



Designation: D1005 – 95 (Reapproved 2020)

# Standard Test Method for Measurement of Dry-Film Thickness of Organic Coatings Using Micrometers<sup>1</sup>

This standard is issued under the fixed designation D1005; 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 ( $\epsilon$ ) 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 measurement of film thickness of dried films of paint, varnish, lacquer, and related products using micrometers. Procedures A and B utilize stationary micrometers and Procedures C and D, hand-held micrometers. Procedures A and C are not recommended for films less than 12.5  $\mu\text{m}$  (0.5 mils) in thickness. The minimum thickness required for Procedures B and D is a function of that required to enable removal of the sample as a free film.

1.2 The procedures appear as follows:

1.2.1 *Procedure A*—Stationary micrometer for measuring coatings applied to plane rigid surfaces.

1.2.2 *Procedure B*—Stationary micrometer for measuring free films.

1.2.3 *Procedure C*—Hand-held micrometer for measuring coatings applied to plane rigid surfaces.

1.2.4 *Procedure D*—Hand-held micrometer for measuring free films.

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

1.4 *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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.5 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

<sup>1</sup> 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 D01.23 on Physical Properties of Applied Paint Films.

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## 2. Referenced Documents

2.1 *ASTM Standards:*<sup>2</sup>

D823 Practices for Producing Films of Uniform Thickness of Paint, Coatings and Related Products on Test Panels  
D2370 Test Method for Tensile Properties of Organic Coatings

## 3. Significance and Use

3.1 This test method is particularly applicable to the measurement of free films and is also satisfactory for the measurement of films on laboratory test panels.

3.2 The accuracy and precision of the thickness measurements may be influenced by the deformability of the coating. This test method is not applicable to coatings that are readily deformable under the load of the measuring instrument.

3.3 The accuracy and precision of the thickness measurements are also influenced by the uniformity of the substrate when the coatings are applied to laboratory test panels.

## 4. Apparatus

4.1 *Procedures A and B:*

4.1.1 The apparatus shall consist of a dial comparator, dial indicator, or micrometer. A rigid base is required for mounting the dial comparator or dial indicator gages. The presser foot of the micrometer or dial indicator shall be circular, from 1.5 to 3.0 mm ( $1/16$  to  $1/8$  in.) in diameter, and shall be flat on the bottom. The presser foot shall be fixed to an indicator that reads to 2.5  $\mu\text{m}$  (0.1 mil). The load on the presser foot shall be between 140 and 275 kPa (20 and 40 psi). For Procedure B, a smooth uncoated test plate is also required.

4.1.2 Verify the accuracy of instrument calibration by setting to zero with the anvils closed followed by measuring shims of known thicknesses or standards specifically designed for this purpose. Record the standard thickness gage measurement and the micrometer reading. Use these results to construct a calibration curve.

<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.