



Designation: D 6132 – 97

Standard Test Method for Nondestructive Measurement of Dry Film Thickness of Applied Organic Coatings Over Concrete Using an Ultrasonic Gage¹

This standard is issued under the fixed designation D 6132; 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 use of ultrasonic film thickness gages to measure accurately and nondestructively the dry film thickness of organic coatings applied over a substrate of dissimilar material. Measurements may be made on field structures, on commercially manufactured products, or on laboratory test specimens. These types of gages can accurately measure the dry film thickness of organic coating on concrete substrates. This test method should be proven for other substrates such as wood, hardboard, plastic, and glass prior to specifying this procedure for use.

1.2 This test method is not applicable to coatings that will be readily deformable under load of the measuring instrument as the instrument probe is placed directly on the coating surface to take a reading.

1.3 The effective range of instruments using the principle of ultrasonics is limited by gage design. A thickness range of 0.5 to 275 mils (10 μm to 7 mm) has been demonstrated.

1.4 The values stated in inch-pounds are to be regarded as the standard. The SI values given in parentheses are provided for information only.

1.5 *This standard does not purport to address 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:

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

D 1005 Test Method for Measurement of Dry-Film Thickness of Organic Coatings Using Micrometers²

D 4138 Test Method for Measurement of Dry Film Thickness of Protective Coating Systems by Destructive Means³

¹ This test method is under the jurisdiction of ASTM Committee D-1 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 Annual Book of ASTM Standards, Vol 06.01.

³ Annual Book of ASTM Standards, Vol 06.02.

E 691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method⁴

2.2 *Steel Structures Painting Council Standard:*
SSPC-PA2 Measurement of Dry Paint Thickness with Magnetic Gages⁵

3. Summary of Test Method

3.1 Instruments complying with this test method measure thickness by emitting an ultrasonic pulse into the coating that is reflected back from the substrate to the probe. The travel time is converted into a thickness reading. The instrument must be placed directly on the coating surface to take a reading.

3.2 After verifying the calibration on a known coated part of the object or material of the same kind, the instrument probe is coupled with the coated specimen, after proper cure and conditioning according to the coating manufacturer's instructions.

3.3 It should be recognized that the accuracy of the measurements can be influenced when:

3.3.1 The coated object to be measured is not planar with respect to the transducer face at the point of measurement,

3.3.2 The surface roughness of the coated specimen exceeds the coating thickness, and

3.3.3 Coating density is not uniform.

4. Significance and Use

4.1 Many coating properties are markedly affected by the film thickness of the dry film such as adhesion, flexibility, and hardness. To be able to compare results obtained by different operators, it is essential to measure film thickness closely.

4.2 Most protective and high performance coatings are applied to meet a requirement or a specification for the dry-film thickness of each coat, or for the complete system, or both. Coatings must be applied within certain minimum and maximum thickness tolerances in order that they can fulfill their intended function. In addition to potential performance deficiencies, it is uneconomical to apply more material than necessary when coating large areas such as floors and walls.

⁴ Annual Book of ASTM Standards, Vol 14.02.

⁵ Available from Steel Structures Painting Council, Post Office Box 641256, Pittsburgh, PA 15264-1256.