Designation: D2290 – 16

Standard Test Method for Apparent Hoop Tensile Strength of Plastic or Reinforced Plastic Pipe[1]

This standard is issued under the fixed designation D2290; 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 U.S. Department of Defense.

1. Scope*

1.1 This test method covers the determination of the comparative apparent tensile strength of most plastic products utilizing a split disk or ring segment test fixture, when tested under defined conditions of pretreatment, temperature, humidity, and test machine speed. This test method is applicable to reinforced-thermosetting resin pipe regardless of fabrication method. This test method also is applicable to extruded and molded thermoplastic pipe.

Procedure A is used for reinforced-thermosetting resin pipe; Procedure B is used for thermoplastic pipe of any size; Procedure C is used for thermoplastic pipe with nominal diameter of 4½ in. (110 mm) and greater. Procedure D is used for polyethylene pipe with a nominal diameter of 14 in. (350 mm) and greater and preferably having wall thickness 1 in. (25 mm) and greater. Procedure E is used for polyvinyl chloride (PVC) pipe with a nominal diameter of 14 in. (350 mm) and greater and having wall thickness 1 in. (25 mm) and greater.

1.2 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.3 *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]

D618 Practice for Conditioning Plastics for Testing

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

E4 Practices for Force Verification of Testing Machines

3. Summary of Test Method

3.1 For Procedures A, B, and C, the test specimen is loaded through the suggested self-aligning split disk test fixture (Fig. 1) which applies tensile stress to the test ring. An apparent tensile strength rather than a true tensile strength is obtained in this test because of a bending moment imposed during test at the split between the split disk test fixture. This moment is induced by the change in contour of the ring between the two disk sections as they separate. The test fixture is designed to minimize the effect of this bending moment.

3.2 For Procedure D, ring segment test specimen pairs are loaded into the suggested self-aligning test fixtures (Fig. 2) that are designed to apply direct tensile stress to the reduced areas of the ring segment test specimens (Fig. 3) with minimal bending moment.

3.3 For Procedure E, a single ring segment test specimen is loaded into the suggested self-aligning test fixture (Fig. 4) that is designed to apply direct tensile stress to the reduced areas of the ring segment test specimen (Fig. 5) with minimal bending moment.

4. Significance and Use

4.1 Split disk and ring segment tensile tests, properly interpreted, provide reasonably accurate information with regard to the apparent tensile strength of plastic pipe when employed under conditions approximating those under which the tests are made.

4.2 Ring tensile tests may provide data for research and development, engineering design, quality control, acceptance or rejection under specifications, and for special purposes. The test cannot be considered significant for applications differing widely from the load-time scale of the standard test.

NOTE 1—Procedure C has been used on polyethylene and polybutylene pipe to produce results equivalent to Quick Burst results (Test Method D1599) for 4 in. to 8 in. pipes.

[1] This test method is under the jurisdiction of ASTM Committee F17 on Plastic Piping Systems and is the direct responsibility of Subcommittee F17.40 on Test Methods.

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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**

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