AEROSPACE MATERIAL SPECIFICATION

AMS2486™	REV. F

Issued 1973-05
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Revised 2024-01

Superseding AMS2486E

Conversion Coating of Titanium Alloys Fluoride-Phosphate Type

RATIONALE

AMS2486F results from a Five-Year Review and update of this specification with the addition of Ordering Information and Fixture/Electrical Contact Locations (see 3.2.1), changes to Conversion Bath (see 3.1), Cleaning (see 3.2.2), Rinsing (see 3.3.2), Handling (see 3.3.4), Coating Adhesion (see 3.4.2), Quality (see 3.5.1), Acceptance Tests (see 4.2.1), Periodic Tests (see 4.2.2), Preproduction Tests (see 4.2.3), Sampling Acceptance Tests (see 4.3.1), Periodic and Preproduction Tests (see 4.3.2), Primer Coating Adhesion Testing (see 4.3.3), Control factors (see 4.4.3), and Note (see 8.5).

NOTICE

ORDERING INFORMATION: The following information shall be provided to the processor by the purchaser:

1) Purchase order shall specify not less than the following:

- AMS2486F
- Part number to coated
- Quantity of pieces to be conversion coated
- Basis metal alloy, and/or basis metal material specification, to be conversion coated
- Optional: fixture/electrical contact locations, when not specified (see 3.2.1.2)
- Primer/organic coating and application process, if different (see 4.3.3)
- Special features, geometry, or processing present on parts that requires special attention by the processor

2) Parts manufacturing operations such as heat treating, forming, joining, and media finishing can affect the condition of the substrate and adversely affect the finished part. The sequencing of these types of operations should be specified by the cognizant engineering organization or purchaser and is not controlled by this specification.

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
Tel: +1 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: CustomerService@sae.org
SAE WEB ADDRESS: **http://www.sae.org**

For more information on this standard, visit
https://www.sae.org/standards/content/AMS2486F

1. SCOPE

1.1 Purpose

This specification establishes the requirements for a chemical conversion coating on titanium alloys.

1.2 Application

This process has been used typically to provide a coating that is receptive to anti-galling and organic finishes, but usage is not limited to such applications.

1.3 Safety - Hazardous Materials

While the materials, methods, applications, and processes described or referenced in this specification may involve the use of hazardous materials, this specification does not address the hazards that may be involved in such use. It is the sole responsibility of the user to ensure familiarity with the safe and proper use of any hazardous materials and to take necessary precautionary measures to ensure the health and safety of all personnel involved.

2. APPLICABLE DOCUMENTS

The issue of the following documents in effect on the date of the purchase order forms a part of this specification to the extent specified herein. The supplier may work to a subsequent revision of a document unless a specific document issue is specified. When the referenced document has been cancelled and no superseding document has been specified, the last published issue of that document shall apply.

2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

ARP4992 Periodic Test for Processing Solutions

AS7766 Terms Used in Aerospace Metals Specifications

2.2 U.S. Government Publications

Copies of these documents are available online at https://quicksearch.dla.mil.

MIL-PRF-23377 Primer Coatings: Epoxy, High-Solids

MIL-PRF-85582 Primer Coatings: Epoxy, Waterborne

FED-STD-141 Paint, Varnish, Lacquer, and Related Materials: Methods of Inspection, Sampling and Testing

2.3 Terms used in AMS are defined in AS7766.

3. TECHNICAL REQUIREMENTS

3.1 Conversion bath shall consist of an aqueous solution of the following materials technical grade or purer, in the concentrations shown and shall be operated at 80 °F ± 10 °F (27 °C ± 6 °C). Alternative solutions may be used when approved by the cognizant engineering organization.

Trisodium Phosphate ($Na_3P0_4 \cdot 12H_20$), 6.5 to 6.9 ounces per gallon (48.7 to 51.6 g/L).

Potassium Fluoride ($KF \cdot 2H_20$), 2.3 to 3.2 ounces per gallon (17.2 to 24.0 g/L).

Hydrofluoric Acid, (HF), 1.6 to 2.8 ounces per gallon (12.0 – 21.0 g/L).

3.1.1 Makeup and replenishment water shall have a minimum resistivity of 50000 ohm-cm (a maximum conductivity of 20 µS/cm.)

3.2 Preparation

3.2.1 Fixture/Electrical Contact Locations

Tight fixture/electrical contact shall be maintained during the conversion coating process in order to prevent damage or contact arcing (burning) of parts, but small irregularities of coating at points of fixture/electrical contact are acceptable.

3.2.1.1 For parts that are to be coated all over, and contact locations are not specified, contact locations shall be at the discretion of the processor.

3.2.1.2 For parts that are not to be coating all over, and contact locations are not specified, locations shall be in areas on which coating is not required.

3.2.2 Cleaning

The coating shall be applied over a surface free from water breaks. The cleaning and etch activation if used (see 8.5) procedure shall not produce pitting or intergranular attack of the basis metal and shall preserve dimensional requirements. The use of halogenated solvents is prohibited.

3.2.3 Masking

A suitable maskant shall be applied to any area or areas where (1) application of the coating is not permitted (see 8.5), (2) solution entrapment may occur such as a faying surface, or (3) another metal, such as a thread insert, is present.

3.3 Procedure

3.3.1 Coating

Parts shall be immersed in the conversion bath for 2 to 4 minutes.

