ANSI/AWWA D120-19
(Revision of ANSI/AWWA D120-09)

American Water Works Association
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AWWA Standard

Thermosetting Fiberglass-Reinforced Plastic Tanks

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AWWA Standard

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Committee Personnel

The AWWA Standards Committee on Thermosetting Fiberglass-Reinforced Plastic Tanks, which reviewed and approved this standard, had the following personnel at the time of approval:

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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.

Foreword

This foreword is for information only and is not a part of ANSI/AWWA D120*

I. Introduction.

I.A. *Background*. The purpose of this standard is to establish the significant quality requirements for commercially available thermosetting fiberglass-reinforced plastic (FRP) tanks for use in the water industry. This standard is based on the technology for the fabrication of the tanks by either the contact-molded or filament-wound process. It is intended that the tanks are to be used for the storage of water and other liquids. Both aboveground and underground tanks are covered. The specific application must consider the limitations as specified according to Sec. 1.1, and information must be provided by the user to completely describe the tank requirements.

I.B. *History*. In June 1971, the Engineering and Construction Committee, appointed by the AWWA Technical and Professional Council, evaluated the use of reinforced plastics in the water industry and found sufficient use of products made from this material to recommend the development of an AWWA standard. One of the most extensive uses of reinforced plastics was for the construction of tanks. At the 1974 fall meeting, the AWWA Standards Council approved the formation of a committee for the preparation of an AWWA standard for reinforced plastic tanks for the water industry.

The standards committee began the preparation of the new standard early in 1975. The responses to a questionnaire sent out by the Engineering and Construction Committee indicated that the methods being followed for specifying and purchasing reinforced plastic products varied within the water industry. Frequently, it was the practice for the water utilities that were planning on using reinforced plastic products to state the actual or anticipated service conditions, and the manufacturer then warranted the product for that service. In other instances, the manufacturer presented a product for a particular type and condition of service, and the water utility then made the selection based on this presentation. Because of these practices, functional and product-design requirements used by both water utilities and tank fabricators evolved, and many of these were available to the committee.

In addition, applicable standards, specifications, and test methods published by ASTM International† (ASTM) and the US Department of Commerce were reviewed

* American National Standards Institute, 25 West 43rd Street, 4th Floor, New York, NY 10036.
† ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428.

by the committee. There were two documents the committee used as the basis for the AWWA standard: (1) ASTM D3299, Standard Specification for Filament-Wound Glass-Fiber-Reinforced Thermoset Resin Corrosion-Resistant Tanks, and (2) National Bureau of Standards Voluntary Product Standard PS-15-69, Custom Contact-Molded Reinforced-Polyester Chemical-Resistant Process Equipment.

The initial draft of the first edition of the standard was prepared and circulated to the committee members in 1976. The final draft was submitted to the committee for letter ballot voting on Apr. 15, 1983, and a consensus for acceptance was received. The standard was reaffirmed without revision on June 18, 1989.

In June 1997, the AWWA Standards Committee on Thermosetting Fiberglass-Reinforced Plastic Tanks began preparation of the revised standard. Inquiries into the water storage industry indicated the need for standards governing underground, round fiberglass-reinforced plastic tanks. The committee decided to incorporate in the revised standard current relevant standards for underground tanks used for storage of products other than water. For this purpose, the committee referred to UL* 1316, Glass-Fiber-Reinforced Plastic Underground Storage Tanks. Further, the committee recognized the need to update the standard to incorporate current standards for aboveground tank design and production. Standards referred to for this purpose included (1) ASTM D3299, Specification for Filament-Wound Glass-Fiber-Reinforced Thermoset Resin Corrosion-Resistant Tanks and (2) ASTM D4097, Specification for Contact-Molded Glass-Fiber-Reinforced Thermoset Resin Corrosion-Resistant Tanks.

The initial draft of the second edition of the standard was prepared and circulated to the committee members in 1999. The final draft was submitted to the committee for letter ballot voting in December 2001, and a consensus for acceptance was received. Subsequent editions of ANSI/AWWA D120 were approved by the AWWA Board of Directors on June 16, 2002 and Jan. 25, 2009. This edition was approved on June 7, 2019.

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 consortium included the Water Research Foundation (formerly AwwaRF), and the Conference of State Health and Environmental Managers (COSHEM), the American Water Works Association (AWWA), and the Association of State Drinking

* Underwriters Laboratories Inc., 333 Pfingsten Road, Northbrook, IL 60062.

Water Administrators (ASDWA) joined later. The consortium is responsible for the cooperative effort of manufacturers, regulators, product users, and other interested parties that develop and maintain the NSF standards.

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. Two standards developed under the direction of NSF: NSF† ANSI 60, Drinking Water Treatment Chemicals—Health Effects, and NSF/ANSI 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 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 to "Toxicology Review and Evaluation Procedures," NSF/ANSI 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.

This standard does not address additives requirements. Thus, users of ANSI/AWWA D100 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.

