



Designation: F1941/F1941M – 16

Standard Specification for Electrodeposited Coatings on Mechanical Fasteners, Inch and Metric¹

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INTRODUCTION

This specification covers the coating of steel unified inch and metric mechanical fasteners by electrodeposition. The properties of the coatings shall conform to the ASTM standards for the individual finishes. This standard shall be used in place of ASTM B633 for mechanical fasteners.

Coating thickness values are based on standard tolerances for inch and metric external threads. The coating must not cause the basic thread size to be transgressed by either the internal or external threads. The method of designating inch coated threads shall comply with ASME B1.1 and ISO 965-1, ISO 965-2, and ISO 965-3 for ISO metric coated threads.

With normal methods for depositing metallic coatings from aqueous solutions, there is a risk of delayed failure due to hydrogen embrittlement for case hardened fasteners and fasteners having a hardness above 39 HRC. Although this risk can be managed by selecting raw materials suitable for the application of electrodeposited coatings and by using modern methods of surface treatment and post heat-treatment (baking), the risk of hydrogen embrittlement cannot be completely eliminated. Therefore, the application of a metallic coating by electrodeposition is not recommended for such fasteners.

1. Scope*

1.1 This specification covers application, performance and dimensional requirements for electrodeposited coatings on threaded fasteners with unified inch and metric screw threads, but it may also be applied to other threaded parts and non-threaded parts such as washers and pins. It specifies coating thickness, supplementary hexavalent chromate or non-hexavalent conversion coatings, corrosion resistance, precautions for managing the risk of hydrogen embrittlement and hydrogen embrittlement relief for high-strength and surface-hardened fasteners. It also highlights the differences between barrel and rack plating and makes recommendations as to the applicability of each process.

1.2 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the standard.

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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1.3 Terms used in this specification are defined in Terminology F1789.

1.4 The following precautionary statement pertains to the test method portion only, Section 9, of this specification: *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

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

B504 Test Method for Measurement of Thickness of Metallic Coatings by the Coulometric Method

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