



Society of Automotive Engineers, Inc.
400 COMMONWEALTH DRIVE, WARRENDALE, PA. 15096

AEROSPACE MATERIAL SPECIFICATION

AMS 2410F

Superseding AMS 2410E

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SILVER PLATING Nickel Strike, High Bake

1. SCOPE:

1.1 Purpose: This specification covers the engineering requirements for electrodeposition of silver on other metals, usually with a nickel strike between the basis metal and the silver, and the properties of the deposit.

1.2 Application: Primarily to provide a bearing surface and to prevent galling or seizing of surfaces of parts made of corrosion-resistant steels and alloys and of parts made of other metals not deleteriously affected by high-temperature baking.

2. APPLICABLE DOCUMENTS: The following publications form a part of this specification to the extent specified herein. The latest issue of Aerospace Material Specifications (AMS) shall apply. The applicable issue of other documents shall be as specified in AMS 2350.

2.1 SAE Publications: Available from Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096.

2.1.1 Aerospace Material Specifications:

AMS 2350 - Standards and Test Methods

2.2 ASTM Publications: Available from American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

ASTM B487 - Metal and Oxide Coating Thicknesses by Microscopical Examination of a Cross Section

ASTM B499 - Measurement of Coating Thicknesses by The Magnetic Method: Nonmagnetic Coatings on Magnetic Basis Metals

ASTM B504 - Measurement of the Thickness of Metallic Coatings by The Coulometric Method

ASTM E376 - Measuring Coating Thickness by Magnetic-Field or Eddy-Current (Electromagnetic) Test Methods

2.3 Government Publications: Available from Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.

2.3.1 Military Standards:

MIL-STD-794 - Parts and Equipment, Procedures for Packaging and Packing of

2.4 ANSI Publications: Available from American National Standards Institute, 1430 Broadway, New York, NY 10018.

ANSI B46.1 - Surface Texture

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3. TECHNICAL REQUIREMENTS:**3.1 Preparation:**

- 3.1.1 Prior to cleaning, texture of surfaces to be plated on parts other than nuts shall, unless otherwise specified, be not rougher than 80 microin. (2 μm), determined in accordance with ANSI B46.1.
- 3.1.2 Parts shall have chemically clean surfaces, prepared with minimum abrasion, erosion, or pitting, prior to immersion in the plating solution.
- 3.1.3 Electrical contacts between the parts and power source shall be made in such a manner as will ensure that neither chemical or immersion deposition nor electrical arcing or overheating will occur. If parts are to be plated all over, contact points shall be located where specified or where agreed upon by purchaser and vendor. If parts are not required to be plated all over, contact points shall be located in areas on which plating is not required or is optional.

3.2 Procedure:

- 3.2.1 Parts shall be plated in the following sequence except that the nickel strike may be omitted in plating copper and copper alloys:

Nickel Strike
Silver Strike
Silver Plate

- 3.2.2 The plated parts shall be removed from the plating solution, thoroughly rinsed, and dried.

- 3.3 Post Treatment: Except as specified herein, all parts except nuts shall be heated to 935° - 965°F or 502° - 518°C after plating, rinsing, and drying and held at heat for not less than 20 min. nor more than 1 hr; temperature of the parts shall not be over 400°F or 205°C for more than 7 hr, and above 400°F or 205°C, the heating and cooling medium shall be a neutral or reducing atmosphere (except that hydrogen shall not be used) or shall be a neutral or nonoxidizing molten salt bath. If such heating would lower hardness of parts below drawing limits or otherwise deleteriously affect the parts, heating shall be at the highest practicable temperature which will maintain specified properties. Heating of nuts will not be required.

3.4 Properties:

- 3.4.1 Thickness: Shall be as follows, determined in accordance with ASTM B487, ASTM B499, ASTM B504, ASTM E376, or other suitable method agreed upon by purchaser and vendor:

- 3.4.1.1 Where silver flash is specified, plate thickness shall be approximately 0.0001 in. (3 μm).

- 3.4.1.2 Thickness of plate other than flash shall be as specified on the drawing. If machining of plated metal is required, plate thickness as deposited shall be sufficient to allow machining of all areas of plated surfaces to the dimensions specified on the drawing.

- 3.4.2 Composition: Silver as plated shall be not less than 99.9% pure; the process of plating shall be controlled to produce this purity.

3.4.3 Adhesion:

- 3.4.3.1 Plated metal shall be firmly and continuously bonded to the underlying metal. Nuts, and other parts after heating, shall show no blisters or other indications of poor bond.

3.4.3.2 Parts other than nuts shall withstand, after heating, a shear or chisel test so conducted as to indicate quality of the bond. Silver shall shear away with no parting of plate and basis metal.

3.4.3.3 Nuts shall show no peeling of the silver when scratched with a knife or other sharp tool.

3.5 Quality:

3.5.1 Silver plate which is not subsequently machined shall be sound, smooth, continuous, uniform in color, and free from blisters and other imperfections detrimental to fabrication or to performance of parts. Selectively plated areas shall be sharply defined.

3.5.2 Silver plate which is to be machined shall be sound, and free from excessive nodulation or treeing at edges. Finished parts shall be free from visible pits, excessive porosity, and other imperfections detrimental to fabrication or to performance of parts.

3.5.3 Abrasion of plating on corners and edges of nuts will not be cause for rejection but plate shall be continuous on the threads. Marking of the cone section of self-locking nuts, produced in offsetting the locking beams or other locking feature, will not be cause for rejection.

∅ 3.5.4 Double plating and spotting-in after plating are not permitted, unless otherwise specified.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The processing vendor shall supply all samples and shall be responsible for performing all required tests. Results of such tests shall be reported to the purchaser as required by 4.5. Purchaser reserves the right to perform such confirmatory testing as he deems necessary to ensure that processing conforms to the requirements of this specification.

4.2 Classification of Tests:

4.2.1 Acceptance Tests: Tests to determine conformance to thickness (3.4.1) and quality (3.5) requirements are classified as acceptance tests.

4.2.2 Periodic Tests: Tests to determine conformance to composition (3.4.2) and adhesion (3.4.3) requirements and of cleaning and plating solutions and of heating media to ensure that the plate will conform to the requirements of this specification are classified as periodic tests.

4.2.3 Preproduction Tests: Tests to determine conformance to all technical requirements of this specification are classified as preproduction tests.

4.2.3.1 For direct U.S. Military procurement, substantiating test data and, when requested, preproduction test material shall be submitted to the cognizant agency as directed by the procuring activity, the contracting officer, or the request for procurement.

4.3 Sampling: Shall be not less than the following:

4.3.1 Acceptance Tests:

∅ 4.3.1.1 Thickness: Three parts for each consecutive 8 hr of operation of the same set of solutions.

4.3.1.2 Quality: As agreed upon by purchaser and vendor.

∅ 4.3.2 Periodic Tests and Preproduction Tests: As agreed upon by purchaser and vendor.