



Designation: F3393 – 20^{ε1}

Zinc-Flake Coating Systems for Fasteners¹

This standard is issued under the fixed designation F3393; 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.

^{ε1} NOTE—Table 1 was editorially corrected in August 2020.

1. Scope

1.1 Zinc-flake coating systems are fluid dispersions of zinc-flakes, sometimes with the addition of aluminum flakes, which are non-electrolytically applied to steel substrates. The zinc-flake coating system shall be supplied without hexavalent chromium and can be water based or solvent based systems. Cohesion among the zinc-flakes and adhesion to the steel substrate is achieved through a matrix that is formed during the curing process.

1.2 This specification covers the classification, performance, and basic requirements for non-electrolytically applied zinc-flake coatings on unified inch and metric series threaded fasteners with minimum nominal diameters of 0.250 in. for inch series and 6 mm for metric.

1.3 This standard is a consolidation and replacement of three ASTM standards: Specifications **F1136/F1136M**, **F2833**, and **F3019/F3019M**.

1.4 *Units*—The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system are not necessarily exact equivalents; therefore, to ensure conformance with the standard, each system shall be used independently of the other, and values from the two systems shall not be combined.

1.5 *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.*

1.6 *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.*

2. Referenced Documents

2.1 ASTM Standards:²

- B117** Practice for Operating Salt Spray (Fog) Apparatus
- B487** Test Method for Measurement of Metal and Oxide Coating Thickness by Microscopical Examination of Cross Section
- B499** Test Method for Measurement of Coating Thicknesses by the Magnetic Method: Nonmagnetic Coatings on Magnetic Basis Metals
- B568** Test Method for Measurement of Coating Thickness by X-Ray Spectrometry
- D610** Practice for Evaluating Degree of Rusting on Painted Steel Surfaces
- D3359** Test Methods for Rating Adhesion by Tape Test
- E376** Practice for Measuring Coating Thickness by Magnetic-Field or Eddy Current (Electromagnetic) Testing Methods
- F606/F606M** Test Methods for Determining the Mechanical Properties of Externally and Internally Threaded Fasteners, Washers, Direct Tension Indicators, and Rivets
- F788** Specification for Surface Discontinuities of Bolts, Screws, Studs, and Rivets, Inch and Metric Series
- F1136/F1136M** Specification for Zinc/Aluminum Corrosion Protective Coatings for Fasteners
- F1470** Practice for Fastener Sampling for Specified Mechanical Properties and Performance Inspection
- F1624** Test Method for Measurement of Hydrogen Embrittlement Threshold in Steel by the Incremental Step Loading Technique
- F1789** Terminology for F16 Mechanical Fasteners
- F1940** Test Method for Process Control Verification to Prevent Hydrogen Embrittlement in Plated or Coated Fasteners
- F2833** Specification for Corrosion Protective Fastener Coatings with Zinc Rich Base Coat and Aluminum Organic/Inorganic Type
- F3019/F3019M** Specification for Chromium Free Zinc-Flake Composite, with or without Integral Lubricant,

¹ This specification is under the jurisdiction of ASTM Committee **F16** on Fasteners and is the direct responsibility of Subcommittee **F16.03** on Coatings on Fasteners.

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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.