testing and Materials, 100 Barr Harbor Dr., West Conshohocken, PA 19428-2959.