



Performance Requirements for Exterior Plastic Parts

1 Introduction

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. This standard covers the performance requirements of plastic parts used in exterior automotive applications. The parts may be functional assemblies or they may be a subassembly of, or attached to, metallic, decorative or functional parts.

Note: For coated (painted, etc.) parts, not all tests are required. See Appendix A, Table A1 for the specific requirements. Additional requirements for coated or painted plastic parts or parts which incorporated metals in their construction are given in the relevant performance requirements.

1.2 Applicability. All exterior plastic parts that are molded-in-color, painted or hard coated.

1.3 Remarks. Not limited to only plastic parts. Can be used for rubber, textile, foam, etc., if applicable. When possible, test components as an assembly.

2 References

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

2.1 External Standards/Specifications.

ASTM D523	ISO 4892-1	ISO 7724-1	SAE J1767
ISO 3865	ISO 4892-2	SAE J1545	SAE J2527

2.2 GM Standards/Specifications.

9982223	GMW14093	GMW14700	GMW16955
9982224	GMW14162	GMW14729	GMW17084
GMW3059	GMW14334	GMW14864	GMW17456
GMW3221	GMW14688	GMW15719	

2.3 Additional References.

- Component Technical Specification (CTS)
- Subsystem Technical Specification (SSTS)

3 Test Preparation and Evaluation

3.1 Resources.

3.1.1 Facilities.

3.1.1.1 Calibration. The test facilities and equipment shall be in good working order and shall have a valid calibration label.

3.1.1.2 Alternatives. Alternative test facilities and equipment may also be used. However, all measuring variables as specified in this standard shall be determined correctly with respect to their physical definition.

3.1.2 Equipment. See 4.1 through 4.12 and 4.14.

3.1.3 Test Vehicle/Test Piece. Unless otherwise specified in the relevant test procedure for the property concerned, either the complete component or a section of that component shall be used for test pieces. Unless otherwise specified in the appropriate test procedures, at least three (3) test pieces shall be tested. For test procedures that require a complete component, components shall be randomly selected from a minimum of 50 parts if not otherwise agreed to by the responsible GM Materials Engineer.

Note: If regrind is to be used, all test parts, surrogate parts and/or plaques must be manufactured with the maximum amount of regrind the supplier intends to use. The maximum amount allowed for injection molded parts shall be RE20HS = 20% maximum Home Scrap regrind. If no Regrind (RE) suffix appears on the drawing/math file, no regrind is approved for use.

3.1.4 Test Time. See 4.1 through 4.12 and 4.14.

3.1.5 Test Required Information. See 4.1 through 4.12 and 4.14.

3.1.6 Personnel/Skills. See 4.1 through 4.12 and 4.14.

3.2 Preparation. See 4.1 through 4.12 and 4.14.

3.3 Conditions.

3.3.1 Environmental Conditions. Unless otherwise stated in respective test procedures, all samples shall be conditioned prior to each required test according to GMW3221, Code A.

3.3.2 Test Conditions. Deviations from the requirements of this standard shall have been agreed upon. Such requirements shall be specified on component drawings, test certificates, reports, etc.

3.4 Instructions. See 4.1 through 4.12 and 4.14.

3.5 Data. See 4.1 through 4.12 and 4.14.

3.6 Safety. This standard may involve hazardous materials, operations, and equipment. This standard does not propose to address all the safety problems associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

3.7 Documentation. Samples of components or material released to this standard shall be tested for conformity with the requirements of this standard and approved by the responsible GM Department prior to the start of delivery of production level components or materials.

Any change to the component or material, e.g., design, function, properties, manufacturing process and/or location of manufacture requires a new release of the product. It is the sole responsibility of the supplier to provide the customer, unsolicited, with documentation of any change or modification to the product/process, and to apply for a new release.

If not otherwise agreed to, the entire verification test shall be repeated and documented by the supplier prior to start of delivery of the modified or changed product. In some cases, a shorter test can be agreed to between the responsible GM department and the supplier.

3.7.1 Test Results. The test report shall have the same outline and numbering as this test specification.

Note: If surrogate data is to be used, there must be documentation stating; actual surrogate part, molding process, approved material (GM specification, Supplier, and Product code), color, grain, gloss, and amount of regrind.

