



Opaquing Paints For Heat Sensitive Plastics For Lighting Applications

1 Scope

This specification covers the requirements for opaquing paints to be used over heat sensitive plastic lenses for exterior lighting applications. This specification includes protected and 2nd surface painting applications.

1.1 Material Description. Coating technology shall be documented with approval. These coatings are typically monocoats.

1.2 Symbols. Not applicable.

1.3 Applicability. These coatings can be used on heat sensitive transparent or translucent plastics, typically to enhance appearance or block light. The typical plastic in this case is a transparent acrylic like poly(methyl methacrylate) (PMMA), with a Glass Transition Temperature (T_g) less than 100 °C.

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

1.4.1 Initial approval per this specification must be evaluated and approved.

1.4.2 This specification shall be used in conjunction with the Approved Paint on Plastics Systems (APOPS), a section of Materials Specification File (MATSPC) which lists approved substrate, cleaning, priming and topcoat combinations.

1.4.3 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 D523	ISO 2808	ISO/TS 16949	SAE J2527
ASTM D1474	ISO/IEC 17025	SAE J1545	

2.2 GM Standards/Specifications.

GMW3059	GMW14124	GMW14729	GMW15891
GMW3208	GMW14698	GMW14829	GMW17138
GMW3221	GMW14701	GMW15777	

2.3 Additional References. None.

3 Requirements

3.1 Samples and Testing.

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 and per film build, 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 per specimen.

3.1.2.1 At minimum, the boundary conditions of the recommended film build range shall be tested to the requirements in this specification.

3.1.2.2 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.

3.1.3 Test Conditions.

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

3.1.3.2 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 less than 72 h are not a good basis for comparing the relative performance characteristics of paint finishes.

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

3.1.3.4 Expose the test specimens to specified environment(s). 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.

3.1.3.5 Unless otherwise specified, the tolerance on exposure times is ± 5 minutes.

3.2 Surface Preparation. The surface must be clean and free of surface defects which would affect photometric performance or appearance.

3.3 Cure. Surface of part must be within the range of time and temperature specified by the supplier for cure, and must be checked per GMW15891. Time in oven and ambient temperature must be regulated to meet this requirement without exceeding over/under bake specifications.

3.4 Application and Appearance. Reduce and apply uniformly to achieve total opacity at 1 mil (25 μm). Must meet the requirements of GMW15777 with the exception of Gloss, Orange Peel, Off Color and Distinctness of Image (DOI) sections.

3.5 Performance.

3.5.1 Initial Coating Source Approval. For a coating to be initially approved as a source, samples must meet the requirements of Table 1.

Table 1: Coating Requirements

Test Description	Test Method	Requirements
Initial Adhesion	GMW14829, Method A	Maximum rating of 1.
240 h Humidity	GMW14729	No Appearance Change.
+ Tape Adhesion ^{Note 1}	GMW14829, Method A	Conduct on three (3) separate areas on the panel. Maximum rating of 1.
Adequacy of Cure (Test with Xylene)	GMW15891	Maximum rating of 0. Maximum rating of 0 for systems with clearcoat. Maximum rating of 1 for monocoats.