MIL-T-12879A(MR)
21 February 1966
SUPERSEDING
See 6.4

MILITARY SPECIFICATION

TREATMENTS, CHEMICAL, PREPAINT AND CORROSION INHIBITIVE, FOR ZINC SURFACES

1. SCOPE

1.1 Scope. This specification covers prepaint and corrosion inhibitive chemical (including electrochemical) treatments for electroplated, hot-dipped, or solid zinc surfaces and zinc-base alloy cast surfaces (see 6.1).

1.2 Classification. The chemical treatments shall be of the following types and classes as specified (see 6.1):

Type I - Prepaint

Class 1 - Phosphate
Class 2 - Chromate

Type II - Final finish (chromate)

2. APPLICABLE DOCUMENTS

2.1 The following documents, of the issue in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein.

STANDARDS

FEDERAL

Fed. Test Method Std. No. 141 - Paint, Varnish, Lacquer and Related Materials; Methods of Inspection, Sampling and Testing

MILITARY

MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes

(Copies of specifications, standards, drawings, and publications required by suppliers in connection with specific procurement functions, should be obtained from the procuring activity or as directed by the contracting officer.)

FSC MFFP

3. REQUIREMENTS

3.1 Preproduction approval. When specified by the procuring agency, the contractor shall submit prior to production a description of his treatment process together with samples of treated parts. The description shall be in sufficient detail to indicate conformance with this specification.

3.2 Material. The manufacturer is given latitude in the selection of materials and methods of application except as specified herein. Each treatment, as deposited, shall be of the general class of material specified for the treatment in 1.2.

3.3 Sequence of treatment operations. Each treatment shall consist of (a) cleaning of surface, followed by (b) the chemical treatment proper, then (c) rinsing, and (d) thorough drying, as further specified below.

3.3.1 Cleaning. Surfaces to be treated shall be free of oil, grease, dirt, white corrosion products and other foreign matter. If the surfaces to be treated are already free of foreign matter, the cleaning operation may be omitted. Cleaning shall be accomplished without undue removal of zinc.

3.3.1.1 Cleaned surfaces. Cleaned surfaces, when wiped with a clean, white, lintless cloth or cleansing tissue, shall not show more than a slight amount of smut or other deposit on the wiping material.

3.3.1.2 Aqueous chemical solution method of cleaning. When cleaning is accomplished by aqueous chemical solutions, it shall include a thorough rinsing with clean water.

3.3.1.3 Activation. Following cleaning, surfaces to be treated may be activated by washing with an appropriate solution or solutions.

3.3.2 Chemical treatment. Chemical treatment shall be conducted according to instructions of the chemical supplier and shall provide a surface conforming to the requirements of this specification.

3.3.3 Rinsing. Chemical treatment shall be followed by rinsing in clean water to remove residual treatment solution.

3.3.3.1 Type I, class 1. Type I, class 1 treatment shall be further rinsed with a diluted chromic acid or chromic-phosphoric acid solution maintained at a pH between 2.0 and 6.0.

3.3.3.2 Type I, class 2 and type II. Rinse water for type I, class 2 and type II treatments shall not exceed 150°F, unless the process is specifically designed for rinsing at higher temperature.

3.3.4 Drying. Following treating and rinsing, surfaces shall be thoroughly dried without delay and before subsequent finishing or packaging. Temperature of treated surfaces and air used for drying shall not exceed 250°F for type I, class 1 treatment, and 150°F, for type I, class 2 and type II treatments, unless the process is specifically designed for drying at higher temperatures.

3.4 Properties of the treated surfaces.

3.4.1 Type I.

3.4.1.1 Coating weight. Type I, class 1 treatment shall result in deposit on the zinc surfaces of a water insoluble phosphate film weighing not less than 150 milligrams per square foot on any specimen when tested as specified in 4.4.1.

