



Powder Topcoat for Small Parts with Limited Ultraviolet (UV) Exposure

1 Scope

1.1 Material Description. This specification covers the requirements for black thermosetting powder paint. This coating is intended to act as a final topcoat that would provide a smooth, hard, corrosion and Ultraviolet (UV) resistant finish. This coating is intended to be applied over metallic substrates that are phosphated, either zinc or iron and Electrocoat (e-coat) primed per GMW14671 -B-U/B or autodeposition per GMW14671 -F-U/B. Other GM approved pretreatments and/or primer may be specified as approved by the responsible GM Materials Engineer.

1.2 Symbols. Not applicable.

1.3 Applicability. This topcoat is intended to provide UV protection to underhood and chassis components that have limited exposure to UV light such as: trailer hitches, exposed fuel tanks, entry steps, exposed battery boxes, etc.

1.4 Remarks. None.

2 References

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

2.1 External Standards/Specifications.

ASTM D523	ISO 2813	SAE J1960
ASTM D3363	ISO 15184	

2.2 GM Standards/Specifications.

GMW3059	GMW14729	GMW15282	GMW15891
GMW14270	GMW14829	GMW15356	
GMW14669	GMW14872	GMW15545	
GMW14671	GMW14873	GMW15777	

2.3 Additional References.

Engineering Drawing

3 Requirements

Materials approved to this specification must meet the following requirements unless otherwise noted on the engineering drawing and noted in the "Remarks" section of the GM Materials Approved Source List.

Note: All parts (or panels where applicable) tested in this specification must be painted in the production process unless otherwise approved by GM Materials Engineering.

3.1 Film Thickness. The minimum dry film thickness for all significant surfaces shall be specified in the "Remarks" section of the GM Materials Approved Source List and on the engineering drawing.

3.2 Part Aging. Parts shall be processed on production processes and aged for 72 h prior to testing described in 3.3 to 3.9.

3.3 Appearance. The coating shall present a smooth, uniform, continuous appearance. The coating must meet or exceed specifications for uniformity as designated in GMW15777, Zone C, except for gloss and Distinction of Image (DOI), unless specified on the Engineering Drawing.

3.3.1 Gloss (ASTM D523 or ISO 2813). Parts shall meet gloss level requirements noted on engineering drawings as measured per ASTM D523 or ISO 2813 (60 degree meter). Gloss level ranges for approved powders will be noted in the GM Materials Approved Source List.

3.4 Cure (GMW15891). Painted parts must be tested to determine cure using the appropriate solvent per the paint supplier's recommendation. The coating must achieve a minimum rating of zero (0) or one (1).

3.5 Pencil Hardness (ASTM D3363 or ISO 15184). The paint film pencil hardness shall be between H and 3H when tested per ASTM D3363 or ISO 15184.

3.6 Painted Part Performance (GMW14669 Type A3). Parts painted in the production process. Panels cut from the appropriate substrate may be substituted if it is impractical to test parts.

3.7 Accelerated Corrosion Cyclic Corrosion and Scribe Creepback (GMW14872 and GMW15282). After duration C the part shall exhibit a corrosion rating of eight (8) or better per GMW15356.

3.8 Accelerated Weathering. (Xenon Exposure SAE J1960 – Exterior Cycle +96 h Humidity per GMW14729 and Tape Adhesion per GMW14829, Method B). Test panels shall be made using production intent substrates and painted in the production process. After exposure to 1500 kJ the test panels shall have a minimum of 80% gloss retention. Rate panels weekly for gloss and DOI retention, cracking, color change, and yellowing. After completing 1500 kJ of xenon exposure, expose the test panels to humidity per GMW14829. There shall be a minimum of 95% retention after tape adhesion testing per GMW14729 Method B, on each of the three (3) test panels. After humidity testing, conduct a final rating (a minimum of 80% gloss retention is required) and evaluate polish back (hand polish only) if gloss retention is below minimum specification using 3M Finesse-It Final Finish Easy Cleanup.

3.9 UV Transmission (GMW15545). (Spectrophotometer with Integrating Sphere). The coating must be opaque to UV transmission to the underlying primer layer or substrate. The topcoat must be prepared at the minimum film build and baked 15 °C above the target temperature for 90 minutes. Report data as specified in GMW15545. Testing must be conducted with wavelengths from 290 nm to 700 nm. No more than 0.1% transmission is allowed from 290 nm to 360 nm. No more than 0.5% transmission is allowed at 400 nm.

3.10 Florida Exposure. (GMW14873), Procedure One (1); Black Box Exposure +96 h humidity per GMW14829 and Tape Adhesion per GMW14729). Expose panels for a duration of 24 months. The paint must retain 80% of gloss (after light hand polishing with 3M Finesse-It Final Finish Easy Cleanup), changes color no more than a Delta E (ΔE) of three (3) and/or visual rejection by appropriate engineering personnel, and maintaining film integrity. After exposure, the panels shall be exposed to 96 h of humidity per GMW14829. There shall be a minimum of 95% retention when tested per GMW14729 Method B, on each of the three (3) test panels

4 Manufacturing Process

Not applicable.

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 Data Sheet/Safety Data Sheet must be submitted in compliance with the Globally Harmonized System of