



Standard Specification for Nickel-Cobalt Alloy Coating¹

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1. Scope

1.1 This specification describes the requirements for corrosion-resistant coatings of electrodeposited nickel-cobalt on metallic substrates and electrodeposited nickel-cobalt used for electroforming.

NOTE 1—The nickel-cobalt alloy is principally deposited as a coating on steel products. It can also be electrodeposited on iron, stainless steel, aluminum, titanium and any other metal substrate.

NOTE 2—The nickel-cobalt alloy coating has a low coefficient of friction of 0.08 that provides a dry lubricant on part surfaces that are in contact with each other and are subject to galling.

1.2 This specification incorporates an accelerated exposure test method to evaluate the effects of corrosion and galling on the coating, and incorporates a means of reporting the results to the purchaser.

1.3 The specification incorporates a classification scheme that establishes service conditions for thickness, classes of deposits based on the level of monitoring, and type based on supplemental coatings used after deposition.

1.4 The coating thickness ranges from 5 to >30 μm , and it can be applied to machined parts, springs, latches, threaded parts, fasteners, etc. The deposit can also be used to electroform parts requiring high strength with the alloy being maintained at 50% nickel-cobalt.

1.5 The nickel-cobalt alloy is used to protect ferrous metals in contact with corrosive environments such as: oil and gas production facilities, costal marine, and ACQ (Alkaline Copper Quaternary) treatments for wood treatments.

1.6 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.

1.7 *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.

1.8 *This standard has been revised to comply with the Restriction of Hazardous Substances **RoHS Requirements** that seek to limit the exposure of workers and the public to toxic metals. The nickel-cobalt alloy does not contain any of the six Restricted Hazardous Substances.*

2. Referenced Documents

2.1 ASTM Standards:²

A193/A193M Specification for Alloy-Steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications

A194/A194M Specification for Carbon and Alloy Steel Nuts for Bolts for High Pressure or High Temperature Service, or Both

A681 Specification for Tool Steels Alloy

B117 Practice for Operating Salt Spray (Fog) Apparatus

B183 Practice for Preparation of Low-Carbon Steel for Electroplating

B242 Guide for Preparation of High-Carbon Steel for Electroplating

B254 Practice for Preparation of and Electroplating on Stainless Steel

B320 Practice for Preparation of Iron Castings for Electroplating

B322 Guide for Cleaning Metals Prior to Electroplating

B368 Test Method for Copper-Accelerated Acetic Acid-Salt Spray (Fog) Testing (CASS Test)

B374 Terminology Relating to Electroplating

B568 Test Method for Measurement of Coating Thickness by X-Ray Spectrometry

B571 Practice for Qualitative Adhesion Testing of Metallic Coatings

B602 Test Method for Attribute Sampling of Metallic and Inorganic Coatings

B697 Guide for Selection of Sampling Plans for Inspection of Electrodeposited Metallic and Inorganic Coatings

B762 Test Method of Variables Sampling of Metallic and Inorganic Coatings

¹ This test method is under the jurisdiction of ASTM Committee B08 on Metallic and Inorganic Coatings and is the direct responsibility of Subcommittee B08.03 on Engineering Coatings.

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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.