



Solventborne Primer Component 2-Wet Topcoat System

1 Scope

This specification covers the qualification and performance requirements of 2-Wet (or 2Wet) (wet on wet paint application) solventborne primer that is applied to rigid substrates.

1.1 Material Description. These primers are high solids solventborne technologies and are components of rigid topcoat systems that are used in conjunction with 2Wet solventborne monocoat (MC) technology including 9986570 2Wet MCs. These primers are not approved as stand-alone baked coatings and to do so would require validation additional to this material specification.

1.1.1 Specified herein are material requirements per the Manufacturing Engineering (ME) Vehicle Systems Paint Materials Group. These specifications are used to verify the materials have been processed to produce a finished product of quality consistent with that proven in initial qualification testing.

1.2 Symbols. Not applicable.

1.3 Applicability. These solventborne primers are typically applied to Electro-Coat Paint Operation (ELPO) coated surfaces or appropriately primed rigid plastics. Following the primer application, an ambient flash is employed to remove excess volatiles from the primer prior to 2Wet MC application. Following MC application, the entire coating system is baked simultaneously in a single bake, as described in 3.3.4.

1.4 Remarks. Each combination of primer and MC must be tested and approved as a unique topcoat system. The individual components are not interchangeable between suppliers unless otherwise tested and approved. In addition, the topcoat system must meet qualifications set forth in this specification and those shown on engineering drawings. Validation testing for plant-specific layering, ancillary materials and processing must be conducted before release.

2 References

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

2.1 External Standards/Specifications.

ASTM D1186 IATF 16949

2.2 GM Standards/Specifications.

9986570	GMW3059	GMW15545	GMW17405
GMW3005	GMW14270	GMW15777	GMW17434

2.3 Additional References. None.

3 Requirements

3.1 Individual material sources may differ in their physical or chemical properties. Upon submission, all material properties, system performance, and system processing properties shall meet the performance specifications as outlined by the responsible engineer. The percent volume non-volatiles for each primer color must not exceed $\pm 1.5\%$ of the established baseline. The percent volume non-volatile data will be acquired from the Certificate of Analysis (COA) per GMW17405. Film build target and range baseline for a given primer color are established during the qualification process. Volume non-volatile and film build baseline properties shall form the basis of all subsequent lots. Deviation from these established baseline properties must be approved by the appropriate GM engineer.

3.2 Requirements on Test Specimens. Material submitted for qualification to this specification, as a topcoat system (Primer plus MC) must meet all the material, performance and processing requirements of GMW3005,

Type A and/or B, Class 2. In addition, this topcoat system must meet the requirements those set forth in this specification, and on the engineering drawings.

3.3 Processing Requirements. Primers covered under this specification are intended to be applied wet on wet under the MC layer. Processing or material requirement differences are specified as follows.

3.3.1 Booth Conditions. Booth humidity level during application is to be controlled. A nominal operating range of $65\% \pm 5\%$ Relative Humidity (RH) at $24\text{ }^{\circ}\text{C} \pm 3\text{ }^{\circ}\text{C}$ ($75\text{ }^{\circ}\text{F} \pm 5\text{ }^{\circ}\text{F}$) defines a humidity ratio range of 0.012 ± 0.0005 per pound of moisture per pound of dry air. Supplier shall establish the optimum booth conditions and humidity ratio tolerance level required to maintain consistent appearance without formulation adjustments.

3.3.2 2Wet Primer Application. The primer is typically applied to the vehicle exterior in one-coat application. Where interior application is required, determination of flash time limitations between interior and exterior coats and appropriate sequence of operations must be demonstrated.

3.3.3 Ambient Flash before Exterior MC application. Typical ambient flash times from exterior primer application to exterior topcoat application ranges from 5 minutes to 9 minutes. Supplier shall demonstrate the influence of environmental conditions and flash time robustness to achieve required wet applied solids levels for consistent appearance and to prevent defects. Specific flash times and environmental conditions shall be per agreement with the responsible approving materials engineer.

3.3.4 Bake. Following subsequent application of MC, the primer shall be co-baked as a 2Wet topcoat paint system. A target bake must be identified by the supplier such that the topcoat meets all appearance and performance criteria over a minimum range of film build, time and temperature (basic box). The size of the box and the upper/lower limit temperature variance from target will be dictated by the type of technology. The requirements to define the lower limit (LL) and upper limit (UL) temperatures are defined in GMW3005. All deviations from this minimum performance window must be discussed with the responsible engineer prior to test initiation.

3.3.5 Oven Ramp. Targeted oven ramp for the integrated topcoat system is nominally a 15 minute ramp to target temp with exterior surface temperatures targeted to include ramp rates and a plateau. This aspect should be agreed with the approving GM engineer.

3.4 Chemical Requirements.

3.4.1 Solids Level. This product typically has an applied Volume Solids of $> 48\%$, however this may be agreed otherwise by the approving GM engineer during the final technology submission.

3.5 Physical Requirements.

3.5.1 Film Thickness (ASTM D1186). The coating must meet all specified appearance and durability requirements within the film build ranges as in Table 1, unless agreed otherwise by the approving GM engineer. The actual acceptable range for a color or specific pigmentation will be dictated by appearance and hiding capability established during the workability phase of annual color testing (GMW17434).

Table 1: Film Thickness Range (Target)

Coating	Primary Durability/ Appearance (Zones A, B, C) Note 1	Secondary Durability/ Appearance (Zones D, E) Note 1
Primer (Color Dependent)	25 μm to 45 μm (35 μm average)	May not be required for all colors. If required to meet specific color needs, 20 μm to 40 μm (30 μm average)

Note 1: Appearance zones are specified in GMW15777. Exception: Film builds on specific carlines must be reevaluated for durability.

3.5.2 Minimum Film Build. To ensure sufficient film continuity, minimum technology film build of any primer color shall not be $< 25\text{ }\mu\text{m}$, unless agreed otherwise by the approving GM engineer during the technology submission phase.

3.6 Ultraviolet Transmission Through Cured Paint Film (GMW15545). For exterior primers, samples must be prepared with primer alone at minimum film build and target bake and tested per GMW15545. Lower limit of film build for durability is $25\text{ }\mu\text{m}$ for liquid solventborne primer.