



PERFORMANCE, PHOSPHATE COATING, ZINC

WSS-M3P1-E1

1. SCOPE

This specification defines the performance requirements of a zinc phosphate coating on automotive parts which are subsequently painted.

2. APPLICATION

This specification was released originally for phosphate coatings used for iron, steel, zinc or zinc alloy coated steel or zinc parts where maximum paint adhesion and corrosion resistance are required. It is to be used for aluminum only when processed concurrently with steel parts. The coating provides a clean grease-free surface for painting, improves adhesion of the paint film and inhibits spread of corrosion when the paint film is broken.

3. REQUIREMENTS

3.1 APPROVED SOURCES

This specification is performance based and does not have approved sources.

3.2 MASS SPECTROSCOPY

Ford Motor Company, at its option, may conduct mass spectroscopy and/or other analysis of material/parts supplied to this specification. The analyses established for initial approval shall constitute the reference standard and shall be kept on file at the designated material laboratory. All samples shall produce the same analyses that correspond to the reference standard when tested under the same conditions.

3.3 PHYSICAL PROPERTIES

3.3.1 Coating Weight (FLTM AQ 101-01 or FLTM AQ 101-02)

The coating weight as defined below must only be used with the materials described.

Note: When phosphate solutions with high Nickel or Manganese contents are in use, the chromic acid test (FLTM AQ 101-01) should be used.

3.3.1.1 Coating Weights-Dip Systems with Conditioner Spec WSS-M3B74-A

Cold Rolled Steel	1.3 - 3.8 g/m ²
Zinc coated Steel	1.6 - 4.3 g/m ²
Galvannealed Steel	2.5 - 6.0 g/m ²
Aluminum	1.6 - 4.5 g/m ²

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Documents

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3.3.1.2 Coating Weights-Dip Systems with Conditioner Spec WSS-M3B81-A

Cold Rolled Steel	1.3 - 3.8 g/m ²
Zinc coated Steel	1.4 - 4.3 g/m ²
Galvannealed Steel	2.0 - 5.5 g/m ²
Aluminum	1.0 - 3.2 g/m ²

3.2.1.3 Coating Weights for Spray Systems

Cold Rolled Steel	1.3 - 3.8 g/m ²
Hot Rolled Steel	1.5 - 3.0 g/m ²
Zinc coated Steel	1.6 - 4.0 g/m ²
Galvannealed Steel	2.5 - 6.4 g/m ²
Aluminum	1.3 - 3.5 g/m ²

3.3.2 Crystal Size

Measurements conducted at 1000 magnification in a scanning electron microscope.

3.3.2.1 Crystal Sizes for Dip Systems 25 microns max
(for all substrates)

3.2.2.2 Crystal Sized for Spray Systems 25 microns max
(for all substrates)

3.4 PROCESS WINDOW DEFINITION

The final testing requirements shall be defined by the responsible Materials Engineer. The supplier shall perform a Design of Experiments (DOE) (Response Surface Analysis is recommended) to determine the process window of the pretreatment process controls. At a minimum the DOE shall include the concentrations of the main bath components (such as Free Acid, Total Acid, coating deposition accelerators, etc.), pH, process time and process temperature. Additional study variables may include any other pretreatment bath key components or parameters, and the substrate cleaning conditions (fresh vs. aged alkaline cleaner bath). Appropriate screening experiments should be run to determine what variables/parameters and their levels should be tested. The results of the screening experiments should be reviewed with the responsible Materials Engineer in order to set up the final DOE. Response attributes to the DOE will be based on the materials tested, and will be chosen from tests listed within this specification. Minimal testing required: Coating Weight, Paint Adhesion (FLTM BI 106-01, Method B) before and after Water Immersion (FLTM BI 104-01), Stone Chip Resistance (SAE J400 and FLTM BI 157-06), Corrosion Resistance (L-467 and L-3190). The process window characteristics must be submitted with the initial approval package.

3.5 PREPARATION OF TEST PANELS

In order to eliminate variables in testing production parts, test shall be conducted on standard test panels prepared in accordance with Ford Engineering Material Standard WSS-M2P180-D (or current revision) and relevant precoated steel substrates in current production quality according to para 4.2. Three panels must be prepared representing nominal conditions.

3.5.1 Phosphate Coat

Process panels through complete cycle of phosphate coating system under test, including cleaning, crystal refinement, phosphating, passivation, deionized water final rise and drying.