



AEROSPACE MATERIAL SPECIFICATION

AMS2481™

REV. K

Issued	1946-11
Revised	2015-07
Reaffirmed	2021-01

Superseding AMS2481J

Phosphate Treatment
Antichafing

RATIONALE

AMS2481K revises Stress Relief Treatment (3.1.1) and Hydrogen Embrittlement (3.3.2), and is 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:

- AMS2481K
- Basis metal to be treated
- Tensile strength or hardness of the basis metal
- Pretreatment stress relief to be performed by processor (time and temperature) if different from 3.1.1
- Special features, geometry, or processing present on parts that requires special attention by the processor
- Hydrogen embrittlement relief to be performed by the processor if different from 3.3.2
- Quantity of pieces to be treated

2. Parts manufacturing operations such as heat treating, forming, joining and media finishing can affect the condition of the substrate for coating, or if performed after coating, could adversely affect the plated part. The sequencing of these types of operations should be specified by the cognizant engineering organization or purchaser and is not controlled by this specification.

1. SCOPE

1.1 Form

This specification covers the requirements for a manganese phosphate coating on ferrous alloys.

1.2 Application

This process has been used typically to produce a coating that will minimize chafing of contacting steel surfaces and retain an oil film, but usage is not limited to such applications.

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TO PLACE A DOCUMENT ORDER: Tel: 877-606-7323 (inside USA and Canada)
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SAE WEB ADDRESS:

For more information on this standard, visit

<https://www.sae.org/standards/content/AMS2481K/>

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 that 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.

AMS2750	Pyrometry
AMS2759/9	Hydrogen Embrittlement Relief (Baking) of Steel Parts
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 F519	Test Method for Mechanical Hydrogen Embrittlement Evaluation of Plating/Coating Processes and Service Environments
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3. TECHNICAL REQUIREMENTS

3.1 Preparation

3.1.1 Stress Relief Treatment

3.1.1.1 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 preparation for coating. (Residual tensile stresses have been found to be damaging during coating.) Furnaces used for stress relief shall be controlled per AMS2750; the minimum requirements shall be Class 5, with 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:

3.1.1.1.1 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 (135 °C ± 14) for 5 to 10 hours.

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

3.1.1.1.3 For Peened Parts

If stress relief temperatures above 400 °F (191 °C) are elected, the stress relieve shall be performed prior to peening or the cognizant engineering organization shall be consulted and shall approve the stress relief temperature.