



Weatherable, Abrasion Resistant Coatings for Exterior Plastics Applications

1 Scope

This specification covers the requirements for a weatherable, thermal cure, abrasion resistant hardcoat for exterior applications. The coatings in this specification are for protective purposes on plastics. They can be sprayed, flow coated, or dipped.

1.1 Material Description. Material qualified to this standard is based on the coating performance. Coating technology is unique to each coating supplier. The material description of each coating technology is required at the time of approval.

1.1.1 These coatings are part of a total painted product system and must meet the requirements set forth in this specification and those shown on engineering drawings.

1.1.2 The substrate must be approved to the appropriate GM material specification. For previously unpainted substrates, substrate paintability shall be demonstrated per GMW16172 (plaques or parts).

1.1.3 Initial approval of an abrasion resistant coating per this specification must be evaluated and approved for each substrate.

1.1.4 This specification shall be used in conjunction with the Approved Paint on Plastics System (APOPS), a section of GM Materials Approved Source List, which identifies approved substrate, cleaning, priming, and topcoat combinations.

Note: GM Approved Paint on Parts System is required for the Production Part Approval Process (PPAP) of the exterior lamp assembly.

1.2 Symbols. Not applicable.

1.3 Applicability. These coatings are applied to polycarbonate (PC) exterior trim parts, including pillar appliques and targa roofs.

1.4 Remarks. 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.

2 References

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

2.1 External Standards/Specifications.

ASTM D870	ISO 4892-2	SAE J1545
ASTM D1044	ISO/IEC 17025	SAE J1976
ISO 4892-1	ISO/TS 16949	SAE J2527

2.2 GM Standards/Specifications.

GMW3059	GMW14334	GMW14829	GMW16172
GMW3221	GMW14700	GMW14873	GMW17456
GMW14124	GMW14729	GMW15777	
GMW14270	GMW14797	GMW15891	

2.3 Additional References.

- Qualification Procedure Section in Approved Paint on Plastics Systems (APOPS).

3 Requirements

3.1 Requirements on Test Specimens. Unless otherwise specified, the materials shall be tested under standard conditions per GMW3221, Code A.

3.1.1 Facilities. For a new supplier to GM, all testing shall be performed in an accredited laboratory. Laboratory accreditations to ISO/IEC 17025 are acceptable. A current supplier planning to use a non-ISO/IEC 17025 approved laboratory shall receive approval, prior to testing, from the GM engineer responsible for the specific technology. Generally, the unaccredited laboratory should be in a facility that has a quality system approval to ISO/TS 16949.

3.1.2 Test Piece. The number of samples for each test shall be three (3) per coating unless the responsible engineer and supplier agree on a different number for specific tests prior to the start of testing. All substrates, pretreatments, and coating layers, shall be fully identified with source, product code, and film build.

3.1.2.1 For initial source approval of the coating, the test specimens can be panels or component parts. If test panels are used, the recommended panel size is 100 mm × 150 mm.

3.1.2.2 The substrate must be clean and free of surface defects which would affect performance or appearance.

3.1.2.3 Appearance. The panel appearance must exceed all requirements designated in GMW15777, Exterior Painted Parts Appearance Requirements.

3.1.3 Environmental Conditions.

3.1.3.1 Unless otherwise specified, painted samples shall be subjected to testing after a minimum aging period of 72 h to 96 h following the baking or drying cycle. A shorter aging period may be used, provided it is recognized that this represents a more severe condition of test and that results obtained at different aging times fewer than 72 h are not a good basis for comparing the relative performance characteristics of paint finishes.

3.1.3.2 Test panel/part orientation shall be such that it is not shingled or shielded by another test specimen or test equipment.

3.1.3.3 Expose the test specimens to specified environment. There shall not be a lapse of more than 2 minutes in transferring the test specimens from one environment to another. There is to be no chamber ramp times between cycle conditions unless specified.

3.1.3.4 Unless otherwise specified, the tolerance on exposure time is ± 5 minutes.

3.1.4 Application. Coating to be reduced (if necessary) and applied uniformly to achieve dry film thickness that will meet material and processing specifications when used for exterior plastics applications.

3.2 APOPS. For specific system approval, refer to the Qualification Procedure section in APOPS (GMW14797).

3.3 Requirements on Delivery. It will be the responsibility of the supplier to ensure that the material is not exposed to temperature during shipment which would cause the material to fail to meet any requirements of this specification.

3.4 Performance Requirements. For a coating to be initially approved as a source, samples must meet the requirements of Table 1.

3.5 All materials supplied to this standard must comply with GMW3059, **Restricted and Reportable Substances**, including the requirement to submit a full material composition disclosure to GM via the International Material Data System (IMDS) or via a completed GMW3059 report form.