



Designation: G10 – 10

Standard Test Method for Specific Bendability of Pipeline Coatings¹

This standard is issued under the fixed designation G10; 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 reappraisal. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reappraisal.

1. Scope

1.1 This method covers the specific determination of the effect of short-radius bends on coatings applied to 33.4-mm (1-in. nominal) diameter pipe.

1.2 The values stated in SI units to three significant decimals are to be regarded as the standard. The values given in parentheses are for information only.

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

G6 Test Method for Abrasion Resistance of Pipeline Coatings

G12 Test Method for Nondestructive Measurement of Film Thickness of Pipeline Coatings on Steel (Withdrawn 2013)³

3. Summary of Method

3.1 The method consists of bending a 33.4-mm (1-in. nominal) diameter specimen of coated pipe around a mandrel to produce a range of short-radius bends. Coating failure in the form of cracking or loss of adhesion is detected through visual and electrical inspection of the bent specimen.

4. Significance and Use

4.1 This test will provide information on the ability of coatings applied to pipe to resist cracking, disbonding, or other mechanical damage as a result of bending. Because the test is

applied to coated pipe from commercial production, the results can be directly used in the selection of similar materials for service. The test also has application as a quality control method when variations in coating application or material formulation will affect bending performance.

5. Apparatus

5.1 The bending apparatus shall be essentially as shown in **Figs. 1-3** and shall include the following:

5.1.1 *Variable-Radius Mandrel*, constructed from four 19-mm (0.75-in.) thick pieces of plywood, bolted together and conforming to the geometric shape shown in **Fig. 1**. The geometric construction is accomplished by laying out along the outer edge of the mandrel a series of seven consecutive arcs at decreasing radii of 610, 530, 460, 380, 300, and 230 mm (24, 21, 18, 15, 12, and 9 in.). The first five arcs shall be carried through a 45-deg angle to the next point of tangency. A 45-deg V-notch shall be cut into the edge of the mandrel for seating the pipe specimen. Holes shall be drilled at appropriate locations in the mandrel face for positioning the lever arm and fastening pipe clamps.

5.1.2 *Lever Arm-Roller Assembly*—A 1.83-m (72-in.) lever arm with nylon roller supplies the mechanical advantage necessary to bend the pipe specimen. The lever arm shall contain a series of holes which are used to maintain proper clearance between the roller and pipe sample during the bending operation.

5.2 *Thickness Gage*—Measurements of coating thickness will be required for this test. This shall be done in accordance with Test Method **G12**.

5.3 *Holiday Detector*—A low-voltage d-c holiday detector of the wet-sponge type, specified in Test Method **G6**, shall be used to locate breaks in the coating film.

6. Test Specimens

6.1 The test specimen should be 2.5 m (100 in.) in length. It should be representative of production-coated pipe and be free of obvious coating flaws or defects. Coating specimens shall be applied to 33.4-mm (1-in. nominal) diameter pipe.

7. Conditioning

7.1 The specimen shall be exposed to room temperature for a sufficient time to ensure thermal equilibrium in the pipe and

¹ This test method is under the jurisdiction of ASTM Committee D01 on Paint and Related Coatings, Materials, and Applications and is the direct responsibility of Subcommittee D01.48 on Durability of Pipeline Coating and Linings.

Current edition approved Dec. 1, 2010. Published December 2010. Originally approved in 1969. Last previous edition approved in 2002 as G10 – 83 (2002). DOI: 10.1520/G0010-10.

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 The last approved version of this historical standard is referenced on www.astm.org.