

**MERITOR®**2135 West Maple Road  
Troy, MI 48084-7121

# Process Specification

Specification: 575

Revision Date: 08/08/2013

Revision Level: E

## MANGANESE PHOSPHATE SURFACE TREATMENT

### 1.0 SCOPE

This specification defines the process and performance characteristics of a manganese phosphate surface treatment on ferrous components to reduce wear and prevent galling of moving parts. The plant metallurgist or requester shall define the significant surface requiring the phosphate coating. The control points for Precision Forged Differential Pinions, Side Gears and Output Gears shall be defined at the machined surfaces (Definition of machined surface: bore & thrust face.) **Note: This coating will add an apparent increase to the final dimensions, usually in the range of 0.0001" to 0.0004" on the diameter.**

### 2.0 ENVIRONMENTAL

The material must meet the EPA (Environmental Protection Agency) requirements for the specific area in which it is being used. Lead, cadmium, hexavalent chromates, or vinyl chloride resins are not allowed in the material formulation.

### 3.0 METHOD OF APPLICATION

Application is to be done per chemical manufacturer's recommendations by dipping or spraying. All process parameters including temperatures, chemical concentrations, and contaminants should be followed per chemical manufacturer's recommendations. The parts should be processed continuously through all process steps without allowing the parts to dry in between stages. The process must be a minimum of 4 stages, but a minimum of 7 stages is recommended. The minimum 4 stage process is:

#### 1. Surface Preparation

Clean in accordance with the procedures for the specific product being used. The metal surface should be free from oxides, dirt, oil, and contaminants prior to phosphating.

#### 2. Rinse

#### 3. Phosphate

Phosphatize per chemical manufacturer's instructions.

#### 4. Rinse and/or seal

### 4.0 PHOSPHATE PROPERTIES

The phosphate coating shall be smooth and uniform on the defined significant surface. A minimum manganese phosphate coating weight of 11 g/m<sup>2</sup> (1022 mg/ft<sup>2</sup>) is required. **An optional suffix letter is available, as described below, for subsequent treatment depending on the application, but must be specified on the drawing (i.e. 575-A). If no suffix letter is specified on the applicable engineering drawing, no subsequent treatment shall be applied.** Note: Engineering drawings issued prior to 9/14/76 will not refer to suffix letters. No smut or corrosion products are allowed on finished parts. Any other by-products from processing that interferes with the functionality of the part must be eliminated.

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**Suffix A:** After final rinsing these parts shall be dipped in an aqueous dispersion consisting of 2% Aquadag (Acheson Industries) and 25% by volume of Material Specification P-30 rust preventive and then allowed to dry.

**Suffix D:** Process per MIL-DTL-16232G (2000); Type M, Class 1 specification. A minimum manganese-iron phosphate coating weight of 3000 mg/ft<sup>2</sup> is required. A supplemental coating meeting specification JDM G28 (Nox-rust X-140 or equivalent) must be applied.

## 5.0 **CONTROL POINTS OF BATH OPERATION**

The parameters listed below shall be monitored and maintained in accordance with the recommendations of the chemical supplier. Dated records shall be maintained for the control points of each process stage (temperature, pH, total acid, etc.) and all additions made to the solutions.

### 5.1 **Normal Operating Conditions**

Total Acid Value, ml	12 ± 1
Free Acid Value, ml	1.0 - 2.0
Ferrous Iron, ml	2.0 - 4.0*
Temperature, °F (°C)	200 - 210 (93 - 99)
Immersion Time, minutes	10 - 20

\* Normally, the most uniform results are obtained when the ferrous iron concentration is held between 2.0 and 4.0 titration points (ml) but good coating weights can be obtained at higher or lower concentrations. The widest limits that will produce acceptable coatings should be established for each line by production trials.

## 6.0 **QUALITY REQUIREMENTS**

All process control tests shall be conducted every four hours of production or as approved by Meritor. Coating weights must be verified for every 4 hours of production on 3 test panels or as approved by Meritor.

## 7.0 **PPAP & MATERIAL APPROVAL.**

All process and materials must be approved by the Meritor Materials Engineering per Meritor Material Specification P-2.

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Date	Change
08/08/2013 Level E Request 33002-7	Reformatted and Updated Header/Footer. Updated all Test methods with current date and revision level. Removed Suffix B & Suffix C as the chemicals associated with them are no longer available. Added Sections for Environmental Requirements, Quality Requirements, and Process Approval. Added "The metal surface should be free from oxides, dirt, oil, and contaminants prior to phosphating" under surface preparation.
02/15/2003 Level D Request 22961-1	Add definition of precision formed gear surface control points to scope.
06/15/2001 Level C Request 21206-84	Process specifications 575-A, 575-B, 575-C, and 575-D were withdrawn from PDM Matrix and are superseded by process specification 575. <b>Note:</b> The suffixes are still available for use on drawings as part of P.S. 575 but can no longer be called out as individual specifications in Matrix.
06/16/2000 Level B Request 20148-1	Corrected unit error in 3.0, 3 <sup>rd</sup> line, was 11 mg/m <sup>2</sup> . Editorial changes.
08/01/1997 Level A	Major format revision. Deleted ASTM E-112 crystal testing; was examine crystal size and geometry at 100X per ASTM E-112

Approved By: S. Doyle  
Director - Materials Engineering