WORLDWIDE ENGINEERING STANDARDS	General Specification	GMW14669

Organic Coating Performance for Exterior and Interior Metallic Components

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 for applied organic surface finishes on metallic automobile body parts and components. The focus is the performance of coated parts for which the coating is GM approved, as evidenced by its presence in GM Materials Approved Source List or other regionally approved material databases. However, approval criteria are included for instances when new material is necessary.

Six (6) types of requirements are specified in 1.3 through 1.3.6, dependent upon the severity of service operation of the component. All interior painted metal parts must also meet the requirements of GMW14444.

1.2 Applicability. This performance standard applies to organic surface finishes on metallic automobile body parts and components.

1.3 Classification.

1.3.1 Type A1. Applicable to surface finishes used on the external body and on external components in areas of exceptionally severe service, e.g., vehicle front, sides.

1.3.2 Type A2. Applicable to surface finishes used on the external body and on external components in areas with little/no chipping exposure, e.g., vehicle roof, and rear-facing areas.

1.3.3 Type A3. Applicable to surface finishes used on external components which are not Type A1 or Type A2, and for which performance requirements must be specially defined; this type typically is not used.

1.3.4 Type B1. Applicable to surface finishes used on internal body parts and components in areas of severe service operations, e.g., solar; direct sunlight exposure, and corrosion; items in contact with wet floor, such as lower seat structure.

1.3.5 Type B2. Applicable to surface finishes used on internal body parts and components in areas of moderate service operation, e.g., solar; indirect sunlight exposure, and corrosion; items readily visible near floor, such as brake pedal arm, speaker grilles in lower door.

1.3.6 Type B3. Applicable to surface finishes used on internal components in areas of normal service operation, e.g., solar; no direct sunlight exposure; corrosion; any other steel components visible with difficulty, such as upper structure under seats, structures visible with closures (e.g., glove box) open or seats folded.

Note: Structures not visible to customers (e.g., instrument panel support) may require only temporary corrosion protection and are not covered under this standard.

1.3.7 Some interior components may have mixed service severity (e.g., Type B1 for corrosion and Type B3 for solar). In this case, the most severe type shall be listed and exception(s) noted on the engineering drawing.

1.3.8 This standard does **not** cover performance requirements for:

1.3.8.1 Organic coatings on highly stressed exterior parts (e.g., road wheels). See GMW14670 for steel wheels and/or GMW14885 for aluminum wheels.

1.3.8.2 Organic coatings on chassis components. See GMW14671.

1.3.8.3 Organic coatings on plastic parts. See GMW14797.

1.3.8.4 Organic coatings on fasteners.

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2 References

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

2.1 External Standards/Specifications.

ASTM D7869	ISO 2178	ISO 15184	SAE J1767
ISO 105-A02	ISO 2808	SAE J1545	SAE J2527
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2.2 GM Standards/Specifications.

GMW3005	GMW14444	GMW14704	GMW15282
GMW3059	GMW14664	GMW14729	GMW15287
GMW3208	GMW14669	GMW14797	GMW15356
GMW3286	GMW14670	GMW14829	GMW15357
GMW3417	GMW14671	GMW14865	GMW15359
GMW14162	GMW14698	GMW14872	GMW15891
GMW14333	GMW14700	GMW14873	
GMW14334	GMW14701	GMW14885	

3 Test Preparation and Evaluation

3.1 Resources.

3.1.1 Facilities. Apparatus as required by the appropriate test methods.

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. Not applicable**.**

3.1.3 Test Vehicle/Test Piece. The size, dimensions and number of test pieces shall be as specified in the relevant test method for the property concerned. Unless otherwise specified, three (3) samples per test shall be run.

3.1.4 Test Time. Not applicable.

3.1.5 Test Required Information. Not applicable**.**

3.1.6 Personnel/Skills. Tests must be performed by trained personnel.

3.2 Preparation**.** Conditioning, where required, shall be as specified in the relevant test method for the property concerned.

