



PERFORMANCE, ZINC PHOSPHATE AND ZIRCONIUM OXIDE, FOR ALUMINUM INTENSIVE PRODUCTION

WSS-M3P38-A

1. SCOPE

This specification defines the performance requirements for conversion coatings produced on assemblies made from steel and aluminum. The zinc phosphate coating forms on iron based substrates and zirconium oxide coating on aluminum substrates. The assemblies are subsequently painted.

2. APPLICATION

This specification was released originally for the conversion coatings produced in a process for aluminum intensive assemblies. In this process, iron, steel, and zinc or zinc alloy coated steel are coated with the zinc phosphate coating and aluminum substrates are coated in a subsequent step with a system based on zirconium oxide technologies.

2.1 LIMITATIONS

This process is intended to be used in aluminum intensive automotive applications where the aluminum content in production is approximately 30% – 70% of the total substrate mix.

3. REQUIREMENTS

The supplier shall contact the responsible Materials Engineer prior to initiating qualification testing. Material(s) technical data sheet(s), Design Matrix, Design FMEA, and all other material related processing information shall be made available for review at the same time. Process P-Diagram and plant specific Process FMEA shall be developed before the material can be introduced to a production facility. All materials approved under this specification shall meet all engineering requirements when applied under assembly plant conditions.

In some instances, a partial qualification submission will be allowed (e.g. when minor changes are made to a previously approved material). In this case, the qualification requirements will depend on the degree of changes made to the material. The test requirements shall be agreed upon between the responsible Materials Engineer and the supplier prior to testing.

3.1 STANDARD REQUIREMENTS FOR PRODUCTION MATERIALS

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

3.2 MATERIAL ANALYSIS

Ford Motor Company, as its option, may conduct analysis of materials, and representative parts/panels supplied to this specification. The analysis that may be conducted, but not limited to, material chemical analysis, coating analysis, and corrosion and mechanical resistance testing.

Any material analyses established for the initial approval shall constitute reference standards, and all samples shall produce the same analyses as the corresponding reference standards when tested under the same conditions. All the key material component ranges, and the key material manufacturing control limits must pass standard Gauge Repeatability and Reproducibility requirements.

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3.3 MATERIAL COMPATIBILITY

The supplier shall notify the appropriate Ford Materials Engineering Office if any incompatibility with other process related materials (e.g. sealers, adhesives, electrocoat, etc.) is anticipated. The supplier shall keep abreast of changes in technology of the process related materials which may affect the compatibility and performance of the pretreatment products. Consequently, the appropriate material compatibility testing shall be done to ensure the process will deliver required performance.

3.4 PHYSICAL PROPERTIES

3.4.1 Zinc Phosphate Coating Weight (FLTM AQ 101-01, FLTM AQ 101-03)

Note: The zinc phosphate coating weight ranges as defined below only apply to the described materials.

3.4.1.1 Zinc Phosphate Coating Weight – Dip System

Cold Rolled Steel	1.3 – 3.8 g/m ²
Electro Galvanized Steel	1.6 – 4.3 g/m ²
Hot Dip Galvanized Steel	1.6 – 4.3 g/m ²
Galvannealed Steel	2.5 – 6.0 g/m ²
Aluminum*	≤ 1.0 g/m ²

3.4.1.2 Zinc Phosphate Coating Weight – Spray System

Cold Rolled Steel	1.3 – 3.8 g/m ²
Electro Galvanized Steel	1.6 – 4.0 g/m ²
Hot Dip Galvanized Steel	1.6 – 4.0 g/m ²
Galvannealed Steel	2.5 – 6.4 g/m ²
Aluminum*	≤ 1.0 g/m ²

* The zinc phosphate coating on aluminum can range from no zinc phosphate coating to light, open, uniform coating.

3.4.2 Zinc Phosphate Crystal Size (SEM analysis at 1000X magnification, for all substrates)

≤ 25 μm

3.4.3 Zirconium Coating Weight (XRF Analysis, other analytical method approved by the responsible Materials Engineer)

Aluminum	10 – 100 mg/m ²
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Note: The supplier is responsible for setting up an appropriate analytical method for measuring the zirconium coating weight. The coating weight measurement method shall be reviewed with the responsible Materials Engineer, and must pass standard Gauge Repeatability and Reproducibility requirements.

3.5 PREPARATION OF TEST PANELS

Testing shall be conducted on standard test panels representing the current production substrates, and current mill oils and lubricants. Test panels shall be prepared according to the exterior performance specification WSS-M2P180.