This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.

Designation: D2992 – 24

Standard Practice for Obtaining Hydrostatic or Pressure Design Basis for "Fiberglass" (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe and Fittings[1]

This standard is issued under the fixed designation D2992; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope*

1.1 This practice establishes two procedures, Procedure A (cyclic) and Procedure B (static), for obtaining a hydrostatic design basis (HDB) or a pressure design basis (PDB) for fiberglass piping products, by evaluating strength-regression data derived from testing pipe or fittings, or both, of the same materials and construction, either separately or in assemblies. Both glass-fiber-reinforced thermosetting-resin pipe (RTRP) and glass-fiber-reinforced polymer mortar pipe (RPMP) are fiberglass pipe.

NOTE 1—For the purposes of this standard, polymer does not include natural polymers.

1.2 This practice can be used for the HDB determination for fiberglass pipe where the ratio of outside diameter to wall thickness is 10:1 or more.

NOTE 2—This limitation, based on thin-wall pipe design theory, serves further to limit the application of this practice to internal pressures which, by the hoop-stress equation, are approximately 20 % of the derived hydrostatic design stress (HDS). For example, if HDS is 5000 psi (34 500 kPa), the pipe is limited to about 1000-psig (6900-kPa) internal pressure, regardless of diameter.

NOTE 3—Where long (continuous) glass fibers are intentionally placed to resist the planned pressure load case (that is, free end pressure testing and 654.7° fiberglass windings) the results from this practice may be overly conservative in predicting long term fiberglass pipe performance when the same pipe is operated at lower (non-damaging) stresses typical in normal pipeline applications.

NOTE 4—All data points in the analysis shall be of the same failure mode. Where plastic creep of the resin leading to pipe failure is precluded by unintended resin matrix cracking or other unanticipated modes of failure, this practice may not accurately represent the pipe's life expectancy.

1.3 This practice provides a PDB for complex-shaped products or systems where complex stress fields seriously inhibit the use of hoop stress.

1.4 Specimen end closures in the underlying test methods may be either restrained or free, leading to certain limitations.

1.4.1 *Restrained Ends*—Specimens are stressed by internal pressure only in the hoop direction, and the HDB is applicable for stresses developed only in the hoop direction.

1.4.2 *Free Ends*—Specimens are stressed by internal pressure in both hoop and longitudinal directions, such that the hoop stress is twice as large as the longitudinal stress. This practice may not be applicable for evaluating stresses induced by loadings where the longitudinal stress exceeds 50 % of the HDS.

1.5 The values stated in inch-pound units are to be regarded as the standard. The values in parentheses are given for information purposes only.

NOTE 5—There is no known ISO equivalent to this standard.

1.6 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.7 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D618 Practice for Conditioning Plastics for Testing

D883 Terminology Relating to Plastics

D1598 Test Method for Time-to-Failure of Plastic Pipe Under Constant Internal Pressure

D1599 Test Method for Resistance to Short-Time Hydraulic Pressure of Plastic Pipe, Tubing, and Fittings

[1] This practice is under the jurisdiction of ASTM Committee D20 on Plastics and is the direct responsibility of Subcommittee D20.23 on Reinforced Thermosetting Resin Piping Systems and Chemical Equipment.

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[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at www.astm.org/contact. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

***A Summary of Changes section appears at the end of this standard**

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