3.4.1.2 Paint adhesion. Type I treatments, when painted and tested as specified in 4.4.2 shall show no blistering, wrinkling or other evidence of loss of adhesion of the paint film in the uncored areas, or further than 1/32 inch from the score marks (see 6.1.2).

3.4.1.3 Appearance (see 6.3).

3.4.1.3.1 Type I, class 1. Type I, class 1 treated surfaces shall have the characteristic fine, crystalline grayish appearance of phosphate treatment coatings. The deposit shall be adherent and nonpowdery. Uniformity of color is not essential, but there shall be no areas without a deposit of phosphate.

3.4.1.3.2 Type I, class 2. Type I, class 2 treated surfaces shall have the depth of color characteristic of the particular treatment used. A small amount of staining and dulling will be permissible, as well as a difference in color in areas where it is not possible to obtain the characteristic color, such as at grind marks. The treatment shall not rub off when wiped with a dry cloth.

3.4.2 Type II.

3.4.2.1 Salt spray resistance. Type II treatment shall withstand the salt spray test when tested as specified in 4.4.3 without the appearance of white corrosion products visible to the unaided eye at normal reading distance on any location including at accidental scratches through the chromate film but not including at edges and dissimilar metal junctions.

3.4.2.2 Appearance (see 6.3). Appearance of type II treatment shall be as specified in 3.4.1.3.2. The treatment shall not rub off when wiped with a dry cloth. When an olive drab color, low gloss, clear bright color, or other special effect is desired for the item being treated, it shall be specified in the contract or order.

3.5 Process control. The contractor shall maintain control over factors which affect the quality of the treatment, including solution concentration, time of exposure, and temperature of application. Chemical analyses, solution replenishment, visual inspection and other process control devices shall be conducted with the frequency required to maintain good quality of the treatment and to meet the requirements of this specification. Visual inspection is intended to mean an examination during operation for such appearance factors as (a) streaking (b) dulling (type I, class 2 and type II), (c) unaffected areas, and (d) loss of color.

3.6 Mill-run phosphated zinc coated sheet steel. Where type I, class 1 treatment is applied to flat stock before fabrication of the article, the surfaces shall, after forming, bending and other manufacturing operations, be thoroughly cleaned free of oil, dirt and other foreign matter before application of the organic finish. This cleaning shall be done without recourse to alkaline or acid aqueous solutions which adversely affect the phosphate coating. Where the phosphate deposit is removed from substantially large areas by fabricating operations, the bared areas shall be touched up with a treatment conforming to type I, class 1 requirements, including rinsing and drying.

3.7 Workmanship. The chemical films covered by this specification shall be produced by suitable treatments controlled and operated to give a uniform product as specified herein.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the supplier may utilize his own facilities or any commercial laboratory acceptable to the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.2 Lot. A lot shall consist of all items with chemical treatments of the same type and class, approximately the same size, shape, and thickness, produced in the same bath, and submitted for acceptance at the same time. The lot size shall not exceed that number of items resulting from one eight-hour production.

4.3 Sampling.

4.3.1 Visual examination. Random sampling for visual examination and workmenship shall be conducted in accordance with MIL-STD-105, inspection level II, with an acceptable quality level (AQL) of 1.5 percent defective.

4.3.2 For destructive tests (coating weight, adhesion and salt spray resistance tests). For each test a random sample of two treated items shall be taken from each lot or two separately treated specimens prepared in accordance with 4.3.2.1 to represent each lot. If any item or specimen fails to meet the applicable specified requirement, the lot shall be rejected.

4.3.2.1 Separate specimens. When the treated articles are of such form as to be not readily adaptable to a test specified herein, or are for destructive tests of small lot sizes, the test shall be made by the use of separate specimens treated concurrently with the articles represented. The separate specimens shall be of a basis metal and zinc coating equivalent to that of the articles represented. "Equivalent" specimens includes chemical composition and finish of surface prior to the chemical treatment.

