

NOT MEASUREMENT  
SENSITIVE

DOD-P-16232F  
INTERIM AMENDMENT 1(AR)  
9 SEPTEMBER 1992

MILITARY SPECIFICATION  
PHOSPHATE COATINGS, HEAVY, MANGANESE OR ZINC BASE  
(FOR FERROUS METALS)

This interim amendment is approved for use within the U.S. Army Armament, Munitions and Chemical Command, with DOD-P-16232F, dated 7 November 1978.

Page 2

1.2, Type Z Class 2: Change MIL-C-16173 Grade 1 to MIL-C-16173 Grade 3.

Page 3

2.2, Add the following to the listing of ASTMs:

ASTM F 519

Mechanical Hydrogen Embrittlement Testing of  
Plating Processes and Aircraft Maintenance  
Chemicals, Method For

Page 3 & 4

3.1, Last Line on page 3, first line on page 4: Replace "in writing . . . production" with the following, " . . . in writing within 45 days after contract award to the procuring activity (PCO) and written approval from the procuring activity will be received in 45 days or prior to production."

Page 4

3.2, Line 3: Between the words "the" and "coating", add the words "cleaning and".

3.2.1 F: Rewrite entire paragraph as follows:

"f. Control of the chemical content of the phosphate coating solutions shall consist of determination of free acid, total acid and ferrous iron. Unless otherwise specified (see 6.2), the frequency of testing for free acid, total acid and ferrous iron shall be made prior to processing each lot or every two (2) hours, which ever is less frequent. High production rates may require more frequent analysis to assure process control within the established limits."

Page 5

3.2.2, Rewrite entire paragraph as follows:

"3.2.2 Degreasing. Degreasing shall be performed by solvent, vapor, alkaline or emulsion cleaning. When alkaline or emulsion cleaning is used, thorough rinsing and drying shall be performed prior to abrasive blasting."

AMSC N/A

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FSC MFFP

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Page 6

Renumber the following paragraphs:

<u>FROM</u>	<u>TO</u>
3.2.3	3.2.4
3.2.4	3.2.5
3.2.5	3.2.6

Remove from each of the above paragraphs the word "stage" and the number associated with it from the title.

Add the following paragraphs:

"3.2.3 Abrasive blasting. Abrasive blasting shall be used prior to heavy phosphating unless otherwise specified on the drawing or in the contract. Rust or scale shall be removed by dry, abrasive blasting using sand, steel grit, aluminum oxide, glass bead, plastic bead or other ceramic type abrasives under the following conditions:

- a. Parts shall be free of oil, grease, dirt and other contamination prior to abrasive blasting.
- b. Vibratory deburring shall not be used in lieu of abrasive blasting.
- c. After blasting, abrasive residues shall be removed by a blast of dry compressed air.
- d. Abrasive blasting shall be controlled and performed using a mesh size sufficiently fine to preserve the required RMS finish when specified per 6.2.1.s.
- e. The phosphating operation shall follow abrasive blasting with no intervening processes.

3.2.3.1 Alternatives to abrasive blasting. When method II, III, IV, V or VI of TT-C-490, or a combination thereof, are specified on the drawing or in the contract prior to phosphating, cleaning operations shall be followed by thorough rinsing in clean water. Strong acids or alkaline solutions shall not be used prior to phosphating without subsequent surface conditioning to refine the crystal structure and remove the effects of such solutions on the surface reactivity and the phosphate coating process (ss 6.5). Alternate cleaning methods may be used, when specified, provided they do not adversely affect coating weight, salt spray or hydrogen embrittlement properties."

3 2.4.d, line 2: Delete the words "of Stage 4"

3.2.5.d, line 2: Rewrite as follows: "The final rinse shall be checked at least every lot (8 hours) and shall be discarded . . ."

