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AMERICAN SOCIETY FOR TESTING AND MATERIALS
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Standard Guide for Determining Mass Per Unit Area of Electrodeposited and Related Coatings by Gravimetric and Other Chemical Analysis Procedures¹

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1. Scope

1.1 This guide outlines a general method for determining the mass per unit area of electrodeposited, electroless, mechanically-deposited, vacuum-deposited, anodioxide, and chemical conversion coatings by gravimetric and other chemical analysis procedures.

1.2 This guide determines the average mass per unit area over a measured area.

1.3 The stripping methods cited are described in specifications or in the open literature or have been used routinely by at least one laboratory.

1.4 The procedures outlined can be used for many coating-substrate combinations. They cannot be used where the coating cannot be separated from the substrate by chemical or physical means as would be the case if white brass were plated with yellow brass.

1.5 In principle, these procedures can be used to measure very thin coatings or to measure coatings over small areas, but not thin coatings over small areas. The limits depend on the required accuracy. For example, 2.5 mg/cm² of coating might require 2.5 mg of coating covering 1 cm², but 0.1 mg/cm² of coating would require 25 cm² to obtain 2.5 mg of coating.

1.6 *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:

- A 90/A 90 M Test Method for Weight (Mass) of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings²
- A 309 Test Method for Weight and Composition of Coating on Terne Sheet by the Triple-Spot Test²
- A 428 Test Method for Weight (Mass) of Coating on Aluminum-Coated Iron or Steel Articles²

B 137 Test Method for Measurement of Coating Mass Per Unit Area on Anodically Coated Aluminum³

B 449 Practice for Chromate Treatments on Aluminum³

2.2 British Standards Institution Documents:

BS 729 Hot Dip Galvanized Coatings on Iron and Steel Articles, Specification for:⁴

BS 1706 Electroplated Coatings of Cadmium and Zinc on Iron and Steel, Specification for:⁴

BS 1872 Electroplated Coatings of Tin, Specification for:⁴

BS 3189 Phosphate Treatment of Iron and Steel, Specification for:⁴

BS 3382 Electroplated Coatings on Threaded Components, Specification for:⁴

BS 3597 Electroplated Coatings of 65/35 Tin-Nickel Alloy, Specification for:⁴

2.3 Government Standards:

2.3.1 DOD Standard:

DOD-P-16232F Phosphate Coatings, Heavy, Manganese or Zinc Base (for Ferrous Metals)⁵

2.3.2 Federal Standards:

FED-STD 151b Metals; Test Methods: Test 513.1 for Weight of Coating on Hot Dip Tin Plate and Electrolytic Tin Plate⁶

RR-T-51D Tableware and Flatware—Silverplated⁶

2.3.3 Military Standard:

MIL-M-45202C Magnesium Alloys, Anodic Treatment of⁵

2.4 ISO Standards:

ISO 2081 Metallic Coatings—Electroplated Coatings of Zinc on Iron or Steel⁷

ISO 2082 Metallic Coatings—Electroplated Coatings on Cadmium on Iron or Steel⁷

ISO 2093 Metallic Coatings—Electrodeposited Coatings of Tin, Annex B⁷

ISO 2106 Anodizing of Aluminum and its Alloys—Determination of Mass Per Unit Area (Surface Density) of

¹ This guide is under the jurisdiction of ASTM Committee B-8 on Metallic and Inorganic Coatings and is the direct responsibility of Subcommittee B08.10 on General Test Methods.

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² Annual Book of ASTM Standards, Vol 01.06.

³ Annual Book of ASTM Standards, Vol 02.05.

⁴ Available from British Standards Institution, Linford Wood, Milton Keynes MK14 6L3, England.

⁵ Available from Standardization Documents Order Desk, Bldg. 4 Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094, Attn: NPODS.

⁶ Available from U.S. Government Printing Office, Washington, DC 20402.

⁷ Available from American National Standards Institute, 11 W. 42nd St., 13th Floor, New York, NY 10036.