

AEROSPACE MATERIAL SPECIFICATION



AMS 2441A

Issued JAN 1993
Cancelled OCT 2000

Superseding AMS 2441

Selective (Brush) Nickel Plating
Low-Stressed, Low Hardness Deposit

CANCELLATION NOTICE

This specification has been "CANCELLED" by the Aerospace Materials Division, SAE, as of October 2000, and has been superseded by AMS 2451/3. The requirements of the latest issue of AMS 2451/3 shall be fulfilled whenever reference is made to the cancelled AMS 2441. By this action, this document will remain listed in the Numerical Section of the Index of Aerospace Material Specifications noting that it is superseded by AMS 2451/3.

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1. SCOPE:

1.1 Purpose:

This specification covers the engineering requirements for selective (brush) electrodeposition of nickel and the properties of the deposit.

1.2 Application:

This process has been used typically to provide moderate corrosion and oxidation resistance and dimensional build-up and restoration of parts, which may operate in service up to 700 °F (371 °C), and requiring low tensile stress in the deposit to avoid marked reduction of fatigue strength, 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.

2. APPLICABLE DOCUMENTS:

The following publications form a part of this specification to the extent specified herein. The applicable issue of referenced publications shall be the issue in effect on the date of the purchase order.

2.1 ASTM Publications:

Available from ASTM, 1916 Race Street, Philadelphia, PA 19103-1187.

ASTM B 117	Salt Spray (Fog) Testing
ASTM B 487	Measurement of Metal and Oxide Coating Thicknesses by Microscopical Examination of a Cross Section
ASTM B 504	Measurement of Thickness of Metallic Coatings by the Coulometric Method
ASTM B 530	Measurement of Coating Thicknesses by the Magnetic Method: Electrodeposited Nickel Coatings on Magnetic and Nonmagnetic Substrates
ASTM B 567	Measurement of Coating Thickness by the Beta Backscatter Method
ASTM B 568	Measurement of Coating Thickness by X-Ray Spectrometry
ASTM B 571	Adhesion of Metallic Coatings
ASTM B 578	Microhardness of Electroplated Coatings
ASTM E 92	Vickers Hardness of Metallic Materials
ASTM E 290	Semi-Guided Bend Test for Ductility of Metallic Materials

2.2 U.S. Government Publications:

Available from Standardization Documents Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

MIL-STD-865	Selective (Brush Plating), Electrodeposition
MIL-STD-2073-1	DOD Materiel, Procedures for Development and Application of Packaging Requirements

3. TECHNICAL REQUIREMENTS:

3.1 Preparation:

- 3.1.1 All forming, machining, heat treating, brazing, welding, and surface prestressing shall be completed before parts are plated, unless otherwise permitted by purchaser.
- 3.1.2 Surfaces of parts to be plated shall be smooth and free from blemishes, pits, tool marks, and other irregularities.
- 3.1.3 Steel parts having hardness of 40 HRC or higher and which have been ground after heat treatment, except those to be plated in preparation for brazing, shall be stress-relieved before plating. Temperatures to which parts are heated shall be such that maximum stress-relief is obtained without reducing hardness or parts below drawing limits.
- 3.1.4 Parts, prior to selective plating, shall have chemically clean surfaces prepared with minimum abrasion, erosion, or pitting. Treatments which may promote hydrogen embrittlement shall be avoided.
- 3.1.5 Electrical contacts between the parts and power source shall be made to ensure that neither chemical or immersion deposition nor electrical arcing or overheating will occur.

3.2 Procedure:

- 3.2.1 Parts shall be plated by selective (brush) electrodeposition of nickel from a sulfamate solution containing no addition agents, including stress-reducing agents, which might have a detrimental effect on properties of the plate or of the basis metal. Except as permitted by 3.2.1.1, nickel shall be deposited directly on the basis metal without a prior preplate coating of metal other than nickel.
 - 3.2.1.1 On aluminum and aluminum alloys, a preliminary chemical coating, immersion plate, or metal preplate is permissible.
- 3.2.2 Equipment used to process samples, specimens, and parts shall be in accordance with MIL-STD-865.