



Standard Practices for Measurement of Dry Film Thickness of Protective Coating Systems by Destructive, Cross-Sectioning Means¹

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1. Scope*

1.1 This practice describes the measurement of dry film thickness of coating films by microscopic observation of precision angular cuts in the coating film. Use of these procedures may require repair of the coating film. This practice is intended to supplement the manufacturers' instructions for the manual operation of the gages and is not intended to replace them. It includes definitions of key terms, reference documents, the significance and use of the practice, and the advantages and limitations of the instruments.

1.2 Three procedures are provided for measuring dry film thickness of protective coating systems:

1.2.1 *Procedure A*—Using groove cutting instruments.

1.2.2 *Procedure B*—Using grinding instruments.

1.2.3 *Procedure C*—Using drill bit instruments.

1.3 These procedures are not applicable for soft or ductile substrates that may deform under the test gage cutting tip. The substrate should be sufficiently rigid to prevent deformation of the coating during the cutting process. The surface may be flat or moderately curved. Pipes as small as 25 mm (1 in.) in diameter may be measured in the axial direction.

1.4 Individual coats in a multicoat system where there is a discernible visual difference between coats or the overall thickness of a coating system can be measured by these procedures.

1.5 The range of thickness measurement is typically 2 to 2000 microns (0.1 to 80 mils) and depends upon the cutting angle of the blade.

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 *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

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

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

D 7091 Practice for Nondestructive Measurement of Dry Film Thickness of Nonmagnetic Coatings Applied to Ferrous Metals and Nonmagnetic, Nonconductive Coatings Applied to Non-Ferrous Metals

3. Terminology

3.1 *Definitions of Terms:*

3.1.1 *accuracy, n*—the measure of the magnitude of error between the result of a measurement and the true thickness of the item being measured.

3.1.2 *dry film thickness, n*—the thickness of a coating (or coating layers) as measured from the surface of the substrate.

3.1.3 *micrometre (micron), n*—one one-thousandths of a millimetre (0.001 mm); 25.4 microns = 1 mil.

3.1.4 *mil, n*—an imperial unit of measure; one one-thousandths of an inch (0.001 in.); 1 mil = 25.4 microns.

3.1.5 *reticle, n*—a scale on transparent material fitted at the focal plane of the eyepiece of the microscope for the purpose of measuring the width of a feature within the image.

4. Summary of Practice

4.1 The three procedures are based on measurement of dry film thickness by observation of the width of angular cuts in the coating through a microscope having a built-in reticle with a scale. Each procedure employs different instruments to make the cut in the coating.

4.2 *Procedure A*—Uses a carbide or carbide-tipped wedge to cut a groove in the coating. The groove is cut at a precise angle to the surface. Various wedge angles are available. This procedure requires the manual cutting of the coating by dragging a cutting wedge through both the coating and the

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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.

*A Summary of Changes section appears at the end of this standard.