

AAC1119
AAC AUTOMOTIVE STANDARD FOR ANODIC OXIDE FINISHES
PRODUCED BY SULFURIC ACID ANODIZING OF ALUMINUM

1. SCOPE

This standard covers the typical requirements for clear and colored anodic oxide finishes on automotive aluminum and aluminum alloy parts. Based upon application, six types of anodic oxide finishes are specified with each having a letter designation as shown in Table 1.

TABLE 1 FINISH APPLICATION TYPES

<u>Application</u>	<u>Type</u>
Clear Exterior	A
Colored Exterior	B
Clear Interior	C
Colored Interior	D
Non-decorative (functional)	E
Unsealed for paint base (functional)	F

2. REFERENCED STANDARDS

ASTM B137	ASTM B244	ASTM B368	ASTM B487
ASTM B680	SAE J1885	SAE J1960	SAE J1976

3. TESTING REQUIREMENTS

Table 2 indicates which tests must be conducted for each of the six application types in Table 1. The required tests are denoted by an X. Test methods follow the Table 2.

TABLE 2 TESTING REQUIREMENTS FOR ANODIZED ALUMINUM

Test	Type	Type	Type	Type	Type	Type
	A	B	C	D	E	F
Finish Thickness	X	X	X	X	X	X
Finish Mass	X	X	X	X	X	X
Finish Density	X	X	X	X	X	X
Seal Quality (ADT)	X	X	X	X	X	
Corrosion Resistance (CASS)	X	X			X	
Weatherometer		X		X		
Florida Exposure		X		X		

3.1 Finish Thickness

Finish thickness shall be determined by microscopical examination of a cross-section per ASTM B487. Measurement by eddy current per ASTM B244 may be used if results obtained can be correlated with the microscopical examination method. Thickness shall be as specified in Table 3.

3.2 Finish Mass

Finish mass shall be determined per ASTM B137. Mass shall be as specified in Table 3. Finish mass on colored parts should be determined on an equivalent clear sealed finish prior to coloring.

TABLE 3 FINISH THICKNESS AND FINISH MASS

Color	Thickness Minimum (µm)		Mass Minimum (g/m ²)	
	Exterior	Interior	Exterior	Interior
Clear/Nondecorative/Functional	8.0	3.0	20	6
Electrolytic Black* (Sn)**	15.0	8.0	40	20
Electrolytic Black* (Co/Ni)**	8.0	8.0	20	20
Gold (FAO/FSO)**	8.0	3.0	20	6

* Colors other than black may be available. For black finishes, thicker finishes may be needed to meet requirements of color and gloss.

** Materials in parentheses indicate elements or compounds in the pigmentation.

3.3 Finish Density

Finish density shall be determined from the results of the finish thickness and mass testing. Density shall be a minimum of 36 g/in³ (equivalent to 2197 g/dm³).

Finish Density = Finish Mass / Finish Thickness = (FM in mg/in²) / (FT in mils) = g/in³

or if using metric measurements for length:

Finish Density = Finish Mass / Finish Thickness = (FM in mg/dm²) x 100 / (FT in microns) = g/dm³

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3.4 Seal Quality (ADT)

The maximum Acid Dissolution Test (ADT) rating shall be 6.0 when tested as in ASTM B680 and calculated (using the result from ASTM B137) per the following equation:

$$\text{Rating} = (W1-W2) \times F \times T / (W1-W3)$$

Where:

W1-W2 = Mass (in mg) of Finish removed resulting from ASTM B680.

W1-W3 = Total mass (in mg) of Finish resulting from ASTM B137.

T = Finish thickness in mils or microns.

If T is measured in mils:

F = 200

If T is measured in microns:

F = 7.874

3.5 Corrosion Resistance (CASS)

Corrosion resistance shall be determined per ASTM B368. The minimum exposure shall be 16 h unless otherwise specified. There shall be no pitting, corrosion, or other appearance change after exposure.

3.6 Weatherometer

Type B finished products shall be exposed per SAE J1960 for 2500 kJ/m². After exposure there shall be no base metal corrosion or objectionable change in color or gloss level, and no development of a weathering bloom which cannot be easily removed by polishing with Original DuPont Formula #7 Auto Polish and Cleaner (made by Borden, Inc.) or equivalent.

Type D finished products shall be exposed per SAE J1885 for 1241 kJ/m². After exposure there shall be no indication of loss of gloss, objectionable color change, or other visible detrimental surface deterioration.

3.7 Florida Exposure

Type B finished products shall be exposed per SAE J1976 for 31380 MJ/m² total solar radiation. After exposure there shall be no base metal corrosion or objectionable change in color or gloss level, and no development of a weathering bloom which cannot be easily removed by polishing with Original DuPont Formula #7 Auto Polish and Cleaner (made by Borden, Inc.) or equivalent.

Type D finished products shall be exposed per SAE J1976 for 12550 MJ/m² total solar radiation. After exposure there shall be no indication of loss of gloss, objectionable color change, or other visible detrimental surface deterioration.

Note

The Weatherometer and Florida Exposure requirements are considered to be developmental tests intended for Type B and D finished products. They are required for new coloring technologies that are not included in Table 3. Individual suppliers may independently choose to periodically conduct these tests to verify their process.

4. INITIAL SOURCE APPROVAL

No shipment shall be made by any anodize supplier to a customer until representative initial production samples have been approved by the customer as meeting the requirements of this specification.

5. INSPECTION AND REJECTION

All shipments of material or parts under contract or purchase order manufactured to this specification shall be equivalent in every respect to the initial samples approved by the customer. Without prior notification and approval by the customer there shall be no changes permitted in either formulation or manufacturing processes which would produce products different from the initial production samples. Lack of notification by the supplier constitutes grounds for rejection of any shipment. While samples may be taken from incoming shipments and checked for conformance to this specification, the anodize supplier shall accept the responsibility for incoming shipments meeting this specification without dependence upon the customer's inspection.

6. REVISION HISTORY

This standard was initiated in February 2004.

<u>Revision</u>	<u>Date</u>	<u>Changes</u>
Initial	2/04	None.