INCH-POUND

TT-C-490C
AMENDMENT 2
June 29 1990
SUPERSEDING
AMENDMENT 1
30 June 1987

FEDERAL SPECIFICATION

CLEANING METHODS FOR FERROUS SURFACES AND PRETREATMENTS FOR ORGANIC COATINGS

This amendment, which forms a part of Federal Specification TT-C-490C, dated March 18, 1985 is approved by the Commissioner, Federal Supply Services, General Services Administration, for the use of all Federal agencies.

PAGE 1

Paragraph 1.2.2 - delete entire paragraph and rewrite it as follows:

"1.2.2 Chemical conversion and pretreatment coatings shall be of the following types as specified below (see 6.4).

Type I - Zinc phosphate spray application (150 mg/sq ft min - 500 mg/sq ft max)

Zinc phosphate immersion or dip application (300 mg/sq ft min - 500 mg/sq ft max)

Type II - Aqueous iron phosphate (35 mg/sq ft min)

Type III - Organic pretreatment coating (wash pretreatment, unless otherwise specified)

Type IV - Non-aqueous iron phosphate (35 mg/sq ft min)
Type V - Zinc phosphate (500 mg/sq ft min)"

Add the following new paragraph:

"1.2.2.1 Method of application. New design documents, engineering drawings and ordering data shall indicate the type of coating required and method of application when applicable (see 6.17)."

PAGE 3

Paragraph 3.2 - delete paragraph and rewrite as follows:

"3.2 Preproduction approval (type I only). Unless otherwise specified by the procuring agency, details of the proposed procedure including chemicals and the equipment to be used by the contractor, shall be submitted in writing to the contracting office of the procuring agency concerned so that written approval can be granted prior to the commencement of production (see 6.5). The exact designation of any material proposed for use, together with the name of the manufacturer, shall be stated. The proposed procedure shall include a detailed method of control including limits for time, temperature, concentration and all other pertinent details. The contractor shall coat six (4 in x 6 in) panels by the proposed zinc phosphate coating procedure outlined for use in the contract. He shall test the coating weights of three of these panels and shall furnish the contracting officer a laboratory test report which confirms that the test panel coating weights are in conformance with the requirements of the contract. No deviation from the approved process shall be permitted without written approval of the procuring agency concerned through the contracting officer. Approval of the process materials and equipment implies no guarantee of acceptance of the results obtained in use (see 6.5.1.1). Any unapproved change to a government approved procedure will invalidate the procedure."

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Paragraph 3.4.5.1 - delete paragraph and rewrite as follows:

"3.4.5.1 Final rinse (type I and II only). The final rinse in types I and II processes shall be a chromic acid solution or a mixture of phosphoric and chromic acids. The material, temperature, and concentration and other process controls including recommendations for replenishment and discarding shall be designated by the supplier of the final rinse chemicals (see 4.2.5).

Paragraph 3.4.5.1.1 - delete paragraph and rewrite as follows:

3.4.5.1.1 Non-chromic final acid rinses. Proprietary final acid rinses which contain no chromate are available and permissible for use over phosphate coatings provided they meet TT C-490 requirements. These alternative rinses are permitted for use in instances where the chromate salts could harm the subsequent paint coating system being applied. These alternative final acid rinses (non-chromic) must meet the requirements of 3.5.6 and 3.5.7, the requirements specified for paint adhesion and salt spray resistance or must meet those requirements specified for the designated coating system."

Add the following new paragraph:

"3.4.5.1.2 Non-acidified, non-chromic final rinse. Proprietary formulations that are alkaline based rather than acid based cannot be used without the specific approval of the procurement agency involved."

AMENDMENT 2

PAGE 6

Paragraph 3.5.2 - delete paragraph and rewrite as follows:

"3.5.2 Phosphate coating weight (Types I, II, IV and V only) (not applicable to incidental nonferrous metal). Coating weight shall be controlled or tested as in paragraph 4.2.6. Unless otherwise specified, the coating weight shall be tested at least every four hours (see 6.18). The following coating weights are applicable."

Delete paragraphs 3.5.2.1 through 3.5.2.3 and rewrite as follows:

"3.5.2.1 Type I zinc phosphate coatings. Type I covers zinc phosphate coatings. Type I coatings can be applied by spray, dip or immersion and permit a coating weight which ranges from a minimum of 150 mg/sq ft for spray applications, to 300 mg/sq ft for immersion applications to a maximum coating weight of 500 mg/sq ft.

3.5.2.2 Type II aqueous iron phosphate coating. Type II has a minimum coating weight of 35 mg/sq ft.

3.5.2.3 Type IV non-aqueous iron phosphate coatings. Type IV non-aquenous iron phosphate requires a minimum coating weight of 35 mg/sq ft.

3.5.2.4 Type V zinc phosphate coatings. Type V zinc phosphate requires a minimum coating weight of 500 mg/sq ft."

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Paragraph 4.2.6.1 Delete paragraph title and substitute the following: "4.2.6.1 - Phosphate coating weight (types I, II, IV, and V)."

also under paragraph 4.2.6.1 - delete formula

$$g/sq\ m = \frac{(\text{Initial weight in grams - final weight in grams})}{\text{Total surface area in square inches}}$$

and replace deleted formula with the following:

$$\text{"mg/sq m} = \frac{(\text{Initial weight in milligrams - final weight in milligrams})}{\text{Total surface area in square meters}}\text{"}$$

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Paragraph 4.2.8 - delete sentence 3 and rewrite it as follows:

"A two coat paint system should be tested after drying in accordance to the applicable paint specification. For example, a two coat alkyd system should not be tested until a minimum of 72 hours drying time while an epoxy-polyurethane system will require 168 hours before testing."

