



High Corrosion Performance Powder Coating for Applied Parts

1 Scope

This specification covers the requirements for both grey and black thermosetting powder paints.

Type One (1) (grey) and Type Two (2) (black) coatings are intended to act as a corrosion resistant primer, where exposure to Ultraviolet (UV) light would require the use of a weatherable topcoat.

Type Three (3) (grey) and Type Four (4) (black) coatings are intended to be used as a single coating that would provide a smooth, hard, corrosion and moderately UV resistant finish.

These coatings are intended to be applied over metallic substrates that have been previously coated with zinc phosphate (9984123), iron phosphate or other GM approved pretreatments.

1.1 Material Description. Thermosetting powder paints for underhood and chassis components.

1.2 Symbols. Not applicable.

1.3 Applicability. Type One (1) and Type Two (2) coatings are intended to provide corrosion protection to underhood and chassis components that are generally not exposed to UV light such as: tie rod ends, intermediate drive shafts, steering linkages, brackets, pulleys, etc. Type Three (3) and Type Four (4) coatings are 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, tow hooks, etc.

1.4 Remarks. None.

2 References

2.1 External Standards/Specifications.

ASTM D523	ASTM D3363	SAE J1960	SAE J2334
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2.2 GM Standards/Specifications.

9984123	GMW14671	GMW14872	GMW15357
GMW3059	GMW14729	GMW14873	GMW15777
GMW14270	GMW14829	GMW15282	GMW15891

2.3 Additional References.

Engineering Drawing

3 Requirements

Materials approved to this specification must meet the following requirements for both initial approval on test panels as well as Production Part Approval Process (PPAP) approval on production parts unless otherwise noted on the Engineering Drawing and noted in the "Remarks" section of the GM Materials Approved Source List.

Unless otherwise noted, all generic material approvals are to be completed over both iron phosphate and zinc phosphate panels of multiple substrate materials: hot rolled steel, cold rolled steel, cast iron, cast aluminum, and either electrogalvanized steel or hot dipped galvanized steel.

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. A minimum dry film thickness of 50 μm (2.0 mils) is required for all significant surfaces unless otherwise specified on the engineering drawing.

3.2 Part Aging. The following tests shall be performed on parts painted with the production process after aging a minimum of 72 h.

3.3 Appearance. The coatings shall have a smooth, uniform, continuous appearance.

Type Three (3) and Type Four (4) coatings must meet or exceed corporate specifications for uniformity as designated in GMW15777 Zone C, except for gloss and Distinctness of Image (DOI), unless specified on the engineering drawing.

3.3.1 Gloss (ASTM D523). When specified, the coatings shall meet gloss level requirements noted on engineering drawings as measured per ASTM D523 (60 degree meter).

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

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

3.6 Painted Part Performance (GMW14671). Parts/panels painted in the production process shall meet all the requirements (including gasoline and oil resistance) as specified in GMW14671 except the salt spray requirement shall be 1000 h with no red rust and scribe performance per 3.5.2.1 of GMW14671. The GMW14872 cyclic corrosion requirements are also required for PPAP, based on Table Four (4) of GMW14671.

3.7 Additional Test Requirements. The following requirements must be completed for initial material approval only:

3.7.1 Accelerated Weathering (Type Three (3) and Type Four (4) only). (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 800 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 800 kJ of xenon exposure, expose the test panels to humidity per GMW14729. There shall be a minimum of 95% retention after tape adhesion testing per GMW14829 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.

3.7.2 Accelerated Corrosion. Field correlative cyclic corrosion testing is required. Test panels are to be scribed following GMW15282, and then GMW14872 or SAE J2334 may be used to determine the predictive general corrosion performance of test samples. Materials must pass duration D of GMW14872 when tested to this specification. Unless otherwise noted, pass criteria is to be 6 mm maximum creepback and a minimum rating of eight (8) per GMW15357 on Cold Rolled Steel (CRS) and cast iron panels/parts. Pass criteria is 3 mm maximum creepback and a minimum rating of eight (8) per GMW15357 for all other panel/part substrates after the coupon mass loss requirements of duration D in GMW14872 (approximately 80 cycles) or SAE J2334 (approximately 60 cycles) are met.

3.7.3 Florida Exposure. (GMW14873, Procedure One (1) Black Box Exposure and 96 h humidity per GMW14729 with tape adhesion per GMW14829). Expose panels for a duration of 24 months. The paint must retain 80% of gloss after 12 months. At the end of 24 months the paint must retain 50% of its gloss, change color no more than an ΔE of three (3), meet the visual approval by appropriate GM engineering personnel, and maintain film integrity. After the 24 month exposure, the panels shall be exposed to 96 h of humidity per GMW14729. There shall be a minimum of 95% retention after tape adhesion testing per GMW14829 Method B, on each of the three (3) test panels. After humidity testing, conduct a final rating, a minimum of 50% gloss retention is required.

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.