AEROSPACE
MATERIAL SPECIFICATIONS
SOCIETY OF AUTOMOTIVE ENGINEERS, Inc. 485 Lexington Ave., New York 17, N.Y.

AMS 2471B

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ANODIC TREATMENT OF ALUMINUM BASE ALLOYS
Sulfuric Acid Process, Undyed Coating

1. ACKNOWLEDGMENT: A vendor shall mention this specification number and its revision letter in all quotations and when acknowledging purchase orders.

2. APPLICATION: To increase corrosion resistance and provide surfaces which will ensure satisfactory adherence of paint and other organic finishes. For coatings to be colored by dyeing, AMS 2472 should be specified. This process is not suited to parts or assemblies which contain joints or recesses in which the anodizing solution may be retained.

3. PREPARATION: Parts prior to being coated shall have clean surfaces prepared with minimum abrasion, erosion, or pitting. Cleaning by a process giving a slightly etched surface is desirable.

4. SOLUTIONS:

4.1 Electrolyte: Shall be an aqueous solution of sulfuric acid of suitable concentration (nominal concentration is 15%). The temperature of the anodizing solution shall be maintained at 64 - 75 F (17.8 - 23.9 C).

4.2 Sealer: Unless otherwise specified, shall be an aqueous solution containing 5 - 6% by weight sodium or potassium dichromate. The sealer solution shall be maintained at a pH of 4.5 - 6.0 and a temperature of 190 - 210 F (87.8 - 98.9 C). Adjustments in the acidity of the sealer solution shall be made by the addition of chromic acid.

5. PROCEDURE:

5.1 The cleaned parts shall be made the anode in the electrolyte contained in a suitable metal tank which may also serve as the cathode. Direct current shall be applied as required to produce an anode current density of 10 - 15 amp per sq ft for 15 - 30 min. as required to produce an anodic coating conforming to the specified technical requirements. Other conditions of time, temperature, and amperage may be used when approved by purchaser. After anodizing, all parts shall be rinsed thoroughly in cold running tap water.

5.2 Parts shall be immersed in the sealer solution for not less than 20 minutes. After sealing, all parts shall be rinsed thoroughly in clean cold running tap water, then in clean hot water, and dried.

6. TECHNICAL REQUIREMENTS: When ASTM methods are specified for determining conformance to the following requirements, tests shall be conducted in accordance with the issue of the ASTM method listed in the latest issue of AMS 2350.

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6.1 Coating Weight: Shall be not less than 600 mg per sq ft but routine determinations are not required. If parts are of such size or shape that surface area cannot readily be determined, coating weight determinations may be made on separate specimens not less than 3 x 3 in. in width and length and 0.025 - 0.063 in. thick but routine determinations are not required; separate specimens, when used, shall be of an alloy of the same class as the parts represented, as follows:

Class 1. Alloys of Aluminum Association designations 1100, 3003, 3004, 5052, 6053, 6061, 6062, 6063, and all alclad alloys.

Class 2. All wrought alloys not listed as class 1 and all casting alloys.

Separate specimens shall be processed with the work they represent. Determinations of coating weight shall be made in accordance with ASTM B137 on parts or specimens which have been anodized and rinsed but not sealed.

6.1.1 If small parts such as rivets and machine screws are anodized in bulk in a container, the specified coating weight shall apply to not less than 75% of the parts treated together, determined by random sampling, but in no case shall any part show uncoated areas.

6.2 Corrosion Resistance:

6.2.1 For control purposes, samples of AMS 4037 sheet 0.040 in. thick and not less than 3 x 10 in. (the 10 in. dimension being perpendicular to the direction of rolling) treated in accordance with Section 5 shall withstand 250 hr exposure to salt spray without corroding to the extent that would cause more than 5% decrease in tensile strength and 10% decrease in elongation from those of duplicate treated but unexposed panels; in no case shall a corroded specimen have tensile strength lower than 62,000 psi or elongation lower than 12%. The salt spray corrosion test shall be conducted in accordance with ASTM B117. Test results for both exposed and unexposed panels shall be reported as the average of three specimens from each panel. Tensile test specimens shall conform to ASTM E8. The foregoing test is not required when material or parts treated in accordance with Section 5 are subsequently painted.

6.2.2 Each part that is anodized and not subsequently painted shall be capable of withstanding salt spray test conducted in accordance with ASTM B117 for 250 hr without showing more than a few scattered visual corrosion pits.

7. PRECAUTIONS:

7.1 Surfaces to be painted should be handled with care after anodizing to prevent rupture of the film and contamination by dirt or oil before painting, which should be performed as soon after treatment as practicable.

7.2 Wire, hooks, racks, and clamps used to suspend the parts in the electrolyte, if they are also in contact with the electrolyte, should be of aluminum, aluminum alloy, or commercially pure titanium. Good, tight electrical contact should be maintained during the anodic treatment to prevent burning of parts but small irregularities of coating at points of electrical contact will be permitted.

7.3 Anodizing baths should be provided with an exhaust system as a protection for the operators and prevention of corrosion of metal equipment in the vicinity.

7.4 Unless otherwise specified, all parts should be anodized after all heat treatment, machining, welding, forming, and perforating operations have been completed, insofar as practicable.

7.5 Sub-assemblies may be anodized provided the surfaces which are exposed after assembly are anodized, and provided there is no possibility of entrapping anodizing solution. Surfaces exposed to fuels, intake air, and coolants should not be machined after anodizing, but surfaces continually protected by oil films may be machined after anodizing.