PAGE 10

Paragraph 6 - add the following parenthetical note immediately below:

6. NOTES:

"(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory)."

PAGE 11

Paragraph 6.4 - change part (a) listed under ordering data from "(a) Title, number and date of this specification" to the following:

"(a) Specification identification includes title, revision letter and date of specification and existing amendment. Type of coating and applicable classification must also be specified."

Paragraph 6.5.1.1

Delete entire paragraph and change as follows:

"6.5.1.1 Army preproduction procedure approval for type I coatings. Coating procedures used in the application of type I zinc phosphate coatings must be approved prior to commencement of production. Prospective contractors are requested to furnish the following information:

a. Specification identification including revision letter and amendment if issued. Also indicate the classification for which preproduction procedure approval is requested.

b. A cover letter designating contract number, component or part number and contractor/subcontractor (Company name and Commercial and Government Entity (CAGE) code number if available) shall be furnished by the procuring activity for documentation purposes.

c. Detailed information shall be included in the proposed procedure with respect to chemicals and equipment used. The supplier's chemical product profile or technical data instructives for both make-up and the limiting/optimum operating condition shall be included for the purpose of formulation verification.

d. The title page of the detailed procedure shall indicate: company name, date of preparation/date of revision, identification code or manufacturing process number if available and the total number of pages within the procedure (Note: each page within the procedure should be numbered to reflect the total page count).

e. A preliminary process cycle shall list the necessary steps needed to carry out the phosphate coating procedure. Tank numbers shall be assigned to the processing baths so that the finishing cycle will correspond to the detailed description within the procedure.

f. Describe processing tank material, size, working capacity (volume), and chemical formulation for each bath and indicate the specific parameters used within each bath for each operation.

g. Quality control procedures shall be included which will be used for monitoring each bath used within the procedure.

h. Coating weight requirements shall be specified and quality assurance control procedures shall be specified which will assure proper control.

i. Specify hydrogen embrittlement relief procedures and the quality assurance provisions employed to alleviate embrittlement problems prior to shipment of parts.

j. The contractor/subcontractor shall prepare six phosphatized panels (see 4.2.2) using the proposed phosphate coating procedure designated for use in contract and shall indicate the test results of three representative panels (coating weights) tested in accordance with paragraph 4.2.6.1. The contractor shall forward the test results from three of these phosphatized panels to the procuring contracting office so that the coating weights obtained can be evaluated for conformance to those specified for use in the contract."

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Paragraph 6.8 - delete TABLE I. Test requirements. Replace it with the following:

TABLE I. Test requirements.

Test	TT-E-516	TT-E-485	TT-P-664
Dry film thickness, mils	0.9 - 1.1	0.9 -1.1	0.9 - 1.1
Cure (dry) - Time at 120°F	24 Hours	24 hours	24 hours
Salt Spray - Exposure Time, Hours	48	144	336
Adhesion Air drying Time, Hours	1	1	4

Paragraph 6.11 - delete sentence 3 and replace it with the following sentence:

"A pretreatment primer or coating conforming to DoD-P-15328 or MIL-C-8514 may be used for the type III organic pretreatment coating."

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Add the following paragraphs:

"6.16 Phosphate coating weights. EPA regulations are imposed by both Federal and State agencies which place a finanical burden on the contractor. Therefore, accurate alternative stripping methods may be substituted for the

chromic acid stripping solution described in paragraph 4.2.6.1 provided the same accuracy can be maintained.

6.16.1 Scanning electronic microscope. The scanning electron microscope (SEM) is often used to study zinc phosphate crystal morphology.

6.16.2 Coating weight conversions. Coating weights are given in mg/sq ft throughout this specification. However, because there may be a need to express the coating weight in mg/sq m, the following conversion factor is noted for informational purposes:

$$\text{mg/sq m} = \text{mg/sq ft} \times 10.764$$

6.17 Existing documents and/or drawings. All existing documents and/or drawings which call for pretreatment per TT-C-490, types I, IV, or V do not presently indicate the specific coating weight minimum weight requirements but future revisions should be updated to include the appropriate minimum requirement.

6.18 Coating weight test results. Quality assurance inspection tests performed in accordance with paragraph 4.2.6.1 are mandated to ensure timeliness and availability of the coating weights obtained. Records must be maintained at the phosphate application site and upon request of the acquisition activity, such records including reports of the test results shall be made available (see 3.5.2 and 4.2.6.1)."

Military custodians:
Army - MR
Navy - YD
Air Force - 11

Review interest:
Army - MI, ER, AV, AR, AT, ME, SM
Navy - AS
Air Force - 70, 82, 84, 99

User interest:
Navy - MC, SH
Air Force - 80

Preparing activity:
Army - MR

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Civil agency interest:
GSA
Coordinating activity:
GSA-FSS

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