AEROSPACE
MATERIAL SPECIFICATIONS

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AMS2472A

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ANODIC TREATMENT OF ALUMINUM BASE ALLOYS
Sulfuric Acid Process, Dyed 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 colored surfaces. For coatings to be used as a base for paint or other organic finishes, AMS 2470 or AMS 2471 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.

2.1 AMS 2472, designating a coating weight of 600 mg per sq ft, should be specified only for standard hardware parts, such as rivets, pins, nuts, washers, bolts, screws, and fittings, which are dyed for identification purposes; AMS 2472-1, designating a coating weight of 2500 mg per sq ft, should be specified for parts, such as cabin panelling and trim, dyed for decorative purposes.

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 a temperature within the range Ø of 64 - 85 F (17.8 - 29.4 C); the selected temperature shall be maintained within ±2 F (±1.1 C) and within the range above during the anodizing cycle.

4.2 Dye: Shall be as required to produce the specified color.

4.3 Sealer: Unless otherwise specified, shall be a 5% solution of nickel acetate in deionized water and shall be maintained at a pH value of 5.6 - 5.8 and a temperature of 190 - 210 F (87.8 - 98.9 C). Adjustments Ø in the pH value of the sealer solution shall be made by the addition of acetic acid or sodium hydroxide as required.

4.3.1 For alloys of Class 2 (See 6.1), a second sealer shall be used, consisting of a 1% solution of sodium or potassium dichromate maintained at a pH value of 5.0 - 6.0 and a temperature not lower than 208 F Ø (98 C). Adjustments in the pH value of this solution shall be made by the addition of chromic acid or sodium hydroxide as required.

5. PROCEDURE:

5.1 The cleaned parts shall be made the anode in the electrolyte contained in a suitable tank which, if made of metal, may also serve as the cathode. Direct current shall be applied as required to produce an Ø anode current density of 10 - 15 amp per sq ft when AMS 2472 is specified, or 15 - 20 amp per sq ft when AMS 2472-1 is specified, for such time 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 dyed to the color specified by immersing in appropriate dye solution. The temperature of the solution and the time of immersion shall be as necessary for production of the specified color. Ø Either the parts or the solution shall be agitated during immersion. Parts shall then be rinsed in cold running tap water.

5.3 Parts shall be immersed in the nickel acetate sealer solution for not less than 10 minutes. Parts made of Class 2 alloys (See 6.1) shall then be immersed in the dichromate sealer solution for 10 minutes.
Ø 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.

6.1 Coating Weight: Shall be not less than 600 mg per sq ft when AMS 2472 is specified and not less than 2500 mg per sq ft when AMS 2472-1 is specified, but routine determinations are not required. If parts are of such size or shape that surface area cannot readily be determined, coating weight determinations
Ø 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, 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 dyed and 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 240 hr exposure to salt spray without corroding to the extent that would cause more than 5%
Ø decrease in tensile strength and 10% decrease in elongation from those of duplicate treated but unexposed panels. 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 tests shall be conducted in accordance with the latest issue of AMS 2355.

6.2.2 Each part that is anodized shall be capable of withstanding salt spray test conducted in accordance with
Ø ASTM B117 for 240 hr without showing more than a few scattered visual corrosion pits.

7. PRECAUTIONS:

7.1 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.

7.2 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.

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