



Matte Finish (Low Gloss) Two Component (2K) Clearcoat

1 Scope

This specification covers the qualification and performance requirements of two-component (2K), matte finish (low gloss), high solids (50% to 55% volume solids as sprayed), rigid, urethane clearcoats. These clearcoats are intended for use wet-on-wet over waterborne or solventborne basecoats.

1.1 Material Description. These clearcoats are part of the total waterborne or solventborne basecoat/clearcoat system.

1.2 Symbols. Not applicable.

1.3 Applicability. These topcoats are designed to be applied over a baked primer.

1.4 Remarks. Not applicable.

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.

GMW3005

GMW3059

GMW14270

GMW15777

2.3 Additional References.

Advanced Product Quality Planning (APQP)

GM Materials Approved Source List

3 Requirements

Note: These topcoats are not subject to the R-value and B-value standards of GMW15777.

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

3.2 Gloss Level. Testing must be completed at the specified gloss levels at the time of submission (e.g., 20 gloss, 30 gloss, and/or 50 gloss using a 60 degree gloss meter).

3.2.1 Establishing Gloss Range. New model year colors will have individual and distinct gloss ranges and shall be derived through the following methodology. Using a sealed aluminum panel (e.g., ACT, APR16353, TRU Aluminum 10.16 cm x 15.24 cm x 0.635 cm (4 in x 6 in x 0.025 in) unpolished, coil coated: gray) apply low gloss clear, minimum 38 μ m (1.5 mil) to target final gloss range, i.e., a 30 gloss $\pm$ 5 gloss using a 60 degree gloss meter. This will establish clearcoat gloss position. Using this low gloss clearcoat applied to other colors will identify required gloss level. As an example, red basecoat with 30 gloss clear could result in a final of 25 gloss, which would then be reported as 25 gloss $\pm$ 5 gloss. These ranges, as established through a standardized clearcoat, are to be reported on the panel label affixed to the back of each panel when developing certified standards.

3.3 Durability Performance. Systems approved under this specification must meet the minimum performance requirements of a Class 1 Topcoat as described in GMW3005. Topcoat Type B and/or Type D testing requirements shall be determined by the targeted usage.

3.4 Processing Requirements. These topcoats are designed to be applied over a baked primer. These topcoats are not designed to be finessed/polished or spot-repaired.

3.5 Etch Resistance. Coatings approved under this specification are expected to provide a finish that will prevent or minimize environmental etch and water spot damage. Damage due to etch or water spot must not impact warranty costs and customer dissatisfaction. Since environmental conditions vary from site to site and from year to year, a comparison using control materials is the method of defining etch resistance. The responsible engineer must be consulted prior to start of the submission to verify which specific control(s) are to be used.

3.5.1 Field Performance. Ultimate field performance is determined from surveys of production vehicles. In order to assess new technology or a technology modification prior to production, a controlled exposure study will be made on large panels or parts at selected sites, including Jacksonville, Florida. After the Jacksonville etch study, all etch-resistant paint systems must demonstrate a minimum performance between 0 to 5 rating units based on a 10-point rating scale over several years.

3.6 Compatibility. Compatibility with associated materials is evaluated for Type A, Type B and/or Type D usage per GMW3005.

3.7 Processability. General processability must be demonstrated per GMW3005. The process used to create the test panels must be production capable.

3.7.1 Appearance. The topcoat system (basecoat/clearcoat) must meet or exceed corporate specification as designated in GMW15777.

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).

3.7.3 Film Build Latitude. The specific clearcoat film build range must be established by Designed Experiment or a matrix ranging from 25.4 μm to 63.5 μm (1.0 to 2.5 mil). Performance criteria are Xenon weatherometer, Florida exposure, flexibility, humidity adhesion and chip resistance. Values will be noted on the GM Materials Approved Source List for the specific technology. Refer to the approving paint engineer for additional information in regard to exceptions for the typical processing film build ranges.

3.7.4 Flash. For waterborne basecoats, a flash time of one (1) minute to two (2) minutes between coats of basecoat, with approximately three (3) minutes of heated flash before clearcoat application is typical. Solventborne basecoats typically require one (1) minute to two (2) minutes between coats of basecoat and three (3) minutes of flash before clearcoat application. Clearcoats are applied wet-on-wet over basecoat. They typically require one (1) minute to two (2) minutes of flash between coats of clearcoat and typically six (6) minutes of flash before entering the bake oven. Refer to the approving paint engineer for additional information in regard to exceptions for the typical processing flash time ranges.

3.7.5 Bake. Products that are approved to this standard have a typical bake range of 108 °C to 135 °C (225 °F to 275 °F). Time at substrate temperature typically varies from 20 minutes to 90 minutes. Refer to the approving paint engineer for additional information in regards to exceptions for the typical bake temperature and time ranges.

3.7.6 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 Global Paint and Polymers Center and is the only acceptable document for defining cure.

3.8 Chemical Requirements. All clearcoat reducers must be urethane grade or equivalent.

3.9 Special Handling. Component B (typically isocyanate) may require a dry nitrogen blanket to prevent the entry of moist air. Isocyanate materials in the Component B will react with water, alcohols, and certain other materials. Therefore, precautions must be taken to ensure that none of these are present or introduced into storage containers or circulating systems containing materials noted in this section.

3.10 Safety. Special precautions must be taken to limit pulmonary inhalation of fumes and direct skin contact with unreacted isocyanate materials. Follow local plant safety procedures, agreements, and monitoring procedures.

3.11 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 Characteristics (KPC), Key Control Characteristics (KCC) and Manufacturing Control Plans).