SAE Aerospace
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AEROSPACE MATERIAL SPECIFICATION

SAE AMS2475 REV. G

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Superseding AMS2475F

Protective Treatments Magnesium Alloys

RATIONALE

AMS2475G results from a Five Year Review and update of this specification.

1. SCOPE

1.1 Purpose

This specification establishes the requirements for chromate conversion coatings on magnesium alloys.

1.2 Application

This process has been used typically to improve corrosion resistance and adherence of organic finishes but usage is not limited to such applications. The dichromate treatment may not be suitable for alloys with high manganese content. The chrome pickle treatment has been used as touch-up for previously dichromate-treated surfaces and for improving corrosion protection temporarily, but usages are 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 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 canceled 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 724-776-4970 (outside USA), www.sae.org.

AMS-M-3171 Magnesium Alloy, Processes for Pretreatment and Prevention of Corrosion on

3. TECHNICAL REQUIREMENTS

3.1 Solutions

3.1.1 Acid Pretreatment and Preparation

3.1.1.1 Hydrofluoric acid solution shall be an aqueous solution containing 15 to 20% by weight of 48% hydrofluoric acid (HF). The hydrofluoric acid solution shall be operated at room temperature.

3.1.1.1.1 When handling hydrofluoric acid, great care should be taken to avoid contact with the skin; rubber gloves, face shield, and protective clothing should be worn by operators.

3.1.1.2 Acid pickle solution (3.2.2):

TABLE 1 - Acid Pickle Solution**

Ingredients	Quantity for Cast Surfaces*	Quantity for Other than Cast Surfaces*
Sulfuric acid (H_2SO_4, sp gr 1.84)	2.5 fl oz (63 mL)	none
Nitric acid (HNO_3, sp gr 1.42)	10.25 fl oz (260 mL)	none
Chromic acid	none	1.5 lbs (680 g)
Water to make	1 gallon (3.8 L)	1 gallon (3.8 L)

*Quantities are approximate
** Ambient temperature operation required

3.1.2 Sodium dichromate solution shall be an aqueous solution containing 10 to 15% of sodium dichromate ($Na_2Cr_20_7•2H_20$) and 0.25% of either magnesium fluoride (MgF_2) or calcium fluoride (CaF_2) by weight. The solution shall be maintained saturated with magnesium or calcium fluoride by the continuous immersion of a cloth bag, or equivalent, containing the compound. The sodium dichromate solution shall be operated at not lower than 200 °F (93 °C) and preferably at its boiling point.

3.1.3 Chrome pickle solution shall be as shown in Table 2.

TABLE 2 - Chrome Pickle Solution**

Ingredients	Quantity for Wrought Surfaces	Quantity for Cast Surfaces*
Sodium dichromate ($Na_2Cr_2O_7•2H_{2O}$)	1.5 pounds (680 g)	1.5 pounds (680 g)
Nitric acid (HNO_3, sp gr 1.42)	1.5 pints (610 mL)	1 to 1.5 pints (450 to 610 mL)
Water to make	1 gallon (3.8 L)	1 gallon (3.8 L)
$NaHF_2$, KHF_2, or NH_4HF_2	None	2 oz (51 g)

Quantities are approximate
* As defined in AMS-M-3171 Type I.
** A proprietary solution, acceptable to the cognizant engineering organization, applied in accordance with manufacturer's instructions, may be used.

3.2 Preparation

3.2.1 The coating shall be applied to a surface free from water breaks, dirt, mill marking, heat scale, and discoloration. The cleaning procedure shall not produce pitting or intergranular attack of the basis metal and shall preserve dimensional requirements.

3.2.2 Acid Pickle