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Page 7

3.3, Rewrite entire paragraph as follows:

"3.3 Stress Relief. Unless otherwise specified (see 6.2), parts with a surface or through hardness of Rockwell C 39 or greater shall be given a stress relief treatment. This includes carburized, induction hardened, flame hardened, etc. treatments. Also, any part that is ground, cold formed, cold straightened, etc., that may induce residual tensile stresses after machining or heat treatment shall be given a stress relief treatment. The stress relief treatment shall consist of a heat treatment at 177 to 204 degrees C (350–400 degrees F) for a minimum of one hour for every inch of thickness but not less than one half hour for thicknesses less than one half inch."

3.4.2, Delete the words "and subject to a sustained load in service exceeding 25 per cent of the base metal yield strength."

Table 1: Delete the heat treatment option at 325 degrees F.

Page 8

3.6, Delete the 3rd sentence referring to the "Springfield immersion test."

3.7, lines 2 and 3: Delete the words "in accordance with the following."

Table II: Change "1–1/2" to "1.5" and delete the entire column for "Springfield immersion test."

Page 9

3.7.4, Line 2: Change "grade 1" to "grade 3".

3.9, Rewrite entire paragraph as follows:

"3.9 Surface texture. Unless otherwise specified, items shall comply with the finish or surface roughness requirements on the drawing prior to application of the phosphate coating. Surfaces for which the roughness characteristics can be obtained by special mechanical/chemical operations shall be so specified on the drawing or in the contract."

Page 11

4.4.2, line 3: Delete the words "same condition" and substitute "approved process control ranges".

4.4.3.2.a, line 5: Add "or other quality assurance provisions (QAP's) as specified in the technical data or contract".

4.4.3.2.c: Rewrite the entire paragraph as follows:

"c. Hydrogen embrittlement relief test. Testing to determine the adequacy of the treatment for hydrogen embrittlement relief shall be performed by the vendor or contractor at a frequency of 90–120 days to assure that the embrittlement relief treatment is adequate."

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Page 14

4.8.3: Rewrite entire paragraph as follows:

"4.8.3. Hydrogen embrittlement testing. Unless otherwise specified, testing to determine the adequacy of the hydrogen embrittlement relief treatment shall be performed in accordance with the following:

a. For parts that are surface or through hardened at Rockwell C 39 and above, cylindrical specimens in accordance with ASTM-F519, Type 1a, shall be used for the test. Phosphated specimens shall be subjected to a sustained tensile load equal to 75 percent of the ultimate notched tensile strength of the material. Loading of the specimen shall be accomplished within one hour after completing the hydrogen embrittlement relief treatment stated in the approved procedure. The steel, 4340 at Rockwell C51-54, is acceptable for worse case situations unless otherwise specified on the drawing or in the contract.

b. Unless otherwise specified (see 6.2) the specimens shall be held under the load for a minimum of 200 hours and then examined visually under 10x magnification and an illumination of 1100 lux (1x) for cracks. The production parts covered by the test period shall be rejected if any coated specimen develops any crack or breaks as a result of the test."

Pages 16-19

4.8.6.2 through and including 4.8.6.2.2: Delete.

Page 19

6.1: Rewrite entire paragraph as follows:

"6.1 Intended use. The "heavy" phosphate coatings covered by this specification are intended as a base for holding/retaining supplemental coatings which provide the major portion of the corrosion resistance. "Light" phosphate coatings used for a paint base are covered by other specifications such as TT-C-490. Heavy zinc phosphate coatings may be used when paint and supplemental oil coatings are required on various parts or assemblies."

Page 20

6.1.1.6, line 3: After "required" and before "and" add "during storage"

6.1.2.a, line 1: At the end of the line after suitable, add the word "supplementary".

6.1.2.b, lines 1, 5 and 6: Change the number "1" to "3".

6.1.2.b, second sentence: Delete the words " . . . and where a dry-to-touch film is required, indoor or outdoor, for domestic and overseas shipment, with or without cover".

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Page 22

6 2.2. Rewrite the first line as follows: "Any data, other than the procedure submission requirements specified in 3.1 of this document, required for delivery in connection with this document shall be specified on a DD Form 1423 incorporated into the contract."

Custodians:

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Preparing activity

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(Project MFFP-A448)