AEROSPACE MATERIAL SPECIFICATION

AMS2418™	REV. K
Issued 1951-10 Revised 2021-12 Superseding AMS2418J	

Plating, Copper

RATIONALE

AMS2418K is the result of a Fire-Year Review and update of this specification with changes to ordering information corresponding to changes in the document, stress relief treatment for peened parts (3.1.1.3) changed to when specified to align with other plating AMSs, added contact locations per GAB19AB (3.1.3, 4.4.3), clarification of alloys that can have a flash plate (3.2.1), and updated lot definition per GAB16AA (4.3.1).

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:

- AMS2418K
- Plating thickness (see 3.4.1)
- Basis metal to be plated
- Tensile strength or hardness of the basis metal
- If pre-plate stress relief is to be performed by plating processor and if different from 3.1.1, time and temperature are to be specified
- If steel parts were machined, ground, cold formed or cold straightened after heat treat (3.1.1)
- If steel parts have been shot peened, specify if required stress relief has been completed (3.1.1.3)
- Optional: Fixture/electrical contact locations, when not specified (3.1.3)
- 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
- Minimum thickness on internal surfaces, if required (see 3.4.1.4)
- Solderability testing, if required (see 3.4.5)
- Quantity of pieces to be plated

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
Tel: +1 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: CustomerService@sae.org
SAE WEB ADDRESS: **http://www.sae.org**

For more information on this standard, visit
https://www.sae.org/standards/content/AMS2418K/

2. Parts manufacturing operations such as heat treatment, forming, machining, welding, brazing, and media finishing, performed prior to plating, can affect the condition of the substrate before plating. Those operations, if performed after plating, could adversely affect the plated part unless the plate is used as a source of copper for brazing, masking for nitriding or carburizing, or prevention of carburizing. The sequencing of these types of operations before and after plating should be specified by the cognizant engineering organization and is not controlled by this specification.

1. SCOPE

1.1 Form

This specification covers the requirements for electrodeposited copper.

1.2 Application

This process has been used typically to provide an anti-seize surface, to prevent carburizing of surfaces on which carburizing is neither required or permitted, to prevent decarburization, to enhance solderability, or to provide a source of copper for furnace brazing, but usage is not limited to such applications.

1.3 Classification

Plating covered by this specification is classified as follows:

Type 1: Engineering plating
Type 2: Plating for masking

1.3.1 Type 1 shall be supplied if no class is specified.

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.

AMS2759/9 Hydrogen Embrittlement Relief (Baking) of Steel Parts

ARP1917 Clarification of Terms Used in Aerospace Metals Specifications

ARP4992 Periodic Test 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 B253 Preparation of Aluminum Alloys for Electroplating

ASTM B374 Standard 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 B504 Measurement of Thickness of Metallic Coatings by the Coulometric Method

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 B678 Solderability of Metallic-Coated Products

ASTM B734 Electrodeposited Copper for Engineering Uses

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

ASTM B764 Simultaneous Thickness and Electrode Potential Determination of Individual Layers in Multilayer Nickel Deposit (STEP Test)

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

ASTM F519 Mechanical Hydrogen Embrittlement Evaluation of Plating/Coating Processes and Service Environments

3. TECHNICAL REQUIREMENTS

3.1 Preparation

3.1.1 Stress Relief Treatment

All steel parts having a hardness of 40 HRC and above and that are machined, ground, cold formed, or cold straightened after heat treatment shall be cleaned to remove surface contamination and thermally stress relieved before plating. (Residual tensile stresses have been found to be damaging during electroplating.) Furnaces used for stress relief shall be controlled per AMS2750: the minimum requirements shall be Class 5 and Type D instrumentation. Temperatures to which parts are heated shall be such that stress relief is obtained while still maintaining hardness of parts within drawing limits. Unless otherwise specified, the following treatment temperatures and times shall be used:

3.1.1.1 For parts, excluding nitrided parts, having a hardness of 55 HRC and above, and for carburized and induction hardened parts, stress relieve at 275 °F ± 25 °F (135 °C ± 14 °C) for 5 to 10 hours.

3.1.1.2 For parts having a hardness less than 55 HRC, and for nitrided parts, stress relieve at 375 °F ± 25 °F (191 °C ± 14 °C) for a minimum of 4 hours. Higher temperatures shall be used only when specified or approved by the cognizant engineering organization.

3.1.1.3 For Peened Parts

If stress relief temperatures above 375 °F (191 °C) are specified, the stress relieve shall be performed prior to peening.

3.1.2 The plating shall be applied over a surface free from water breaks. The cleaning procedure shall not produce pitting, embrittlement, or intergranular attack of the basis metal and shall preserve dimensional requirements.

3.1.2.1 For steel parts 40 HRC and over, contact time with surface activation acids such as hydrochloric, hydrofluoric, and sulfuric acids shall be minimized so as not to produce hydrogen embrittlement (see 8.5).

3.1.3 Fixture/Electrical Contact Locations

3.1.3.1 Except for barrel plating, for parts that are to be electroplated all over, and contact locations are not specified, contact locations shall be at the discretion of the processor.