



Acrylic Powder Topcoat for Parts

1 Scope

1.1 Material Description. This specification describes the requirements for an acrylic powder topcoat to be used on exterior component parts.

1.2 Symbols. Not applicable.

1.3 Applicability. Typical applications include metallic A, B and C pillars post appliques.

2 References

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

2.1 External Standards/Specifications.

ASTM D153	ASTM D1895	ASTM D3451	ASTM D7091
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2.2 GM Standards/Specifications.

GM9620M	GMW3005	GMW3059	GMW15777
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2.3 Additional References.

TMC003 Material Safety Data Sheet guidance documents (available at www.gmsupplypower.com).

3 Requirements

3.1 Submission. The submission requirements of GMW3005 must be completed prior to approval of the topcoat 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 Type A, Class 3 topcoat as described in GMW3005.

Note: Class 3 topcoat systems provide a three (3) year exterior durability in environmental testing, i.e., Florida exposure.

3.3 Physical Requirements.

3.3.1 Material.

3.3.1.1 The paint shall be in powder form.

3.3.1.2 The powder chemistry must be at least 65% acrylic.

3.3.1.3 Bake. Products that are approved to this standard have a typical bake range of 157 °C to 204 °C (315 °F to 400 °F). Time at substrate temperature typically varies from 20 minutes 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.

3.3.1.4 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 Vehicle Systems Paint Engineering and is the only acceptable document for defining cure.

3.3.1.5 Particle Size. Significant differences in particle size may affect the handling and appearance of powder coatings. Supplier shall identify particle size and distribution per ASTM D3451, Section 8.4. Electronic Counting Analysis is the preferred methodology.

3.3.1.6 Volatile Content. Although powders are nominally 100% solids at room temperature, some volatiles may emanate during the baking process. Mass percent solids and volatile content shall be determined using ASTM D3451, Section 13.

3.3.1.7 Density and Specific Gravity. Apparent density and its bulk factor shall be determined in accordance with ASTM D1895. For specific gravity determinations use ASTM D153 or with modifications described in ASTM D3451, Section 18.

3.3.1.8 Gel Time. The mean gel time of the product shall be determined in accordance with ASTM D3451, Section 14.

3.3.1.9 Quality Control. The supplier must provide a listing of quality control policies and procedures for both raw and finished materials.

3.3.1.10 Processability Testing

3.3.1.10.1 Appearance. The material must meet or exceed corporate specifications for gloss, Distinctness of Image (DOI), orange peel, and uniformity as designated in GMW15777.

3.3.1.10.2 Appearance Matrix. Production representative electrostatic powder guns shall be used. Report fluidizing air pressure, electrostatic voltage, feed and conveyance (or equivalent) air pressures, and powder flow in oz(lb)/minutes.

3.3.1.10.3 Fluidization Characteristics. Evaluate the fluidization of the powder at different fluidization air pressures, particle size distributions, and humidity levels. The fluidization system used must be production representative.

3.3.1.10.4 Flow and Sintering Characteristics. Using a gradient bar oven at target film builds, determine the time versus temperature profiles for flow and sintering properties.

3.3.1.10.5 Heat-up Rate. Supplier shall demonstrate the effect that heat-up rates will have on appearance of the final coating. Also, supplier will demonstrate whether an interrupted bake, as may occur at breaks or shift change, effects appearance attributes.

3.3.1.10.6 Gel Time/Tack Free. Determine the amount of time needed to achieve a tack-free surface when temperature is at the target bake. This may be accomplished using ASTM D3451.

3.3.1.10.7 Package Stability. To address unique characteristics of the powder's bulk handling needs, package stability with respect to heat and moisture exposure shall be established per ASTM D3451, modified as necessary to simulate shipping procedures.

3.3.1.11 Annual Color Testing. After a technology is approved to this specification, every color must be evaluated per GM9620M to determine the effects of the specific color on physical properties. Each year, every new color must also be tested to GM9620M.

3.4 Performance Requirements.

3.4.1 Physical Requirements.

3.4.1.1 Film Thickness (ASTM D7091). All durability and appearance requirements must be met within a minimum range of 51 μm to 102 μm (2 mil to 4 mil). Film build not to exceed 102 μm (4 mil) including in line reprocesses. Individual colors may have narrower ranges for optimum appearance. Individual colors may also have higher film builds than the technology minimum due to hiding or ultraviolet opacity.

3.4.1.2 Panel Preparation Procedure (GMW3005). This specification states the panels that must be prepared to qualify a product. Panels to be prepared are designated by topcoat Type A.

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 Vehicle Systems Engineering - Paint. There shall be no changes in either formulation or manufacturing processes permitted without prior notification and approval by Vehicle Systems Engineering - Paint. 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.

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.