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Designation: D 1737 - 85

AMERICAN SOCIETY FOR TESTING AND MATERIALS

1916 Race St., Philadelphia, Pa. 19103

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Standard Test Method for ELONGATION OF ATTACHED ORGANIC COATINGS WITH CYLINDRICAL MANDREL APPARATUS¹

This standard is issued under the fixed designation D 1737; 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 test method has been approved for use by agencies of the Department of Defense to replace Method 6222 of Federal Test Method Standard No. 141A and for listing in the DoD Index of Specifications and Standards.

1. Scope

1.1 This test method covers the determination by the cylindrical test apparatus of the elongation of attached organic coatings when applied to flat sheet metal of uniform surface texture.

1.2 *This standard may involve hazardous materials, operations, and equipment. This standard does not purport to address all of the safety problems associated with its use. It is the responsibility of whoever uses this standard to consult and establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Applicable Documents

2.1 ASTM Standards:

D 823 Methods of Producing Films of Uniform Thickness of Paint, Varnish, Lacquer, and Related Products on Test Panels²

D 1005 Test Method for Measurement of Dry-Film Thickness of Organic Coatings Using Micrometer²

D 1186 Methods for Nondestructive Measurement of Dry Film Thickness of Nonmagnetic Coatings Applied to a Ferrous Base²

3. Summary of Method

3.1 The materials under test are applied at uniform thickness to flat sheet metal panels. After the coatings are dried or baked, the panels are bent over cylindrical mandrels of various diameters. The elongation is determined from the largest diameter mandrel that produces visible cracking in the coating.

4. Significance and Use

4.1 Coatings attached to substrates are elongated when the substrates are bent during the manufacture of articles or when the articles are abused in service. This test method has been useful in rating attached coatings for their ability to resist cracking when elongated. It has been useful in evaluating the flexibility of coatings on flexible substrates.

5. Apparatus³

5.1 *Automatic Application Equipment*, as described in Methods D 823.

5.2 *Film Thickness Measuring Apparatus*, as described in Test Method D 1005 or in Methods D 1186.

5.3 *Elongation Test Equipment*, consisting of six cylindrical steel rods having diameters of 1 in. (25 mm), $\frac{3}{4}$ in. (19 mm), $\frac{1}{2}$ in. (12.7 mm), $\frac{3}{8}$ in. (9.5 mm), $\frac{1}{4}$ in. (6.4 mm), and $\frac{1}{8}$ in. (3.2 mm), and a means for firmly supporting them during a test.

6. Preparation of Specimens

6.1 Apply the materials to be tested to cold rolled steel (Note 1) conforming to the chemical

¹ This test method is under the jurisdiction of ASTM Committee D-1 on Paint and Related Coatings and Materials and is the direct responsibility of Subcommittee D01.23 on Physical Properties of Applied Paint Films.

Current edition approved Sept. 27, 1985. Published November 1985. Originally published as D 1737 - 60 T. Last previous edition D 1737 - 62 (1979)¹.

² *Annual Book of ASTM Standards*, Vol 06.01.

³ Suitable apparatus may be obtained from laboratory instrument supply houses.