



Standard Test Method for Beam Deflection of “Fiberglass” (Glass-Fiber-Reinforced Thermosetting Resin) Pipe Under Full Bore Flow¹

This standard is issued under the fixed designation D2925; 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.

^{ε1} NOTE—Note 2 was revised editorially in April 2007.

1. Scope*

1.1 This test method covers measurement of the deflection as a function of time of a specimen of fiberglass pipe supported on a flat non-arc'd support as a simple beam under full bore flow of water at elevated temperatures. Both glass-fiber-reinforced thermosetting-resin pipe (RTRP) and glass-fiber-reinforced polymer mortar pipe (RPMP) are fiberglass pipes.

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

1.2 This test method can be used to determine deflection at varying conditions by substituting other test media.

1.3 Deflections observed using this test method are representative only of piping supported as a simple beam under full bore flow which has one diameter of pipe overhanging at each support.

1.4 The values stated in SI units are to be regarded as the standard. The values given in parentheses are provided for information purposes only.

NOTE 2—There is no known ISO equivalent to this standard.

1.5 *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:*²

[C33 Specification for Concrete Aggregates](#)
[D883 Terminology Relating to Plastics](#)

[D1600 Terminology for Abbreviated Terms Relating to Plastics](#)

[D3567 Practice for Determining Dimensions of “Fiberglass” \(Glass-Fiber-Reinforced Thermosetting Resin\) Pipe and Fittings](#)

[F412 Terminology Relating to Plastic Piping Systems](#)

3. Terminology

3.1 *General*—Definitions are in accordance with Terminologies [D883](#) and [F412](#) and abbreviations are in accordance with Terminology [D1600](#), unless otherwise indicated.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *aggregate*—a siliceous sand conforming to the requirements of Specification [C33](#), except that the requirements for gradation shall not apply.

3.2.2 *fiberglass pipe*—a tubular product containing glass fiber reinforcement embedded in or surrounded by cured thermosetting resin; the composite structure may contain aggregate, granular or platelet fillers, thixotropic agents, pigments, or dyes; thermoplastic or thermosetting liners may be included.

3.2.3 *reinforced thermosetting resin pipe (RTRP)*—a fiberglass pipe without aggregate.

3.2.4 *reinforced polymer mortar pipe (RPMP)*—a fiberglass pipe with aggregate.

4. Significance and Use

4.1 In the absence of deflection measurements from actual installed-above-ground piping, this test method may be used to evaluate the influence of span length on mid-span deflections at differing temperatures under full bore flow.

NOTE 3—A flat bearing area, small contact area, and narrow bearing width may induce high localized support interaction stresses, and constraints imposed by the supports may also adversely influence deflections and performance of the pipe.

5. Apparatus

5.1 *Rigid Support* with edges rounded to a 6-mm (1/4-in.) radius, consisting of two uprights of a convenient height. The uprights are to be spaced at a predetermined distance over

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. 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

which deflection is to be determined as shown on Fig. 1. The uprights shall have lateral guides, a saddle, groove, or indentation on the top to keep the pipe specimen from rolling off when placed in position.

5.1.1 The support space distance shall be estimated for a maximum allowable sag of 12.7 mm (½ in.) at test conditions. This estimate may be made by solving Eq 1 for L , using $y = 12.7$ mm (½ in.) and assuming an elastic modulus, $E = 1\ 000\ 000$ psi, unless a more accurate value is available.

5.2 *Source of Hot Water and a Feed System* maintained at conditions such that when this source is coupled to the pipe specimen and the water is fed into the specimen, the water emerging from the specimen shall be maintained continuously at the controlled temperature within $\pm 2^\circ\text{C}$ (3.6°F). The water shall be fed into the specimen at a head not exceeding 1.5 m (5 ft) and allowed to flow through it under such conditions that the pipe specimen is filled with the controlled temperature water at all times. Any recirculation shall be vented to atmosphere. A schematic drawing of the test setup is shown on Fig. 2.

5.3 *Flexible Connections* for the ends of the pipe test specimens, installed so as to produce negligible load on the ends of the pipe.