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

† NSF International, P.O. Box 130140, 789 North Dixboro Road, Ann Arbor, MI 48105.

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

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, flexible couplings, thread-sealing compounds, 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 including 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.

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. Section III.A summarizes supplemental information that should be considered. The purchaser should review this information and other appropriate data and make provisions in the supplemental conditions to describe the specific service requirements.

III.A. *Purchaser Options and Alternatives.* Purchasers are advised that, while this standard presents information on materials and procedures for manufacture of the tank, it does not contain complete engineering information needed to prepare complete requirements for a particular tank installation. A specific installation may require provisions more restrictive than those in the standard and most certainly will require additional design and installation features. In placing orders for thermosetting fiberglass-reinforced plastic tanks to be manufactured in accordance with this standard, the purchaser, in its requirements, should include the following information:

1. Standard used—that is, ANSI/AWWA D120, Thermosetting Fiberglass-Reinforced Plastic Tanks, of latest revision.
2. Whether compliance with NSF/ANSI 61, Drinking Water System Components—Health Effects, is required, in addition to the requirements of the Safe Drinking Water Act.
3. Type of tank—aboveground or underground.
4. Capacity.
5. Material to be stored in the tank.
6. Height, width, and weight limitations.

7. Temperature conditions.

8. Fittings and attachments to be provided and their description.

9. Installation conditions.

10. Operating conditions.

11. Whether certified drawings are to be provided (Sec. III.C, Foreword).

12. Details of federal, state, and local requirements (Sec. 4.2.1 and Sec. 4.3).

13. Whether ultraviolet absorbers are to be added (Sec. 4.3.1.2).

14. Whether fire-retardant agents are to be added (Sec. 4.3.1.4).

15. Loading conditions and design criteria (Sec. 4.5).

16. Whether the outside surface is to be pigmented, painted, or dyed (Sec. 4.10.2.4).

17. Type of flange gaskets (Sec. 4.10.5).

18. Location of hold-down or lift lugs (Sec. 4.10.7 and 4.10.8).

19. Test samples to be provided by the manufacturer (Sec. 5.2.3).

20. Test media for immersion tests (Sec. 5.5.2.2).

21. Test temperature for immersion tests (Sec. 5.5.2.3).

22. Retest agreement (Sec. 5.8).

23. Whether plant inspection is required (Sec. 5.9.1).

24. Tests to be performed by the manufacturer (Sec. 5.9.4).

25. Whether an affidavit of compliance is to be provided (Sec. 6.5).

III.B. *Modification to Standard*. Any modification to the provisions, definitions, or terminology in this standard must be provided by the purchaser.

III.C. *Information to Be Supplied by Manufacturer*. When required, the manufacturer or its representative shall submit, for acceptance by the purchaser, certified drawings showing the principal dimensions, construction details, and materials used for the fabrication. Work shall be done in accordance with these certified drawings after they have been accepted by the purchaser.

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

1. An advisory statement was added in the Foreword (Sec. II.A) regarding chlorine and chloramine degradation of elastomers.

2. Classification terminology has been updated from Type I and Type II to Class I and Class II.

3. Clarified requirements for venting in Sec. 4.4.5.

4. Clarified wall thickness requirement as applicable to single wall and primary wall of double-wall tank in Sec. 4.6.1.

5. Hydrostatic production tests have been separated for aboveground and underground tanks in Secs. 5.3.3.1 and 5.3.3.2

6. Updated reference to current ASTM standard for light and water exposure in Sec. 5.5.3.

7. Limited strength and bending tests to threaded steel pipe fittings in Secs. 5.6.1 and 5.6.2.

8. Removed reference to FRP straps in appendix B.2.

9. Clarified requirements for Manway Enclosures in appendix C.3.

10. Deleted appendix C.7 on Turbine Enclosures, incorporating applicable requirements in appendix C.3.

11. Added requirement for flexible coupling or fitting at flanged tank nozzles in appendix D.3.

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 e-mail at standards@awwa.org.

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AWWA Standard

Thermosetting Fiberglass-Reinforced Plastic Tanks

SECTION 1: GENERAL

Sec. 1.1 Scope

This standard describes the composition, performance requirements, construction practices and workmanship, design, and methods of testing thermosetting fiberglass-reinforced plastic (FRP) tanks for the storage of water or other liquids used in water supply service.

1.1.1 *Limit of standard*. This standard is limited to atmospheric pressure, vented, cylindrical, and spherical tanks, installed either aboveground or underground.

1.1.2 *Temperature limits*. This standard is limited to tanks whose service temperature does not exceed 180°F (82°C) for aboveground tanks and 150°F (66°C) for underground tanks. Consult the tank manufacturer for recommended temperature limits (both minimum and maximum) for specific equipment and service requirements.

1.1.3 *Service limits*. The service limits for environmental exposure and structural loads shall be determined based on tests of laminates that are determined by the engineer to be representative of the materials and methods of fabrication used in the tank.