



Topcoat System, Basecoat/Clearcoat for Plastic Wheel Trim

1 Scope

1.1 Material Description. This specification covers the qualification and performance requirements for exterior, basecoat/clearcoat topcoat systems that perform over a wide process range on two (2) types of plastic substrates used in wheel trim applications. The topcoat system must be separately qualified on each type of substrate. Primers, as required, will also be tested and approved with the applicable basecoat/clearcoat.

1.2 Symbols. Not applicable.

1.3 Applicability. The coating Two (2) Component Basecoat/Two (2) Component Clearcoat (2K/2K) versions of these topcoats can be used on heat sensitive plastics such as Acrylonitrile Butadiene Styrene plus Polycarbonate (ABS+PC). Primers are generally not required with ABS+PC basecoat/clearcoat systems. One (1) Component Basecoat/One (1) Component Clearcoat (1K/1K), One (1) Component Basecoat/Two (2) Component Clearcoat (1K/2K) or 2K/2K versions of these topcoats can be used on higher temperature plastics such as Polyamide 66 plus Polyphenylene Ether (PA66+PPE). Generally, primers are required with PA66+PPE basecoat/clearcoat systems.

1.4 Remarks. The GM Materials Engineer responsible for technology qualification shall be contacted prior to test to determine potential usage for the product and to define the specific test protocol to be followed. Tests are to be performed in triplicate unless otherwise indicated.

2 References

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

2.1 External Standards/Specifications.

ISO 2808	SAE J400	SAE J2527
ISO/IEC 17025	SAE J1976	

2.2 GM Standards/Specifications.

GMW3059	GMW14270	GMW14729	GMW14829
GMW14124	GMW14333	GMW14797	GMW15891

3 Requirements

3.1 Resources.

3.1.1 Calibration. The equipment used at the test facilities shall be in good working order and shall have a valid calibration label.

3.1.2 Facilities. All testing shall be completed in facility which is ISO/IEC 17025 accredited for General Motors to accept data. Proficiency data shall be kept current and made available at the request of the GM Materials Engineer.

3.1.3 Equipment. All equipment and test procedures utilized to supply data to this specification shall be documented on the "Scope of Accreditation" for the facility.

3.1.4 Test Vehicle/Test Piece. Test pieces, wherever possible, shall be the finished part. If size, shape, etc., of the finished part is impracticable, tests shall be conducted on specially prepared coated test panels, as agreed upon by the appropriate GM Materials Engineer.

3.1.5 Test Time. There shall be no deviations from the minimum test times documented in this specification unless it is agreed upon by the GM Materials Engineer. Suppliers are encouraged to run parts in test to the point of nonconformance to understand ultimate performance.

3.1.6 Test Required Information. These test requirements are intended for routine acceptance and control of production painted parts using materials and processes previously found to be satisfactory. These test requirements do not represent the complete testing necessary for engineering approval.

3.2 Conditions. Parts should be tested at the earliest 72 h after final bake unless otherwise specified in a reference specification. A shorter aging time may be used, provided it is recognized that it represents a more severe condition of test. Laboratory conditions, such as humidity and temperature, should be recorded to help understand any test anomalies.

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

3.4 Documentation. Samples of components or material released to this specification shall be tested for conformity with the requirements of this specification 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.

The entire verification test shall be repeated and documented by the supplier prior to start of delivery of a modified or changed product. In some cases, a shorter test can be agreed to between the responsible GM department and the supplier.

Deviations from the requirements of the test procedures shall have been agreed upon. Such requirements shall be specified on component drawings.

3.5 Qualification Requirements. The GM Materials Engineer responsible for technology qualification shall be contacted prior to test to determine potential usage for the product and to define the specific test protocol to be followed.

3.5.1 Film Thickness (ISO 2808). The coating must meet all specific appearance and durability requirements within the general film build ranges as follows and as measured per ISO 2808.

- Basecoat Range: 15 µm to 36 µm (0.6 mils to 1.4 mils)
- Clearcoat Range: 38 µm to 64 µm (1.5 mils to 2.5 mils)

Individual colors may have narrower ranges for optimum appearance. Individual colors may also have higher minimum film builds than the technology minimum due to hiding or ultraviolet opacity.

3.5.2 Bake. Products that are approved to this specification vary in their bake temperature requirements from 82 °C to 132 °C (180 °F to 270 °F) and in their time at substrate temperature from 20 minutes to 90 minutes. Reference the Approved Paint on Plastic System (APOPS) database for the recommended time and temperature for each approved combination of paint and plastic.

3.5.3 Resistance to Chipping (SAE J400).

3.5.3.1 SAE J400 Method A or B. Acceptance criteria see SAE J400; SAE 3B. Note: Data from this test is compared to that obtained in 3.5.3.2 to determine if the technology is subject to embrittlement at cold temperatures.

3.5.3.2 SAE J400 Method C. Acceptance criteria see SAE J400; SAE 3A.

3.5.4 Initial Adhesion (GMW14829).

3.5.4.1 Method A (Cross Hatch). Maximum of 5% removal and 95% retention (rating of one (1)) as defined in GMW14829.

3.5.4.2 Method B (Cross Cut). Maximum of 5% removal and 95% retention as defined in GMW14829.

3.5.5 Humidity Exposure (GMW14729). Standard test exposure is 96 h. No blistering, discoloration or adhesion loss. Follow humidity testing with tape adhesion testing Methods A and B (GMW14829). Maximum of 5% removal as defined in GMW14829.

3.5.6 Cycle Test (GMW14124). No cracking or adhesion loss using Cycle A per GMW14124. Run 15 cycles. Follow cycle testing with 24 h humidity testing per GMW14729 and tape adhesion testing Methods A and B per GMW14829. Maximum of 5% removal as defined in GMW14829.