



AEROSPACE MATERIAL SPECIFICATION

AMS2477™**REV. E**Issued 2005-02
Revised 2025-01

Superseding AMS2477D

Conversion Coating for Aluminum Alloys,
Low Electrical Resistance Coating

RATIONALE

AMS2477E results from a Five-Year Review and update of this specification with changes to Ordering Information, Application (see 1.2), Definitions (see 2.4.1), Fixture Contact Locations (see 3.1.1), Corrosion Resistance (see 3.3.2), Quality (see 3.4.1 and 3.4.2), Periodic Tests (see 4.2.2.1), Acceptance Tests (see 4.3.1), control factors (see 4.4.3), and Notes (see 8.2 and 8.14). Solutions (see 3.1.3) moved from 1.2.

NOTICE

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

1. The purchase order shall specify not less than the following:

- AMS2477E
 - Basis metal to be coated
 - Basis metal temper
 - Optional: fixture contact locations, when not specified (see 3.1.1)
 - Primer and application process, if applicable (see 3.3.4)
 - Special features, geometry, or processing present on parts that requires special attention by the coating processor
 - Quantity of pieces to be plated
2. Parts manufacturing operations such as heat treating, forming, joining, and media finishing can affect the condition of the substrate for coating or, if performed after coating, could adversely affect the coated 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.
3. The parts manufacturer shall ensure that surfaces of metal parts supplied to the processor are free from blemishes, pits, tool marks, and other irregularities that will affect the quality of the finished parts (see 3.4.1).

SAE Executive Standards Committee Rules provide that: "This report is published by SAE to advance the state of technical and engineering sciences. The use of this report is entirely voluntary, and its applicability and suitability for any particular use, including any patent infringement arising therefrom, is the sole responsibility of the user."

SAE reviews each technical report at least every five years at which time it may be revised, reaffirmed, stabilized, or cancelled. SAE invites your written comments and suggestions.

Copyright © 2025 SAE International

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, or used for text and data mining, AI training, or similar technologies, without the prior written permission of SAE.

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
http://www.sae.org

SAE WEB ADDRESS:

Full document details: SAE AMS2477E

For more information on this standard, visit
<https://www.sae.org/standards/content/AMS2477E/>

Documents

Standard, visit Sharing Hub

1. SCOPE

1.1 Purpose

This specification covers the requirements for a low-electrical-resistance chemical conversion coating on aluminum and aluminum alloy parts.

1.2 Application

This process has been used typically to provide aluminum with a thin inorganic film that improves corrosion resistance, preserves the ability to make a low-resistance electrical contact to the aluminum substrate, or provides adhesion of organic coatings, 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 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.

AMS4027 Aluminum Alloy, Sheet and Plate, 1.0Mg - 0.60Si - 0.28Cu - 0.20Cr (6061; -T6 Sheet, -T651 Plate), Solution and Precipitation Heat Treated

ARP4992 Periodic Test for Processing Solutions

AS7766 Terms Used in Aerospace Metals Specifications

2.2 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org.

ASTM B117 Operating Salt Spray (Fog) Apparatus

ASTM D3359 Rating Adhesion by Tape Test

2.3 U.S. Government Publications

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

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

MIL-DTL-53022 Primer, Epoxy Coating, Corrosion Inhibiting, Lead and Chromate Free

MIL-DTL-53030 Primer Coating, Epoxy, Water Based, Lead and Chromate Free

MIL-DTL-81706 Chemical Conversion Materials for Coating Aluminum and Aluminum Alloys

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

MIL-PRF-85582 Primer Coatings: Epoxy, Waterborne

2.4 Definitions

Terms used in AMS are defined in AS7766 and as follows:

2.4.1 PIT

A corrosion pit, as used in 3.3.2, is defined as an area of localized corrosion having a depth greater than its width. As a general rule, a pit usually displays a characteristic tail or line of white aluminum corrosion products.

3. TECHNICAL REQUIREMENTS

3.1 Preparation

3.1.1 Fixture Contact Locations

3.1.1.1 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.

3.1.1.2 For parts that are not to be coated all over, and contact locations are not specified, contact locations may be in areas on which the coating is not required or may be in the areas being coated provided the parts are moved to prevent contact marks/voids within the plating/coating.

3.1.2 Cleaning

The coating shall be applied over a surface free from water breaks. The cleaning procedure shall not produce pitting or intergranular attack of the basis metal and shall preserve dimensional requirements (see 8.5).

3.1.3 Solutions

Type and chemical makeup of solutions are not governed by this specification but shall be qualified in accordance with MIL-DTL-81706, Class 3.

3.2 Procedure

3.2.1 The application process shall consist of immersion, spray, pen, or brush (swab/wipe) application of a solution capable of generating a coating compliant with the requirements of this specification (see 3.3 and 8.6).

3.2.2 Touch-Up

Unless otherwise specified by the cognizant engineering organization, contact points and areas that the coating has been scratched or otherwise damaged may be touched up provided the area touched up does not exceed 5% of the coated surface area, excluding contact points.

3.3 Properties

Surfaces coated, other than touch-up in 3.2.2, shall conform to the following requirements:

3.3.1 Electrical Resistance

Electrical contact resistance of the coated product shall not exceed 0.005 ohm per square inch when tested in accordance with the procedure outlined in 4.3.3.2 or to a procedure acceptable to the cognizant engineering organization.