SAE The Engineering Society For Advancing Mobility Land Sea Air and Space®
INTERNATIONAL
400 Commonwealth Drive, Warrendale, PA 15096-0001

AEROSPACE MATERIAL SPECIFICATION

SAE AMS 2482B

Issued APR 1989
Revised MAR 2000

Superseding AMS 2482A

(R) Hard Coating Treatment of Aluminum Alloys Teflon-Impregnated or Codeposited

1. SCOPE:

1.1 Form:

This specification establishes the engineering requirements for producing a hard, teflon-impregnated or codeposited teflon-aluminum oxide coating on aluminum alloys and the properties of such coating.

1.2 Application:

This process has been used typically to increase, by the formation of a dense, teflon-impregnated aluminum oxide or codeposited teflon-aluminum oxide layer, surface hardness and resistance to abrasion and corrosion of aluminum alloy parts containing, in general, less than 5% copper or 8% silicon or a total of 8% of both. Alloys with higher silicon content alone can be coated satisfactorily with proper precautions in processing. Careful consideration should be given to the use of this process on highly-stressed parts because of the resultant marked lowering of fatigue performance, and on parts with sharp corners and edges where chipping may result.

1.3 Classification:

The processes covered by this specification are classified as follows:

Type 1 - Teflon-impregnated aluminum oxide
Type 2 - Codeposited teflon and aluminum oxide

1.3.1 If a specific type is not specified, type 1 shall be supplied.

1.4 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 which 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.

QUESTIONS REGARDING THIS DOCUMENT: (724) 772-7161 FAX: (724) 776-0243
TO PLACE A DOCUMENT ORDER: (724) 776-4970 FAX: (724) 776-0790
SAE WEB ADDRESS: http://www.sae.org

2. APPLICABLE DOCUMENTS:

The issue of the following documents in effect on the date of the purchase order form 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 ASTM Publications:

Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

ASTM B 117	Operating Salt Spray (Fog) Testing Apparatus
ASTM B 244	Measurement of Thickness of Anodic Coatings on Aluminum and of Other Nonconductive Coatings on Nonmagnetic Basis Metals with Eddy-Current Instruments
ASTM B 487	Measurement of Metal and Oxide Coating Thicknesses by Microscopical Examination of a Cross Section
ASTM D 1193	Reagent Water
ASTM D 1894	Static and Kinetic Coefficients of Friction of Plastic Film and Sheeting
ASTM D 4060	Abrasion Resistance of Organic Coatings by the Taber Abraser

3. TECHNICAL REQUIREMENTS:

3.1 Preparation:

3.1.1 Parts, prior to being coated, shall have clean surfaces, free from water-breaks.

3.1.2 When not otherwise specified by the purchaser, the location of electrical contact points shall be as follows (not applicable to barrel coating).

3.1.2.1 For parts which are to be coated all over, locations shall be acceptable to purchaser.

3.1.2.2 For parts which are not to be coated all over, locations shall be in areas on which plating is not required or is optional.

3.2 Procedure:

Consists of the formation of aluminum oxide, codeposited or impregnated with teflon, on surfaces of parts made the anode in a suitable electrolyte. After coating, parts shall be thoroughly rinsed in cold, clean water and dried.

3.3 Properties:

Coating on parts shall conform to the following requirements:

3.3.1 Thickness: AMS 2482 designates finished coating thickness of 0.002 inch ± 0.005 (51 µm ± 13). Other coating thicknesses may be specified by this specification number and a suffix number designating the nominal thickness in thousandths of an inch (25 µm). A tolerance of ±0.0005 inch (±13 µm) in thickness of coating will be allowed. Thus, AMS 2482-3 designates a finished coating thickness of 0.003 inch ± 0.0005 (76 µm ± 13).

3.3.1.1 Thickness of coating shall be determined on representative parts or specimens by microscopic method, micrometer measurement, eddy-current method in accordance with ASTM B 244 or ASTM B 487, or other method acceptable to purchaser. When micrometer measurement is used, specimens for thickness determination shall be of the same alloy as the parts they represent and shall be processed with the parts represented. The specimens shall be 0.04 x 2 x 4 inches (1.0 x 51 x 102 mm) or of suitable configuration to provide an accurate measurement. Micrometer measurements shall be calibrated against microscopic measurements on specimens processed to the same nominal coating thickness.

3.3.1.2 Coating thickness requirements shall not apply to blind holes or recesses with depth greater than twice the diameter or in open holes with depth greater than seven times the diameter unless a specific coating thickness is specified in those areas.