4.4 Tests.

4.4.1 Coating weight for type I, class 1. A measured area of dry treated surface shall be weighed on an analytical balance. The phosphate coating shall be stripped from the specimen surface using a 25 gram per liter solution (not previously used) of chromic acid (CrO_3) at 50°C and stripping to constant weight in milligrams. Following rinsing with water, then rinsing with acetone or alcohol, drying and cooling to room temperature, the specimen shall again be weighed. Coating weight shall be calculated in milligrams per square foot of treated surface. The specimen area shall be sufficient in size to result in a stripping loss of at least 10 milligrams.

4.4.2 Paint adhesion. Type I treated dry surfaces for the paint adhesion test shall be coated with the organic coating system required for the articles on which a treatment of this type has been specified (see 6.1.2). Air drying systems shall be aged one week and baked systems shall be aged 24 hours before testing. The aged organic coating shall be scored through to the metal for several inches and then half-immersed (including the scored areas) in distilled water at 73.4 ± 2°F (23 ± 1.1°C) for 24 hours. Immediately upon removal from the water, the test specimen shall be examined at unbroken areas and along the scratch marks for the presence of blisters, wrinkling, or other evidence of loss of adhesion of the paint film.

4.4.3 Salt spray resistance (for type II treatments). Treated surfaces for the salt spray test shall be aged for 24 hours prior to exposure. The test surfaces shall be suspended in salt spray for 96 hours in accordance with method 6061 of Fed. Test Method Std. No. 141. The specimens shall then be examined for the presence of white corrosion products (see 3.4.2.1).

5. PREPARATION FOR DELIVERY

5.1 This section is not applicable to this specification.

6. NOTES

6.1 Intended use. Treatments covered by this specification are intended for use on military equipment with zinc surfaces. This specification is not designed to be used for procurement of the chemicals employed in the treatments.

6.1.1 In many cases, the same solution may be designed for both type I, class 2 and type II treatments (chromate).

6.1.2 Type I. The type I treatments are intended for use prior to painting to improve paint adhesion. Determination should be made, prior to specifying any particular organic system to be used over type I treatments, that it is capable of satisfactory use on these treatments and of meeting the paint adhesion requirement specified in 3.4.1.2.

6.1.3 Type II. The type II treatment is intended as a final finish for zinc surfaces to inhibit corrosion and retard the formation of white corrosion products. The color may vary from iridescent gold or yellow to a deep bronze or olive drab, depending on the process. The darker colors usually give better corrosion protection.

6.2 Ordering data. Purchasers should exercise any desired options offered herein, and procurement documents should specify the following:

a. Title, number, and date of this specification.

b. Type and class required (see 1.2).

c. Any special color or appearance required (see 3.4.2.2). Color standards shall be furnished by the procuring activity.

d. Preproduction approval, if applicable (see 3.1).

6.3 Surface defects. Some defects in appearance may be due to faults present in the zinc surface prior to treating. See the end item specification for quality of zinc surface required.

6.4 Specification MIL-T-12879(QMC) dated 7 July 1953 was cancelled 1 March 1965. That specification was being used by several activities of the Department of the Army; therefore, this document represents a reinstatement of the previously cancelled specification.

Custodian:
Army - MR

Preparing activity:
Army - MR

Review interest:
Army - MR, MU, WC

Project No. MFFP-A007

Review/User information is current as of the date of this document; draft circulation should be based on the information in the current DODISS.

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

OMB Approval
No. 22-R255

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1. HAS ANY PART OF THE DOCUMENT CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE?

A. GIVE PARAGRAPH NUMBER AND WORDING.

B. RECOMMENDATIONS FOR CORRECTING THE DEFICIENCIES

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S/N 0102-014-1802

☆ U.S. GOVERNMENT PRINTING OFFICE 1973—714-866/3983 2-1

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POSTAGE AND FEES PAID

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE $300

Director
Army Materials and Mechanics Center
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