



Standard Practice for Obtaining Hydrostatic or Pressure Design Basis for “Fiberglass” (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe and Fittings¹²

This standard is issued under the fixed designation D 2992; 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.

This standard has been approved for use by agencies of the Department of Defense.

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.

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 3—There is no similar or equivalent ISO 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 and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:

D 618 Practice for Conditioning Plastics for Testing³

D 883 Terminology Relating to Plastics³

D 1598 Test Method for Time-to-Failure of Plastic Pipe Under Constant Internal Pressure⁴

D 1599 Test Method for Short-Time Hydraulic Failure Pressure of Plastic Pipe, Tubing, and Fittings⁴

D 1600 Terminology for Abbreviated Terms Relating to Plastics³

D 2143 Test Method for Cyclic Pressure Strength of Reinforced Thermosetting Plastic Pipe⁴

D 3567 Practice for Determining Dimensions of “Fiberglass” (Glass-Fiber-Reinforced Thermosetting Resin) Pipe and Fittings⁴

F 412 Terminology Relating to Plastic Piping Systems⁴

F 948 Test Method for Time-to-Failure of Plastic Piping Systems and Components Under Constant Internal Pressure with Flow⁴

2.2 ISO Standard:

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

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² This revision incorporates a change in the data-analysis procedure.

³ *Annual Book of ASTM Standards*, Vol 08.01.

⁴ *Annual Book of ASTM Standards*, Vol 08.04.

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

