

AEROSPACE MATERIAL SPECIFICATION



AMS 2429C

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Reaffirmed SEP 2006

Superseding AMS 2429B

Plating, Bronze
Nitriding Stop-off
90Cu - 10Sn

RATIONALE

This document has been reaffirmed to comply with the SAE 5-year Review policy.

1. SCOPE:

1.1 Purpose:

This specification covers the engineering requirements for electrodeposition and removal of bronze plate.

1.2 Application:

This process has been used typically as a maskant to prevent nitriding of surfaces on which nitriding is neither required nor permitted, but usage is not limited to such applications.

1.3 Safety - Hazardous Materials:

While the materials, methods, applications, and processes described or referenced in this specification may involve the use of hazardous materials, this specification does not address the hazards which may be involved in such use. It is the sole responsibility of the user to ensure familiarity with the safe and proper use of any hazardous materials and to take necessary precautionary measures to ensure the health and safety of all personnel involved.

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2. APPLICABLE DOCUMENTS:

The issue of the following documents in effect on the date of the purchase order forms a part of this specification to the extent specified herein. The supplier may work to a subsequent revision of a document unless a specific document issue is specified. When the referenced document has been canceled and no superseding document has been specified, the last published issue of that document shall apply.

2.1 ASTM Publications:

Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959 or www.astm.org.

ASTM B 487	Measurement of Metal and Oxide Coating Thicknesses by Microscopical Examination of a Cross Section
ASTM B 499	Measurement of Coating Thicknesses by the Magnetic Method; Nonmagnetic Coatings on Magnetic Basis Metals
ASTM B 504	Measurement of Thickness of Metallic Coatings by the Coulometric Method
ASTM B 567	Measurement of Coating Thicknesses by the Beta Backscatter Method
ASTM B 568	Measurement of Coating Thickness by X-Ray Spectrometry
ASTM B 571	Adhesion of Metallic Coatings
ASTM E 376	Measuring Coating Thickness by Magnetic-Field or Eddy-Current (Electromagnetic) Test Methods
ASTM E 478	Chemical Analysis of Copper Alloys
ASTM F 519	Mechanical Hydrogen Embrittlement Evaluation of Plating Processes and Service Environments

3. TECHNICAL REQUIREMENTS:

3.1 Preparation:

- 3.1.1 Prior to immersion in the plating solution, parts shall be clean and free of water break.
- 3.1.2 Except for barrel plating, electrical contact shall be as follows: For parts which are to be plated all over, locations shall be acceptable to purchaser, for parts which are not to be plated all over, locations shall be in areas on which plating is not required.
- 3.1.3 Auxiliary anodes shall be used as necessary to ensure proper plate thicknesses in holes, recesses, and closed-end deep bores on parts to be protected against nitriding.

3.2 Procedure:

- 3.2.1 Parts shall be plated by electrodeposition of copper-tin alloy from a suitable bronze plating solution. A preliminary strike of copper or, for corrosion and heat resistant steels, of nickel is permissible.
- 3.2.2 After plating, the parts shall be thoroughly rinsed and dried.

3.3 Hydrogen Embrittlement Relief:

After plating, parts having hardness higher than 40 HRC shall be baked for not less than 23 hours at 375 °F ± 10 (191 °C ± 6) or shall be started in the nitriding cycle within four hours after plating.

3.3.1 If the parts have seen no machining/grinding or other processes that induce residual stress between the heat, treatment and nitriding operations, then baking shall not be required.

3.3.2 After nitriding, the bronze plate shall be stripped from parts with an alkaline copper stripper that will not cause pitting or other damage to the basis metal.

3.4 Properties:

The deposited copper-tin alloy shall conform to the following requirements:

3.4.1 Thickness: Shall be not less than 0.0005 inch (13 µm) on all surfaces of representative parts or test panels cleaned and plated with the parts represented, determined in accordance with ASTM B 487, ASTM B 499, ASTM B 504, ASTM B 567, ASTM B 568, and ASTM E 376 or other method acceptable to purchaser.

3.4.1.1 Where "copper strike" or "nickel strike" is specified, the thickness of the strike shall be approximately 0.0001 inch (2.5 µm).

3.4.2 Composition: The tin content of the bronze plate shall be 5 to 15% by weight, determined by wet chemical methods in accordance with ASTM E 478, by spectrochemical methods, or by other analytical methods acceptable to purchaser.

3.4.3 Adhesion: Shall be tested on parts using the heat quench test for copper in accordance with ASTM B 571.

3.4.4 Porosity: Bronze plated low-alloy steel panels, plated with the parts represented, shall be sufficiently nonporous to not give a blue color when tested for five minutes with potassium ferricyanide solution made up in accordance with Table 1. Alternate tests, providing equal sensitivity, may be used when approved by purchaser (See 8.8).

TABLE 1 - Ferricyanide Test Solution

Ingredient	Amount
Potassium ferricyanide	10 grams
Sodium chloride	5 grams
Deionized water	100 mL