3.3 Conditions.

3.3.1 Environmental Conditions. Not applicable.

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. Not applicable.

3.5 Data. Not applicable.

3.6 Safety. This Engineering Standard may involve safety requirements for hazardous materials, the method of operations and equipment. This standard does not propose to address all the safety issues associated with its use. It is the responsibility of the user of this standard to ensure compliance with all appropriate safety and health practices. This would include any specific training that may be required. The safety and health standards include site specific rules and procedures, company rules and procedures, and Government Standards. Contact shall be made with the appropriate site Safety and Health personnel for further direction and guidance in these matters.

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.

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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 results shall be represented in a test report with reference to this standard.

4 Requirements and Procedure

4.1 General. Full requirements are listed in Appendix A, Table A1. Some requirements are also described in detail in the following section. Requirements for ongoing production quality control testing are shown in Appendix D, Table D1.

4.2 Cure Test. Test per GMW15891. An appropriate solvent shall be specified by the paint manufacturer. Samples shall show no more than slight, barely observable change to the paint surface (Rating of 0 or1).

4.3 Crosshatch Adhesion Test. Test per GMW14829, Method A. Coatings must perform both as-received and after humidity exposure to GMW14729 of the hours shown in Appendix A, Table A1. Requirement: Rating 0 or 1.

4.4 Testing to High-humidity Environments. Expose samples to humidity per GMW14729, Method A or B. Coatings must withstand humidity exposure to the hours shown in Appendix A, Table A1. Requirement: No surface change.

4.5 Corrosion Tests. The determination of the resistance of the organic coating to corrosion shall be performed by Cyclic Corrosion Test per GMW14872. If the coating is intended to be used for painting of aluminum substrates, Filiform Corrosion Test per GMW15287 is required. Body assembly or subassembly parts and components shall be tested in vehicle position. Interior components/assemblies shall have coverings (e.g., seat cushions) removed.

4.5.1 Cyclic Corrosion Test with Scribe Creepback. Cyclic corrosion testing, per GMW14872, is the globally preferred method. Corrosion testing shall be performed with a scribe line per GMW15282. This testing is required to be performed on normally processed parts or representative sections of parts. Cyclic corrosion testing shall be run to Exposure C as defined for the part location in the vehicle. Tested specimens shall achieve a rating of 9 or 10 (excluding scribe line) along with 3 mm maximum creepback along the scribe line (6 mm for bare steel or cast iron).

4.5.2 Salt Spray Fog Test. When required by GM Materials Engineering, the Salt Spray Fog Test may be used for bare steel substrates as part of a development program or for rapid quality testing once correlation to cyclic corrosion performance is established. Coatings must withstand Salt Spray Fog Test exposure to the hours shown in Appendix A, Table A1.

Note: Slight rust at edges is permitted for Type B (for non-visible parts only) but shall not exceed 20% of the length of exposed edges unless otherwise noted in specific part information.

4.5.3 Filiform Corrosion Test (For Aluminum Substrates Only). Test parts per GMW15287. Painted parts must meet a filiform resistance requirement of no more than 4 mm length of any filament from the scribe line after a period of 672 h in humidity. Also, there shall be no filament growth on the non-scribed test surfaces at the end of the test, excluding sample prepared cut edges.

4.6 Scratch Resistance. Following GMW14729 humidity, test per GMW14698, Method A (with Test Tip 2) or Method B. Performance requirement is no penetration of the test coating layer at 4.0 N load.

4.6.1 Optionally, pencil hardness test per ISO 15184 may be used to evaluate scratch resistance; the paint shall have a minimum hardness value of "H" per ISO 15184.

4.7 Resistance to Stone Impact. Test per GMW14700, Method A or B, and Method C.

Type A1: Requirement: Rating 8.

Type A2: Requirement: Rating 7.

Type A3: Requirement: Shall be specially defined.

Type B: Requirement: Not applicable.

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