3.3.2 Corrosion Resistance: The coated specimens, 0.04 x 3 x 10 inches (1.0 x 76 x 254 mm), fabricated from an alloy generically similar to the parts represented shall be washed in ASTM D 1193, Type IV, water, dried, and then subjected to a 5% salt spray test for 336 hours in accordance with ASTM B 117, except that the significant surface shall be inclined approximately 6 degrees from vertical. The coated specimens, after salt-spray testing, shall show no more than five isolated spots or pits, none larger then 1/32 inch (0.8 mm) in diameter, in a total of 30 square inches (194 cm^2) of test area. Areas are excepted if they are within 1/16 inch (1.6 mm) of identification markings and electrical contact marks that remain after processing.

3.3.3 Abrasion Resistance: Test specimens, 0.04 x 4 x 4 inches (1.0 x 102 x 102 mm), fabricated from AMS 4037 aluminum alloy sheet or the predominant alloy being processed when the periodic test specimen is selected, shall be tested in accordance with ASTM D 4060, using CS17 wheels with a 1000-gram load. The wheels shall revolve on the coating at a speed of 70 revolutions per minute for 10,000 cycles. After abrading, the specimens shall be weighed to the nearest milligram to determine weight loss. Maximum weight loss shall be 40 milligrams for aluminum alloy 2024 and 20 milligrams for all other aluminum alloys.

3.3.4 Coefficient of Friction: Coated test specimens fabricated from AMS 4037 aluminum alloy sheet or the predominant alloy being processed when the periodic test specimen is selected, 0.04 x 5 x 10 inches (1.0 x 127 x 254 mm) or other suitable configuration to ensure accurate measurement, shall be tested in accordance with ASTM D 1894 or other method acceptable to purchaser. Maximum coefficient of friction shall be 0.15.

3.4 Quality:

Coating, as received by purchaser, shall be smooth, uniform in appearance, and free from scratches, chips, and burned areas. Small irregularities at points of electrical contact are permitted.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection:

The coating processor shall supply all samples for processor's tests shall be responsible for performance of all required tests. When parts are to be tested, such parts shall be supplied by purchaser. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the coating conforms to the requirements of this specification.

4.2 Classification of Tests:

4.2.1 Acceptance Tests: Thickness (3.3.1) and quality (3.4) are acceptance tests and shall be performed on each lot.

4.2.2 Periodic Tests: Corrosion resistance (3.3.2), abrasion resistance (3.3.3), and coefficient of friction (3.3.4) are periodic tests and shall be performed at a frequency selected by the processor unless frequency of testing is specified by purchaser.

4.2.3 Preproduction Tests: All technical requirements are preproduction tests and shall be performed prior to or on the initial shipment of coated parts to a purchaser, when a change in material and/or processing requires reapproval as in 4.4.2, and when purchaser deems confirmatory testing to be required.

4.3 Sampling:

Shall be as follows; a lot shall be all coated parts made from the same alloy, processed to the same coating thickness, and presented for processor's inspection at one time.

4.3.1 For Acceptance Tests: The number of parts sampled shall not be less than shown in Table 1.

TABLE 1 - Minimum Sampling for Acceptance Tests

Number of Parts in Lot	Quality	Thickness
Up to 7	All	3
8 to 15	7	4
16 to 40	10	4
41 to 110	15	5
111 to 300	25	6
301 to 500	35	7
Over 500	50	8

4.3.2 For Periodic Tests: Frequency of sampling shall be at the discretion of the processor unless otherwise specified by purchaser.

4.3.2.1 If test panels of an alloy different from that of the parts they represent are used, panels shall be processed under conditions, previously established, which will produce the same coating thickness as that on the parts they represent.

4.4 Approval:

4.4.1 Sample coated parts and/or the coating and control procedure used to coat parts shall be approved by purchaser before coated parts for use are supplied. When sample coated parts are required, coatings on production parts shall be equivalent to those on the approved sample parts.

4.4.2 The processor shall make no significant change to materials, processes, or control factors from those on which approval was based, unless the change is approved by the cognizant engineering organization. A significant change is one which, in the judgment of the cognizant engineering organization, would affect the properties or performance of the part.

4.4.3 Control factors shall include, but not be limited to, the following:

Surface preparation methods
Composition limits and temperature limits of anodizing bath
PTFE, how applied for Type 1 coating
Frequency of test of anodizing bath composition
Method for determining coating thickness, and, if micrometer measurements are used, correlation between measurement and actual thickness
Anodizing voltage limits, and voltage ramp rates where voltage is not constant
Periodic test plan