GM ENGINEERING STANDARDS	Material Specification	9984901

Topcoat System, Universal, 2K Basecoat/2K Clearcoat

1 Scope

This specification covers the qualification and performance requirements for exterior, two component (2K) solventborne basecoat (BC) and two component solventborne clearcoat (CC) topcoat that performs over bake latitude of 82 °C to 135 °C (180 °F to 275 °F).

1.1 Material Description. Basecoat components of these systems are typically two component (solvent) urethane are urethane blends. Clearcoat components of these systems are flexible, 2K (solvent) urethane or urethane blends. Typical volume solids as sprayed are typically 35% to 50% for basecoats and 45% to 60% for clearcoats. Each combination of specific basecoat and clearcoat must be tested and approved as a basecoat/clearcoat system. The individual components are not interchangeable, and are approved for use only with combinations of basecoat/clearcoat of the total paint system which was used in the qualification testing. It must also be compatible with specific adhesion promoters and/or primers used with specific plastics.

1.2 Symbols. Not applicable.

1.3 Applicability. These topcoats can be used on heat-sensitive plastics, flexible plastics, and rigid metal or plastic parts. These topcoats are designed to be applied over an approved adhesion promoter or baked primer. All thermoplastic polyolefin substrates using 9984901 must be applied over an approved adhesion promoter or flame treatment per GMW16133.

2 References

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

2.1 External Standards/Specifications.

ISO/TS 16949

2.2 GM Standards/Specifications.

9984801	GMW3059	GMW16133	GMW17434
GMW3005	GMW15777		

3 Requirements

3.1 Submission. The submission requirements of GMW3005 must be completed prior to approval of the topcoat (basecoat/clearcoat) system. The supplier must clearly define the usage target.

3.2 Durability Performance. Systems approved under this specification must meet the minimum performance requirements of a Class 2, Type B or C topcoat as described in GMW3005.

3.3 Etch Resistance. Minimum etch-rating is six per the Jacksonville rating scale, or equal to typical original equipment manufacturer (OEM) body system controls for a given exposure test.

3.4 Panel Preparation. Panels are to be prepared for Types B and C materials. Note that power wash per 9984801 is required. Deviation must be approved by GM Manufacturing Engineering Vehicle Systems - Paint.

3.5 Processing Requirements. These topcoats are designed to be applied over an adhesion promoter or baked primer. Any wet-on-wet applications over primer must be evaluated as a separate paint system per this specification and applicable primer specification.

3.6 Appearance. The topcoat system (basecoat/clearcoat) must meet or exceed the requirements as designated in GMW15777.

3.7 Additional Requirements.

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3.7.1 Flash. A flash time of one (1) to two (2) minutes between coats of basecoat or coats of clearcoat and three (3) minutes between basecoat and clearcoat application is typical. Six (6) minutes of flash is typical prior to oven entrance. Refer to the approving Paint Engineer for additional information in regard to exceptions for the typical processing flash time ranges.

3.7.2 Film Build. The clearcoat must meet all specified appearance and durability requirements at a minimum film of 38 µm (1.5 mil). Individual basecoat colors may have higher minimum film builds than the technology minimum due to hiding or ultraviolet opacity. The acceptable range for a color will be established during annual pigmentation evaluation (GMW17434) and will be released by GM Manufacturing Engineering Vehicle Systems – Paint, as the GMW17434 Approved Color Source List, available by model year from the paint source. Refer to the approving Paint Engineer for additional information in regard to exceptions for the typical processing film build ranges.

3.7.2.1 Film Build Latitude. The specific clearcoat film build range for individual technologies must be established by Designed Experiment or a matrix ranging from 25.4 µm to 63.5 µm (1.0 mil to 2.5 mil).

3.7.2.1.1 Performance criteria are Xenon weatherometer, Florida exposure, flexibility, humidity adhesion and chip resistance. Values will be noted on the Approved Source List for the specific technology.

3.7.3 Bake. Products that are approved to this standard have a typical bake range of 82 °C to 135 °C (180 °F to 275 °F). Time at substrate temperature typically varies from 20 to 90 minutes. Refer to the approving Paint Engineer for additional information in regard to exceptions for the typical processing bake temperature and time ranges.

3.7.4 Bake Window. Cure charts must be developed as specified in GMW3005 to define technology limits for each product. Once developed and approved, the bake chart is signed by GM Vehicle Systems Engineering - Paint and is the only acceptable document for defining cure.

3.8 Additional Requirements. Product approval is required under established guidelines outlined in ISO/TS 16949. At product approval, the supplier is expected to have reviewed to GM's satisfaction specific documentation outlined in Advanced Product Quality Planning (APQP), i.e., Design Failure Mode and Effects Analysis (DFMEA), Process Failure and Effects Analysis (PFMEA), Key Product Characteristic (KPC), Key Control Characteristic (KCC) and Manufacturing Control Plans.

4 Manufacturing Process

All shipments of material or parts under contract or purchase order manufactured to this standard shall be equivalent in every respect to the initial samples approved by Engineering. There shall be no changes in either formulation or manufacturing processes permitted without prior notification and approval by Engineering. Lack of notification by the supplier constitutes grounds for rejection of any shipment. While samples may be taken from incoming shipments and checked for conformance to this standard, the supplier shall accept the responsibility for incoming shipments meeting this standard without dependence upon purchaser's inspection. In addition, the supplier shall be responsible for submitting a Certificate of Analysis with each batch of material arriving at a plant.

5 Rules and Regulations

5.1 Legal Regulations. All materials must satisfy applicable laws, rules, regulations and recommendations valid in the country of usage.

5.2 Language. In the event of conflict between the English and domestic language, the English language shall take precedence.

5.3 Inspection and Rejection. Samples of components or materials released to a GM material specification shall be tested for conformity with the requirements of this material specification and approved by the responsible Engineering department prior to commencement of delivery of bulk supplies.

A new approval must be received for any changes, e.g., properties, manufacturing process, location of manufacture, etc. If not otherwise agreed, all testing and documentation normally required for initial release must be completed.

It is the responsibility of the supplier to inform the customer in a timely manner, without solicitation, and to include documentation of all modifications of materials and/or processes and to apply for a new release.

5.4 Material Safety Data Sheets/Safety Data Sheets (MSDS/SDS). For new product submissions, or when a change in chemical composition of an existing product has occurred, a complete copy of the Material Safety

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