



AEROSPACE MATERIAL SPECIFICATION

AMS2466™**REV. D**Issued 1997-09
Revised 2025-06

Superseding AMS2466C

(R) Hard Anodic Coating of Magnesium Alloys
Alkaline, Non-Chromate Type, High Voltage

RATIONALE

AMS2466D results from a Five-Year Review and update of this specification and is a complete revision. The most significant changes are that two new classes were added (see 1.3), anodizing parameters were added (see Table 1), touch-up was added (see 3.3.5), corrosion-resistance requirements were updated (see Table 2), and wear-resistance grades were added (see 3.4.3).

NOTICE

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

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

- AMS2466D
- Basis metal to be anodized
- Anodize Class (see 1.3)
- Optional: Touch-up Class (see 1.3 and 8.11) and coverage dimensions, if different from that in 3.3.5
- Special instructions, such as post-treatment (see 3.3.3)
- Quantity of pieces to be anodized
- Optional: Fixture/Electrical contact locations, when not specified (see 3.2.1)
- Optional: Corrosion testing exposure time for alloys other than listed in 3.4.2
- Optional: Wear resistance testing acceptance criteria (see 3.4.3) for alloy grades other than listed in 3.4.3.1

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

3. The parts manufacturer shall ensure that surfaces of metal parts supplied to the processor are free from blemishes, pits, tool marks, and other irregularities that will affect the quality of the finished parts (see 3.5.1).

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1. SCOPE

1.1 Purpose

This specification covers the requirements for a hard anodic coating on magnesium alloys and the properties of the coating.

1.2 Application

This hexavalent chromium free and hazardous air pollutants free coating has been used typically to provide corrosion resistance and abrasion resistance to cast magnesium alloys and to produce a surface suitable for subsequent application of protective organic finishes, but usage is not limited to such applications.

1.3 Classification

Anodic finishes are classified by coating thickness as follows:

Class 1 - Thin Coating: Coating thickness in the range of 0.0002 to 0.0004 inch (5 to 10 µm).

Class 1H - Heavy Coating: Coating thickness in the range of 0.0005 to 0.0007 inch (13 to 18 µm).

Class 2 - Thick Coating: Coating thickness in the range of 0.0008 to 0.0010 inch (20 to 25 µm).

Class 3 - Thin Touch-up Coating: Coating thickness less than 0.0002 inch (5 µm).

Class 3H - Thick Touch-up Coating: Coating thickness in the range of 0.0001 to 0.0003 inch (3 to 8 µm).

1.3.1 If an anodize class is not specified, Class 1 shall be supplied. If a touch-up class is not specified, Class 3H 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 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.

1.4.1 Authority

The cognizant engineering organization may impose requirements or approve allowances that supersede the requirements in this AMS.

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.

AMS4418 Magnesium Alloy, Sand Castings, 2.5Ag - 2.1Di - 0.70Zr (QE22A-T6), Solution and Precipitation Heat Treated

AMS4427 Magnesium Alloy, Sand Castings, 4.0Y - 2.3Nd - 0.7Zr (WE43B - T6), Solution and Precipitation Heat Treated

AMS4429	Magnesium Alloy, Sand Castings, 2.8Nd - 1.4Gd - 0.4Zn - 0.6Zr (EV31A - T6), Solution and Precipitation Heat Treated
AMS4439	Magnesium Alloy, Sand Castings, 4.2Zn - 1.2 Rare Earths - 0.7Zr (ZE41A-T5), Precipitation Heat Treated
AMS4446	Magnesium Alloy, Sand Castings, 8.7Al - 0.70Zn - 0.26Mn (AZ91E-T6), Solution and Precipitation Heat Treated
ARP4992	Periodic Test for Processing Solutions
AS2390	Chemical Process Test Specimen Material
AS7766	Terms Used in Aerospace Metals Specifications

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 B117	Operating Salt Spray (Fog) Apparatus
ASTM B244	Measurement of Thickness of Anodic Coatings on Aluminum and of Other Nonconductive Coatings on Nonmagnetic Basis Metals With Eddy-Current Instruments
ASTM B487	Measurement of Metal and Oxide Coating Thickness by Microscopical Examination of Cross Section
ASTM B1023	Abrasion Resistance of Hard Anodic Coatings by a Taber-Type Abraser
ASTM D1654	Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments

2.3 U.S. Government Publications

Copies of these documents are available online at <https://quicksearch.dla.mil>.

MIL-DTL-32459	Coatings, Anodic for Magnesium and Magnesium Alloys
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2.4 Definitions

Terms used in AMS are defined in AS7766.

3. TECHNICAL REQUIREMENTS

3.1 Equipment

3.1.1 Tanks shall be fabricated from, or lined with, a material that is compatible with the baths used for cleaning, pretreatment, anodizing, or post-treatment solutions and shall be equipped with temperature controls capable of controlling the bath temperatures within specified limits.

3.1.2 Fixtures

Hooks, clamps, racks, and other fixtures used to suspend parts in the electrolyte, and which are in contact with the electrolyte, shall be fabricated from materials that are fully compatible with the anodizing process.

3.1.3 Masking Materials

Masking materials shall be either organic or inorganic materials that are suitable to seal off dissimilar metals and other hardware on the magnesium component. Masking materials must be chemical compatible with pretreatment, post-treatment, and the anodizing process.

3.2 Preparation

3.2.1 Fixture/Electrical Contact Locations

Tight fixture/electrical contact shall be maintained during the anodic treatment in order to prevent damage or contact arcing (burning) of parts, but small irregularities of coating at points of fixture/electrical contact are acceptable.

3.2.1.1 For parts that are to be anodized all over, and contact locations are not specified, contact locations shall be at the discretion of the processor.

3.2.1.2 For parts that are not to be anodized all over, and contact locations are not specified, locations shall be in areas on which coating is not required.

3.2.2 Masking

All liners, bushings, inserts, dissimilar metal, and other hardware shall be removed from parts or shall be masked prior to anodizing to prevent contact with solutions during processing.

3.2.3 Cleaning

Parts shall have clean surfaces, free from water break, prior to pretreatment and immersion in the anodizing solution (see 8.3).

3.3 Procedure

3.3.1 Pretreatment

The cleaned parts shall be immersed for at least 15 minutes in an aqueous solution of 40 to 70 g/L of a fluoride solution, with a pH of 6.0 to 7.1, and operated at 158 to 180 °F (70 to 82 °C) followed by a water rinse.

3.3.2 Anodizing

Anodizing shall be accomplished using an aqueous, chromate-free, alkaline electrolyte with the parts being made the anode using voltage, maximum current, and/or current densities stated in Table 1. During anodizing, parts shall be oriented so as to prevent gas entrapment.

Table 1 - Anodizing parameters

Anodizing Parameters	Class 1, 1H, and 2 Coatings	Class 3 Coating	Class 3H Coating
Temperature	32 to 70 °F (0 to 21 °C)	50 to 100 °F (10 to 38 °C)	50 to 100 °F (10 to 38 °C)
Current Density	2 -15 A/ft ² (22 to 161 A/m ²)	N/A	N/A
Maximum Current	N/A	0.1 to 5 A total	0.1 to 5 A total
Voltage	0 to 600 V DC	0 to 70 VDC	0 to 300 VDC
Application Method	Immersion	Local-Selective Touch-up	Local-Selective Touch-up