5.4 *A Device for Measuring the Deflection* of the pipe specimen to the nearest 0.025 mm (0.001 in.) with negligible constraint on the specimen. A recommended device is a cathetometer as shown on Fig. 1.

5.5 *Time-Interval Measuring Device* graduated in minutes or seconds.

5.6 *Temperature and Pressure Gages* and suitable control devices to maintain standard test conditions.

6. Test Specimens

6.1 The test specimens shall be sections of fiberglass pipe cut to a precalculated span length plus two pipe diameters ± 13 mm (± 0.5 in.), essentially straight and of a diameter and wall thickness to be specified.

6.2 At least three specimens shall be tested for any given pipe size.

7. Test Temperature

7.1 The test temperature selected should be the maximum recommended service temperature for the piping unless it is desired to test the effects of temperature variation.

8. Procedure

8.1 Measure the total wall thickness, liner thickness, and diameter of the pipe specimen in accordance with Practice D3567.

8.2 Place the test specimen on the upright supports so that there is an overhang of one pipe diameter ± 13 mm (± 0.5 in.) on each end.

8.3 Connect the test specimen to the water supply and outlet system by means of supported flexible connectors.

8.4 Fill the pipe test specimen with water at ambient temperature and determine initial deflection.

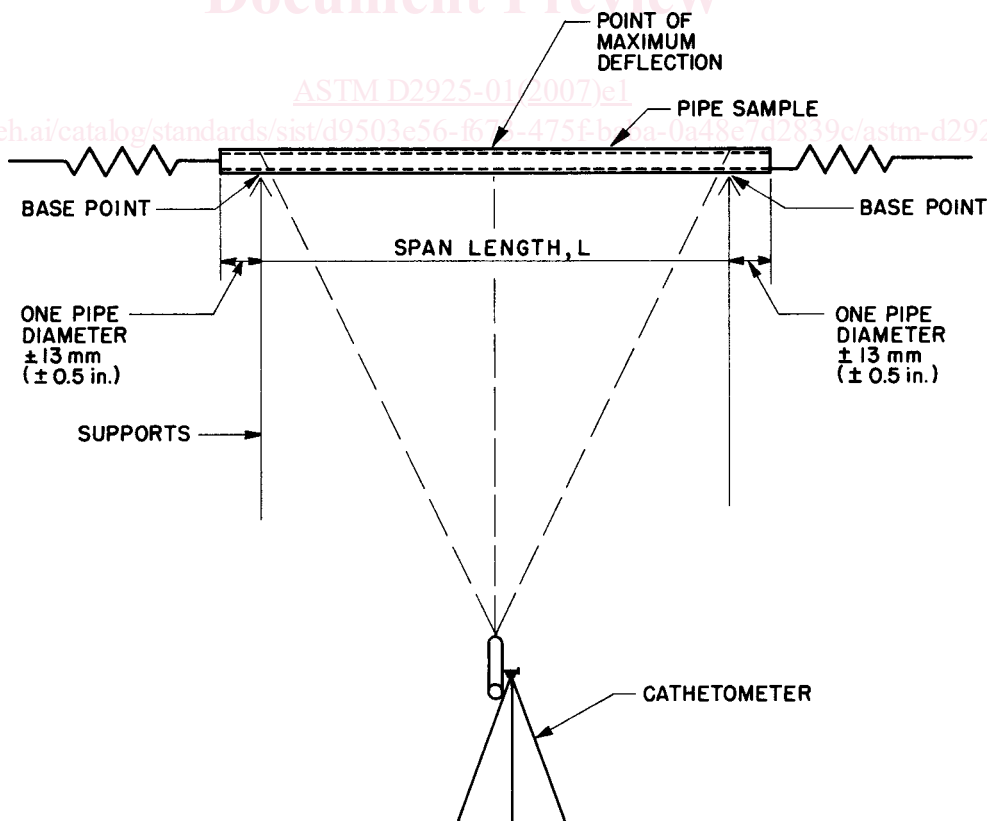


FIG. 1 Schematic of Test Specimen Support