



AEROSPACE MATERIAL SPECIFICATION

AMS2433™**REV. D**

Issued 1986-01
Reaffirmed 2011-10
Revised 2020-05

Superseding AMS2433C

(R) Plating, Nickel-Thallium-Boron or Nickel-Boron
Electroless Deposition

RATIONALE

AMS2433D is a general revision resulting from a Five-Year Review and update of this specification.

NOTICE

ORDERING INFORMATION: The following information shall be provided to the plating processor by the purchaser.

1. Purchase order shall specify not less than the following:

- AMS2433D
- Type of deposit desired (1.3)
- Plate thickness desired (3.4.3)
- Solid film lubricant or polymer, if desired (3.3.2)
- Basis metal to be plated
- Tensile strength or hardness of the basis metal (steel alloys only)
- If steel parts were machined, ground, cold formed or cold straightened after heat treat (3.1.2)
- If steel parts have been shot peened, specify if required stress relief has been completed (3.1.2.3)
- If preplate stress relief is to be performed by plating processor, and (time and/or temperature) if different from 3.1.2
- Fixture contact locations, when not specified (3.1.5)
- Special features, geometry or processing present on parts that requires special attention by the plating processor
- Hydrogen embrittlement relief to be performed by plating processor (parameters or reference document) if different from 3.3.1
- Post treatment bake, 3.3.1.1, time and/or temperature, if different from 3.3.1
- Hardness requirements, as plated and/or, post treatment bake (if different) from 3.4.2

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Full document details: SAE AMS2433D

For more information on this standard, visit
<https://www.sae.org/standards/content/AMS2433D>

Documents

Document Sharing Hub

- Optional: Wear test frequency and wear scar width acceptance criteria (3.4.5)
 - Periodic testing frequency (4.2.2) and/or sample quantity (4.3.3), if different than that stated
 - Special processing, when required, to avoid or remove discoloration (3.5)
 - Quantity of pieces to be plated
2. Parts manufacturing operations, such as heat treatment, forming, joining, and media finishing, can affect the condition of the substrate for plating, or if performed after plating, could adversely affect the plate. The sequencing of these types of operations should be specified by the cognizant engineering organization and is not controlled by this specification.

1. SCOPE

1.1 Purpose

This specification covers the requirements for an electroless nickel-thallium-boron or nickel-boron, deposit on various substrates.

1.2 Application

This process has been used typically to provide a hard, ductile, wear-resistant surface for operation in service up to 1000 °F (538 °C), to provide uniform build-up on complex shapes, and to enhance solderability of surfaces, but usage is not limited to such applications. This process is not generally recommended for materials subject to over-tempering or high temperature embrittlement when exposed to the post-plating heat treatment of 675 °F (357 °C) for 90 minutes (see 3.3.1 and 3.3.1.1).

1.3 Classification

The deposits covered by this specification are classified by composition as follows:

Type 1 - Nickel-Thallium-Boron

Type 2 - Nickel-Boron

Unless otherwise specified, Type 1 shall be supplied.

1.4 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.

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 cancelled and no superseding document has been specified, the last published issue of that document shall apply.

2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

AMS2404 Plating, Electroless Nickel

AMS2750 Pyrometry

AMS4751 Tin-Lead Eutectic, 63Sn-37Pb

ARP1917 Clarification of Terms Used in Aerospace Metals Specifications

ARP4992 Periodic Test Plan for Process Solutions

AS2390 Chemical Process Test Specimen Material

2.2 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org.

ASTM B32 Standard Specification for Solder Metal

ASTM B117 Operating Salt Spray (Fog) Apparatus

ASTM B253 Preparation of Aluminum Alloys for Electroplating

ASTM B374 Terminology Relating to Electroplating

ASTM B487 Measurement of Metal and Oxide Coating Thickness by Microscopical Examination of Cross Section

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

ASTM B567 Measurement of Coating Thickness by the Beta Backscatter Method

ASTM B568 Measurement of Coating Thickness by X-Ray Spectrometry

ASTM B571 Qualitative Adhesion Testing of Metallic Coatings

ASTM B748 Measurement of Thickness of Metallic Coatings by Measurement of Cross Section with a Scanning Electron Microscope

ASTM D2714 Calibration and Operation of the Falex Block-on-Ring Friction and Wear Testing Machine

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

ASTM E384 Microindentation Hardness of Materials

ASTM E1097 Determination of Various Elements by Direct Current Plasma Atomic Emission Spectrometry

2.3 Definitions

Terms used in AMS specifications are clarified in ARP1917, ASTM B374, and as follows.

2.3.1 CORROSION PIT

A pit is defined as an area of localized corrosion having a depth greater than its width. Pit size may be determined by either direct dimensional measurement or by comparison to known references. A superficial pit or discontinuity in the plating surface itself, not penetrating through to the base metal and not showing the presence of red corrosion products, on steel base materials, is not rejectable. As a general rule, a rejectable corrosion pit usually displays a characteristic tail or line of red corrosion products on steel.