

511.6 HARD ANODIC COATING

DESCRIPTION

Hard anodic coatings shall be the result of treating aluminum and aluminum alloys electrolytically to produce a uniform anodic coating on the metal surfaces. The hard anodic coating shall be prepared by any process operation to produce a heavy dense coating of specified thickness on aluminum alloys. The hard anodic coating shall not be applied to aluminum alloys with a nominal copper content in excess of 5 percent or a nominal silicon content in excess 8 percent. Alloys with a nominal silicon content higher than 8 percent may be anodized subject to approval of the procuring activity. Heat treatable alloys shall be in a temper obtained by heat treatment, such as -T4, T6 or T73 prior to anodizing.

ANODIC COATING THICKNESS

The nominal thickness of coating shall be 0.002 inch (2 mils). Unless otherwise specified, the thickness of the coating shall not vary by more than +/- 20 percent for coatings up to 0.002 inch (2 mils) when tested in accordance with the requirements in Table 1. Coatings over 0.002 inch (2mils) shall not vary more than +/- 0.0004 inch (0.4 mil) in thickness. A typical Hard Anodic Coating thickness range is 0.0005 to 0.0045 inch.

COATING WEIGHT

The Coating weight may be determined in lieu of the coating thickness, at the option of the procuring activity. Unsealed hard anodic coatings shall have a minimum coating weight of 4320 milligrams per square foot for every 0.001 inch of coating when tested in accordance with ANSI/ASTM B137.

COATING ABRASION RESISTANCE

Abrasion resistance shall be tested in accordance with Method 6192 of FED-STD-141 using CS-17 wheels with 1000 Gram load. Unsealed hard anodic coatings shall provide a hard abrasion resistant finish as specified herein. The abrasion resistance of anodic coatings will decrease as the coating thickness approaches 3 mils. In general, the abrasion resistance does not increase with increasing coating thickness. The anodic coating shall have a maximum wear index of 3.5mg/1000 cycles on aluminum alloys having a copper content of 2 percent or higher (includes all 2xxx series alloy, 7050 and 7178). The wear index for all other alloys shall not exceed 1.5mg/1000 cycles.

TESTING

TABLE 1					
Test	Applicable type	Number of Specimens to be Tested	Specimen Preparation	Requirement	Test Method
Coating Thickness	Hard Anodic Coatings	3	Section A	Section B	Section C

Section A - Specimen Preparation

Process control test specimens. Production parts shall be used for process control inspection provided they can be adapted to the applicable test. If the production parts cannot be adapted to a particular test, test panels shall be used. At the option of the supplier, test panels shall be composed of either 2024-T3 per QQ-A-250/4 or the alloy representing the largest percent of work anodized during the monthly process control period. Whenever possible, the specimen panels shall be anodized with an actual production run. Additional details for the specimen panels shall be as specified in **A-1** through **A-4**.

A-1: Test specimens for coating weight. Coating weight shall be determined on undyed and unsealed production parts or specimen panels. When specimen panels are used, they shall have a minimum width of 3 inches, and a minimum nominal thickness of 0.032 inches.

A-2: Test specimens for coating thickness. Coating thickness shall be determined on hard anodic coated production parts or specimen panels. When specimen panels are used, they shall have a minimum width of 3 inches, a minimum length of 3 inches, and a minimum nominal thickness of 0.032 inches.

A-3: Test specimens for corrosion and light fastness resistance. Corrosion resistance shall be determined on dyed (Class 2 only) and sealed production parts or specimen panels. Light fastness testing is performed only on dyed (Class 2) coatings and only when specified. When specimen panels are used, they shall have a minimum width of 3 inches, a minimum length of 10 inches, and a minimum nominal thickness of 0.032 inches.

A-4: Test specimens for abrasion resistance. Abrasion resistance shall be determined on hard anodic coating production parts or specimen panels. When specimen panels are used, they shall have a width of 4 inches, a length of 4 inches, and a minimum nominal thickness of 0.063 inches.

Section B - Requirement:

Thickness of coating. Unless otherwise specified in the contract, purchase order, or applicable drawing, the nominal thickness of the coating shall be 0.002 inch (2 mils). Unless otherwise specified, the thickness of the coating shall not vary by more than +/- 20 percent for coatings up to 0.002 inches thick (2 mils) when tested in accordance with the test method below. Coatings over 0.002 inches (2 mils) shall not vary by more than +/- 0.0004 inches (0.4 mils) in thickness.

Section C - Test Method:

1. Hard anodic coating thickness. Test specimens prepared in accordance with Section **A**, shall be tested for anodic coating thickness in accordance with ASTM B 244, Method 520 or Method 520.1 of FED-STD-151 to determine conformance to the requirements of Section **B**. If either ASTM B 244 or Method 520 of FED-STD-151 is used, the thickness shall be computed as the average of not **less** than eight measurements. In case of dispute, anodic coating thickness shall be determined by measurement of a perpendicular cross section of the anodized specimen using a metallographic microscope with a calibrated eyepiece.
2. Hard anodic coating weight Test shall be in accordance with ANSI / ASTM B 137
3. Corrosion Resistance Test shall be in accordance with ASTM B 117
4. Light Fastness Resistance (Class 2 only) Test shall be in accordance with ASTM G 23, ASTM D 822 and ASTM D 2244

Failure to conform to any of the process control requirements and tests specified above shall result in immediate halt of production. The reason for failure shall be determined and corrected before production resumes. All traceable work from the time the failed process control specimens were anodized to the time when production was halted shall be rejected. Traceable work shall be defined as all work in the known locations. Process control testing shall be performed at the start of production.

Quality conformance inspection shall consist of visual and dimensional examinations.

Cost of hard anodic coating shall be included in the pay item of "ACCESS SYSTEM FOR FENDERS"

END OF SECTION