



AEROSPACE MATERIAL SPECIFICATION

AMS2547™

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Electropolishing of Metallic Parts and Materials Using Computer Aided Engineering

RATIONALE

Electropolishing provides a specified microfinish while keeping the required dimensional specifications of the part.

NOTICE

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

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

- AMS2547
- Quantity of pieces to be electropolished
- Basis metal and heat treatment condition to be electropolished
- Before process and after process dimensions (3.6.3)
- Surface texture in micro-inches of electropolished parts if required (3.6.1)
- Optional: Surface texture on internal surfaces, if required (3.1)
- Optional: Instructions for racking isolation (3.4.2)
- Special features, geometry or processing present on parts that require special attention by the electropolishing processor
- Defined P-zones on the part where surface texture is measured (2.2 and 3.6.1)
- Locations within P-zones where surface texture measurements are to be taken (4.3.3)
- Periodic testing frequency and sample quantity, if different from 4.2.2
- Whether approval is based on approval of process/control factors or sample part or both (4.4.1)
- Permissible electrical contact locations, if not specified (3.4.3)
- Methods for determination of embrittlement, pitting, and selective attack (3.6.4)

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Documents
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2. Parts manufacturing operations such as heat treating, forming, joining and media finishing can affect the condition of the substrate for electropolishing, or, if performed after electropolishing can affect the final condition of the parts. The sequencing of these types of operations should be specified by the cognizant engineering organization or purchaser and is not controlled by this specification.

1. SCOPE

1.1 Purpose

This specification establishes the engineering requirements for electropolishing metallic parts and materials using a Computer Aided Engineering approach.

1.2 Application

This specification is applicable to critical and non-critical metallic parts, but usage is not limited to such applications. Following the electropolishing process, metal parts have improved deburring, micro finish value, and enhanced corrosion resistance.

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 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.

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.

ARP1917 Clarification of Terms Used in Aerospace Metals Specifications

ARP4992 Periodic Test for Processing Solutions

2.2 ASME Publications

Available from ASME, P.O. Box 2900, 22 Law Drive, Fairfield, NJ 07007-2900, Tel: 800-843-2763 (U.S./Canada), 001-800-843-2763 (Mexico), 973-882-1170 (outside North America), www.asme.org.

ASME B46.1 Surface Texture (Surface Roughness, Waviness, and Lay)

2.3 ISO Publications

Copies of these documents are available online at <http://webstore.ansi.org/>.

ISO 1302 Indication of surface texture in technical product documentation

2.4 Definitions

P-ZONE: A test zone located on a part.

3. TECHNICAL REQUIREMENTS

3.1 Software

Shall be an engineering simulation tool which takes into account the entire configuration of the electropolishing process, namely:

- Physico-chemical characteristics of the electropolishing solution used in combination with the substrate material of parts.
- Configuration of the electropolishing tank(s), including electrolyte level, indication of flow inlet and outlet system, position and dimension of cathodes, current robbers and/or shields and/or conforming cathodes, position of rack(s).
- Current/voltage source and process parameters.
- Geometrical description of the part.
- Surface texture of electropolished parts, if specified.
- Surface texture on internal surfaces, if specified.

3.2 Solutions

3.2.1 Electrolyte

Shall be a solution suitable for the material used and its alloy grade and condition. The solution shall not cause embrittlement of parts or equipment.

3.3 Equipment

3.3.1 Tanks

Shall be fabricated from a material which is suitable for containment of the electrolyte being used. Cathode material shall be insoluble in the electrolyte.

3.3.2 Fixtures

Wire, hooks, clamps, and racks in contact with the parts or electrolyte should be made of a material that is insoluble in the electrolyte or other material that is masked to prevent contact with the electrolyte (see 8.6).

3.4 Preparation

3.4.1 Cleaning

Parts shall be clean and free of water break. The use of halogenated solvents is prohibited.

3.4.2 Racking

Racks and clamps shall be free of anodic film (see 8.6). The cognizant engineering organization may specify instructions for racking isolation.

3.4.3 Electrical Contact

3.4.3.1 Tight electrical contact shall be maintained during the electropolishing treatment to prevent contact arcing (burning) of parts, but small irregularities of coating at points of electrical contact are acceptable.

3.4.3.2 For parts which are to be electropolished all over, and fixture contact points are not specified, contact locations shall be determined by the processor.