



Black Anodized Aluminum Bar Coded Plates

1 Scope

Note: Nothing in this standard supercedes applicable laws and regulations.

Note: In the event of conflict between the English and domestic language, the English language shall take precedence.

1.1 Purpose/Material Description. This standard contains the requirements for anodizing quality aluminum alloy sheet which has been colored black by electrolytically depositing a coating of cobalt or tin mineral salt on the anodized layer. This standard also contains test requirements of bar and Quick Response (QR) coded plates made from the material.

1.2 Symbols. Not applicable.

1.3 Applicability. Vehicle Identification Number (VIN) tags attached to instrument panel.

1.4 Remarks. The objective is to make certain the purchased material will respond properly to bar and QR scanning devices.

2 References

Note: Only the latest approved standards are applicable unless otherwise specified.

2.1 External Standards/Specifications.

ASTM B137	ASTM D523	ISO 2808	SAE J1545
ASTM B680	ISO 1463	ISO 2813	

2.2 GM Standards/Specifications.

GMW3059	GMW14162	GMW14444	GMW14729
GMW3417	GMW14270	GMW14458	GMW16853
GMW14124			

2.3 Additional References.

Aluminum Association Standards available at <https://www.aluminum.org/standards>

3 Requirements

3.1 Requirements on Test Specimens.

3.1.1 Base Metal. The base metal shall be 0.45 mm to 0.56 mm thick anodizing quality aluminum alloy AA 5005 H34, or equivalent if agreed to by GM Materials Engineering.

3.1.1.1 Chemical Composition. The chemical composition shall meet limits given in the Aluminum Association Standards available at <https://www.aluminum.org/standards>.

3.1.1.2 Mechanical Properties. The mechanical properties of the aluminum sheet shall meet limits for tensile strength, yield strength and elongation as given in the Aluminum Association Standards available at <https://www.aluminum.org/standards>.

3.1.2 Coating Properties.

3.1.2.1 Coating Thickness. The coating thickness shall be 5.5 μm to 7.0 μm on the front side of the material and 5.5 μm minimum on the back side of the material. Coating thickness shall be measured by ISO 1463 microscope method or by ISO 2808 eddy current method. In case of disagreement between purchaser and supplier, the microscope method shall be the preferred method.

3.1.2.2 Corrosion Resistance.

3.1.2.2.1 There shall be no base metal corrosion or coating degradation after 3 h in Copper Accelerated Acetic Acid Salt Spray (CASS) test when conducted per GMW14458.

3.1.2.2.2 Bar and QR coded plates shall be readable by the scanner after 6 h in CASS test when conducted per GMW14458. The plates may be lightly wiped to remove deposits before reading.

3.1.2.2.3 There shall be no base metal corrosion or coating degradation after 5 cycles of an environmental corrosion cycle test per GMW14124, Cycle G.

3.1.2.3 Quality. The maximum Acid Dissolution Test (ADT) rating shall be 6.0 when tested as per ASTM B680 and calculated as per the following equation:

$$Rating = \frac{W_1 - W_2}{W_1 - W_3} \times 7.8 \times T$$

Where:

$W_1 - W_2$ = Weight of coating, mg, dissolved in chromic-phosphoric acid solution per ASTM B680.

$W_1 - W_3$ = Total coating weight, mg, per ASTM B137.

T = Coating thickness, μm .

3.1.2.4 Colorfastness in Humidity. There shall be no detrimental change in coating color or appearance after 72 h at 100% Relative Humidity (RH) per GMW14729 Option A or Option B.

3.1.2.5 Weathering. There shall be no detrimental change in color, gloss or reflectance of the white etched surfaces or the black background after 5000 kJ/m^2 exposure per GMW14162 Cycle D, accelerated weathering, and 100 000 Temperature Normalized Radiation (TNR) Langleys, 4200 TNR mJ/m^2 , per GMW3417 L1 F2 G1 T5, natural weathering.

3.1.3 Surface and Finish Requirements.

3.1.3.1 Gloss. The 60 degree gloss of the black surface shall be 20 ± 5 with the grain of the material when tested per ASTM D523 or ISO 2813.

3.1.3.2 Color. The CIELAB ($L^*a^*b^*$ color space) of the black surface when tested per SAE J1545 shall be as follows:

- $L = 20 \pm 1$.
- $a = 0.8 \pm 0.2$.
- $b = 0.0 \pm 0.3$.

3.1.4 Testing. The tests are shown in Table 1. Tests indicated by a D shall be performed for initial coating system approval. Tests indicated by a Q shall be performed routinely on every lot of material after the coating system has been approved. Plates shall be fastened with production rivets to painted steel panels for all testing, except Acid Dissolution Test. All plates shall be readable by the scanner after completing the specified tests.

3.2 Emissions Testing of Interior Materials and Parts. For all Code E designated parts per GMW14444, reference GMW16853 for emissions testing of interior materials and parts.

3.3 All materials supplied to this standard must comply with GMW3059, Restricted and Reportable Substances. For raw materials, non-dimensional materials (e.g., fluids, greases) and/or bulk materials that require approval into the GM Materials Approved Source List (GMMASL), an International Material Data System (IMDS) submission must be made by the material supplier as a material Material Data Sheet (mMDS). After the mMDS is approved by the GM IMDS team, the materials supplier is to provide a "Header only report" to the responsible GM Materials Engineer. Further guidance can be found in the GM-specific instructions on the IMDS website.