3.3.2 Rinsing

Final rinsing of coated parts shall be in a circulating water bath, maintained at a temperature not higher than 185 °F (85 °C). Rinse time shall be no longer than 16 minutes when rinse water temperature is above 100 °F (38 °C).

3.3.2.1 Dissolved solids content of the final circulating rinse water shall be maintained below 200 parts per million or a minimum 2500 ohms-cm resistivity (a maximum conductivity of 400 µS/cm.)

3.3.3 Drying

Parts shall be dried for not less than 30 minutes in air at 150 to 200 °F (66 to 93 °C).

3.3.4 Handling

Cleaned, coated parts shall be handled with clean, powder free, silicone free, dry gloves.

3.4 Properties

Coating shall conform to the following requirements:

3.4.1 Color

The coating shall be gray in color but some variation in color is acceptable.

3.4.2 Coating Adhesion

Coating shall be adherent to basis metal when parts are wiped with a clean, cotton or synthetic wipe. Heavy powdering or coating removal during wiping is not acceptable.

3.4.3 Primer Coating Adhesion

Primer coating applied to test panels and tested in accordance with 4.3.3 shall not be removed more than 1/16 inch (1.6 mm) from the scribed lines.

3.4.4 Water Spotting

Random staining, due to water spotting, that does not exceed 5% of the coated area, is acceptable.

3.5 Quality

Coating shall be uniform in quality and coverage, free from pits, and from imperfections detrimental to usage of the coating.

3.5.1 Water spotting (see 3.4.4) and differences in the coating appearance, between cast and machined surfaces, between welds and adjacent areas, due to grain size or grain flow variations, or due to variation in alloy composition from part to part and lot to lot, are acceptable.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for Inspection

The processor of coated parts shall supply all samples for the processor's tests and shall be responsible for the performance of all required tests. The cognizant engineering organization reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that processing conforms to specified requirements.

4.2 Classification of Tests

4.2.1 Acceptance Tests

Color (see 3.4.1), coating adhesion (see 3.4.2), water spotting (see 3.4.4), and quality (see 3.5) are acceptance tests and shall be performed on parts, or samples representing parts when permitted, from each lot.

4.2.2 Periodic Tests

Primer coating adhesion (see 3.4.1) is a periodic test and shall be performed monthly unless frequency of testing is specified by the cognizant engineering organization. Tests of cleaning and processing solutions are periodic tests and shall be performed at a frequency selected by the processor unless frequency of testing is specified by the cognizant engineering organization (see.4.4.3 and 8.4).

4.2.2.1 Periodic testing may be suspended in any test period when parts are not processed; however, preproduction testing may be required by the cognizant quality organization upon resumption of processing.

4.2.3 Preproduction Tests

All property verification tests (see 3.4) are preproduction tests and shall be performed prior to or on the initial shipment of processed parts to a purchaser and when the cognizant engineering or quality organization deems confirmatory testing to be required.

4.3 Sampling for Testing

4.3.1 Acceptance Tests

Acceptance test samples shall be randomly selected from all parts in the lot. A lot is a group of parts, all of the same part number, processed through the same chemical solutions in the same tanks under the same conditions, which have completed the chemical processing within a period of 24 hours of each other, and are presented to inspection at the same time. Unless the cognizant engineering organization provides a sampling plan, the minimum number of samples shall be as shown in Table 1.

Table 1 - Sampling for acceptance tests

Number of Parts in Lot	Visual for Water Spotting, Color, and Quality	Coating Adhesion
1 to 7	all	all
8 to 15	7	3
16 to 40	10	4
41 to 150	15	5
151 to 300	25	6
301 to 500	35	7
Over 500	50	8

4.3.2 Periodic and Preproduction Tests

Test specimen configuration and sample quantity shall be at the discretion of the processor, unless otherwise specified by the cognizant engineering organization.

4.3.3 Primer Coating Adhesion Testing

Adhesion testing shall be in accordance with FED-STD-141, Method 6301.3 modified as follows: 6AL-4V titanium panels shall be cleaned in accordance with 3.2.2 and coated in accordance with 3.3; one coat of MIL-PRF-23377 or MIL-PRF-85582 epoxy primer to a dry film thickness of 0.0006 to 0.0009 inch (15 to 23 µm) shall be applied to the panels and fully cured in accordance with the manufacturer's instructions; alternative primer and thickness are allowed when specified or approved by the cognizant engineering organization; the panels shall be immersed in reagent water at 77 °F ± 5 °F for 24 hours ± 1 hour; within 10 minutes of removal from the water, the panels shall be wiped dry, scribed with two parallel lines 1 inch apart (nominal), and an "x" scribed between (and connecting the ends of) the parallel lines; tape specified in FED-STD-141, Method 6301.3, or an equivalent tape acceptable to the cognizant engineering organization, shall be applied to scribed lines, pressed firmly, and quickly pulled from the coating.

4.4 Approval

4.4.1 The process and control factors, a preproduction sample coated part, or both, whichever is specified, shall be approved by the cognizant engineering organization before production parts are supplied.

4.4.2 If the processor makes a significant change to any material, process, or control factor from that which was used for process approval, all preproduction tests shall be performed, and the results submitted to the cognizant engineering organization for process reapproval unless the change is approved by the cognizant engineering organization. A significant change is one that, in the judgment of the cognizant engineering organization, could affect the properties or performance of the part.