



PAINT, POWDERED, THERMOSETTING POLYESTER

WSS-M70J5-B

1. SCOPE

The material defined within this specification is for an exterior thermosetting polyester powder coating applied to metal parts. The powder coating shall provide good initial appearance with adequate durability and corrosion resistance.

2. APPLICATION

This specification was released originally as a polyester powder topcoat finish on exterior parts providing excellent corrosion resistance with specified color and gloss. It is intended for electrostatic spray or fluidized bed application over such substrates as cold rolled steel, galvanized, zinc die cast, aluminum and stainless steel parts.

3. REQUIREMENTS

After a technology is approved to this specification, every color must be evaluated to determine the effects of specific color or physical properties and must comply with the Exterior Parts Painter Approval Process per AVP-T113-015 **(North American Production only)**.

All painted parts must meet the performance requirements of WSS-M2P180-A1 and appropriate Subsystems Design Specification. Only exceptions or requirements specific to this type of material are noted herein.

3.1 STANDARD REQUIREMENTS FOR PRODUCTION MATERIALS

Material Suppliers and part producers must conform to the Company's Standard For Production Materials (WSS-M99P1111-A).

3.2 COMPOSITION

3.2.1 Resin

Powder coatings must be Thermosetting Polyesters or equivalent. Each will be appropriately fortified or used in conjunction with a primer-surfacer and/or clearcoat, the resulting paint system to meet the durability requirements of 5 years.

3.2.2 Pigment/Metal Flake

Pigments and metal flake components are exterior quality automotive grade selected to meet appearance and durability requirements.

3.2.3 Toxicity

In addition to MSDS reports, all suppliers of powder must provide a toxicological study to the Industrial Hygiene Department of Ford Motor Company for evaluation of any potential health hazards associated with the use of their product.

Date	Action	Revisions
2004 09 30	Activated	





3.3 MATERIAL PROPERTIES

3.3.1 Particle Size and Distribution, target (ASTM D 5861)

Significant differences in particle size may affect handling and the appearance of powder coatings. Supplier shall submit particle size and distribution, and equipment used from the original control plan to maintain color.

3.3.2 Specific Gravity (ASTM D 5965, Method A or B)

Identified by supplier
on initial submission
+/- 0.05 maximum.

3.3.3 Gel Time (ASTM D 4217-02 @ 204 °C)

Identified by supplier
on initial submission
+/- 2 s.

3.3.4 Storage Stability, 8 weeks

No caking or change
in application or other
properties.

To an 8 ounce glass jar, fill to 2/3 capacity with the powder under test, and seal with a lid.

Carefully place a floating cover and a 100 gram weight on the surface of the powder before sealing the container.

Place the container into a 40 °C water bath noting the time and date. Immerse the container only to the level of the powder inside.

At one-week intervals, the container is removed from the water bath, blotted dry, and allowed to cool to room temperature.

To evaluate physical stability, gently rotate the container and note the free flowing nature of the powder. If the powder is not free flowing or contains lumps, the lid is removed and the powder probed with a small spatula to determine the degree of compaction or sintering. The test is ended when the powder is not free flowing or agglomerates may not be easily broken.

To determine chemical stability, evaluate gel time, inclined plate flow, and / or cured film properties and compare to initial values. The test is ended when any property has become unacceptable.

3.4 PROCESSABILITY

Pertinent sections of this specification must be performed.

3.4.1 Processing 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) / min.



3.4.2 Fluidization Characteristics

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

3.4.3 Inclined Flow Test (ASTM D 4242)

Determine the time versus temperature profiles for flow and sintering properties as mutually agreed on between supplier and affected Materials Engineering Office.

3.4.4 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, affects appearance attributes.

3.5 PREPARATION OF TEST PANELS

Substrate: Current production phosphated cold rolled steel or galvanized steel, zinc die-cast or AA 3003, H-14 aluminum. Record all information. Substrate approvals will be documented in the Approved Source List.

Electrocoat: Current production cathodic electrocoat applied at 20 – 23 microns, baked 10 minutes at 182 °C metal temperature (MT). Record electrocoat and oven type used.

Primer: If required, primer surfacer applied at 51 – 76 microns, and baked 10 minutes at 149 °C MT. Record primer and oven type used, baked.

Powder Coat: Apply powder topcoat at 51 microns or the optimal performance thickness as recommended by the supplier and bake to parameters defined in Para. 3.6. Record the powder coat material and application (whether a basecoat or clearcoat) and oven type used.

Clearcoat: If required, apply wet clearcoat to 51 – 102 microns, baked per clearcoat material specification. Record clearcoat and oven type used.

3.6 PROCESS WINDOW DEFINITION – NEW PAINT TECHNOLOGIES ONLY

The supplier shall perform a Design of Experiments (DOE) (Response Surface Analysis is recommended) to determine the process window of the control and candidate materials. Variables included in the design are bake time, bake temperature and film thickness and particle size distribution. An initial screening experiment should be conducted to determine what levels should be tested for the variables / parameters. This screening experiment should be reviewed with the materials engineer to set up the final DOE. Responses to the DOE will be based on the materials tested and will be chosen from the tests listed within the specification. Minimal critical testing required: Initial UV Transmittance at various film thickness, initial Cross Hatch Adhesion, Thermal Shock, Condensing Humidity, Chemical Resistance and Stone Chip (SAE J400 and Erichsen). The materials engineer will use this information to determine acceptable plant processing conditions. See also Para 4.2.