4 Requirements and Procedure

4.1 Weather-Ometer Resistance (SAE J2527/ISO 4892-1, ISO 4892-2). Reference Table 1 for exposure limits. A class shall be called out based upon the part application (typical examples are provided).

Note: Only for unpainted parts with exposure to direct or indirect sunlight. If the entire part cannot be exposed, the GM Materials Engineer shall determine the location of the test samples.

4.1.1 International Organization for Standardization (ISO) Procedure. Test as per the conditions of ISO 4892-1 and ISO 4892-2.

- Inner and outer filter: Borosilicate
- Radiant exposure: 0.50 W/m² at 340 Nm

- Test Program Cam No. 7
- Light Only: 102 minutes $\pm$ 0.5 minutes
- Light and Spray: 18 minutes $\pm$ 0.5 minutes
- Black Standard Temperature: 80 °C $\pm$ 3 °C

4.1.1.1 Visual Evaluation. Wash weather specimens prior to measuring and making observations. Wash with scrubbing action, using a sponge that is saturated with a solution consisting of soap and deionized water at 23 °C $\pm$ 3 °C.

Table 1: Exposure Limit Guidelines

Application	Class ^{Note 1}	Test Method	Radiant Energy
Parts exposed to direct sunlight above the belt line with large horizontal surfaces (e.g., tonneau covers, cargo box trim, fascia uppers, step pad or top cap, vinyl roof/simulated convertible, rear end spoilers/horizontal appliqué, decorative decals, emblems, nameplates, ornamentation, and anti-chip film).	1	SAE J2527	$\geq 4500 \text{ kJ/m}^2$
		ISO 4892-1 ISO 4892-2	$\geq 5400 \text{ kJ/m}^2$
Parts exposed to direct sunlight above the belt line with midsize horizontal surfaces and parts that have both vertical and horizontal surfaces (e.g., cowl vents, body mounted pillar and license plate appliqué, grilles, wheel opening moldings, ditch moldings, glass trim, and roof/luggage racks).	2	SAE J2527	$\geq 3500 \text{ kJ/m}^2$
		ISO 4892-1 ISO 4892-2	$\geq 4200 \text{ kJ/m}^2$
Other parts exposed to direct sunlight above the belt line and all parts exposed to direct sunlight below the belt line (e.g., body side moldings, lower body claddings, rocker moldings, mud guards, assist steps, bumper systems, antenna housing, sunroof assembly, and mirror housing).	3	SAE J2527	$\geq 2500 \text{ kJ/m}^2$
		ISO 4892-1 ISO 4892-2	$\geq 3000 \text{ kJ/m}^2$
Hidden parts not exposed to direct sunlight.	4	SAE J2527	$\geq 1250 \text{ kJ/m}^2$
		ISO 4892-1 ISO 4892-2	$\geq 1500 \text{ kJ/m}^2$
Parts with no exposure to direct sunlight.	5	SAE J2527	0 kJ/m ²
		ISO 4892-1 ISO 4892-2	
Hidden parts only exposed when door/closure open (e.g. sill plate moldings).	6	SAE J2527	$\geq 275 \text{ kJ/m}^2$
		ISO 4892-1 ISO 4892-2	$\geq 300 \text{ kJ/m}^2$

Note 1: In case no class is assigned, Class 3 applies as the default standard for the radiant energy. To ensure timely Production Part Approval Process (PPAP), at the discretion of the responsible GM Materials Engineer, surrogate parts or plaques may be weathered instead of actual production parts (Regional validation timing constraints will dictate this. GM North America (GMNA) requires weathering results at Validation Test Complete (VTC), while GM Europe (GME) does not require results until Post Validation Audit (PVA)). If allowed, surrogate parts or plaques must have been processed similarly to the production parts (e.g., injection molded or vacuum formed, same material, same color, same grain, same gloss, and amount of grind).

4.1.1.2 Examination with Microscope (Enlargement: 50x). Test pieces shall show no cracks, no pores or other damages of surface.

4.1.2 SAE International Papers. Test as per the conditions of SAE J2527 Method A with extended filters.