



Standard Test Method for Determining Thermoplastic Pipe Wall Stiffness¹

This standard is issued under the fixed designation F2433; 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 test method covers the determination of the load-deflection behavior of thermoplastic pipe wall sections under parallel plate loading conditions.

NOTE 1—These are not full pipe section tests, but pipe wall segment tests. The results of these tests will be different from pipe stiffness tests per Test Method D2412, although they may be proportional. This test provides quite different information, including stress relaxation under constant strain, and comparisons of the function and stiffness of different pipe wall designs or materials.

1.2 This test method covers a loading test for determining the wall stiffness of a thermoplastic-pipe wall under a combined load of bending and compression. Changes in pipe wall profile geometry under load may also be determined.

1.3 This test method covers thermoplastic pipe.

1.4 The characteristics determined by this test method are wall stiffness and changes in profile wall dimensions at specific deformations.

1.5 The characteristics determined by this test method are wall stiffness, profile wall efficiency, and for some wall elements stability at specific strain levels.

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

1.7 The text of this specification references notes and footnotes that provide explanatory material. These notes and footnotes (excluding those in tables and figures) shall not be considered as requirements of the specification.

1.8 *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.*

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. Referenced Documents

2.1 ASTM Standards:²

D618 Practice for Conditioning Plastics for Testing

D695 Test Method for Compressive Properties of Rigid Plastics

D883 Terminology Relating to Plastics

D1600 Terminology for Abbreviated Terms Relating to Plastics

D2122 Test Method for Determining Dimensions of Thermoplastic Pipe and Fittings

D2412 Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading

F412 Terminology Relating to Plastic Piping Systems

2.2 AASHTO Standards:

M 252 Standard Specification for Corrugated Polyethylene Drainage Pipe³

M 294 Standard Specification for Corrugated Polyethylene Pipe, 300- to 1500-mm Diameter³

3. Terminology

3.1 *Definitions*—Definitions are in accordance with Terminology F412, and abbreviations are in accordance with Terminology D1600, unless otherwise specified.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *chord shortening, n*—the ratio of the reduction in pipe section chord shortening to the initial chord length expressed as a percentage.

3.2.2 Δy , *n*—measured change in chord length (in the direction of load application) expressed in millimeters (inches).

3.2.2.1 *compressive deformation, n*—the measured change of the inside diameter in the direction of load application expressed in millimeters (or inches).

3.2.3 *load (F), n*—the force applied to the wall section to produce or maintain a given percent chord length shortening at any given unit of time; expressed as Newtons per meter (pounds-force per linear inch).

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.

³ Available from American Association of State Highway and Transportation Officials (AASHTO), 444 N. Capitol St., NW, Suite 249, Washington, DC 20001, <http://www.transportation.org>.