



AEROSPACE MATERIAL SPECIFICATION

AMS2451™/3**REV. D**Issued 1998-07
Revised 2022-11

Superseding AMS2451/3C

Plating, Brush, Nickel
Low-Stress, Low-Hardness Deposit

RATIONALE

AMS2451/3D results from a Five-Year Review and update of this specification with revised heat resistance requirements to conform to industry standard practices (3.2.4) and updated corrosion resistance requirements that better matches AMS2424 and current capabilities (3.2.6).

1. SCOPE

1.1 Purpose

This specification covers the requirements for brush plating of low-hardness, low-stress nickel by electrodeposition.

1.2 Application

This process has been used typically to improve the corrosion and oxidation resistance of steel alloys, to repair damaged, worn, or mismachined parts requiring low residual surface stress, to prepare surfaces for brazing, and to repair nickel electrodeposits on parts with service a temperature up to 700 °F (371 °C), but is not limited to such applications.

1.3 Safety - Hazardous Materials

Shall be in accordance with AMS2451.

2. APPLICABLE DOCUMENTS

In addition to those listed in AMS2451, 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.

AMS2424 Plating, Nickel, Low-Stressed Deposit

AMS2451 Plating, Brush, Nickel-Tungsten Low Hydrogen Embrittlement

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Full document details: SAE AMS2451_3D

For more information on this standard, visit
<https://www.sae.org/standards/content/AMS2451/3D/>

Documents

Document Sharing Hub

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 B571 Standard Practice for Qualitative Adhesion Testing of Metallic Coatings

3. TECHNICAL REQUIREMENTS

Shall be in accordance with AMS2451 and as follows:

3.1 Procedure

3.1.1 Nickel shall be electrodeposited from a sulfamate nickel brush plating solution in accordance with instructions from the solution manufacturer. The plating solution shall contain no addition agents, including stress-reducing agents, which might have a detrimental effect on properties of the plate or of the basis metal.

3.2 Properties

3.2.1 Adhesion to Specimens

Shall be in accordance with AMS2451.

3.2.2 Hardness

The hardness of the deposit shall be no greater than 300 HV, or equivalent.

3.2.3 Stress

The residual stress in the deposit shall be within the range of 5 ksi (34.5 MPa) compressive, to 15.0 ksi (103 MPa) tensile.

3.2.4 Heat Resistance

3.2.4.1 Plated ferrous and corrosion resistant parts or specimens shall withstand without blistering, cracking, or debonding, being heated in an air circulating furnace to 1000 °F ± 15 °F (538 °C ± 8 °C) and holding at temperature for not less than 2 hours, followed by air cooling to room temperature.

3.2.4.2 Plated aluminum and aluminum alloy, and copper and copper alloy parts or specimens, shall pass the heat-quench test of ASTM B571.

3.2.5 Hydrogen Embrittlement Relief

Shall be in accordance with AMS2451.

3.2.6 Corrosion Resistance

Plated carbon or low-alloy steel parts, except parts plated to aid in brazing or plated for dimensional restoration, shall show no visual evidence of corrosion of surfaces after being subjected for 48 hours minimum to continuous salt spray corrosion test conducted in accordance with ASTM B117 (see AMS2451).

3.2.6.1 When the specified minimum plate thickness is 0.0005 inch (13 µm) or greater but less than 0.002 inch (0.05 mm), parts or panels shall be corrosion tested after the heat resistance test of 3.2.4 following embrittlement relief of 3.2.5.

4. QUALITY ASSURANCE PROVISIONS

Shall be in accordance with AMS2451.