AEROSPACE MATERIAL SPECIFICATION

AMS2451™/10	REV. C

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Superseding AMS2451/10B

Plating, Brush, Tin-Zinc Low Hydrogen Embrittlement

RATIONALE

AMS2451/10C results from a Five-Year Review and update of this specification with clarification of hydrogen embrittlement (see 3.1.2) information that is redundant in AMS2451 and clarification of composition (see 3.2.1).

1. SCOPE

1.1 Purpose

This specification covers the requirements for brush plating of tin-zinc by electrodeposition.

1.2 Application

This process has been used typically to improve corrosion resistance of steel parts, to repair tin-zinc deposits, and to repair damaged or worn parts, but usage is not limited to such applications.

1.3 Classification

Plating covered by this specification is classified as follows:

Type 1 As plated.

Type 2 With supplementary trivalent chromium surface treatment.

1.3.1 Unless a specific type is specified, Type 1 shall be supplied.

1.4 Safety - Hazardous Materials

Shall be in accordance with AMS2451.

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.

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
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For more information on this standard, visit
https://www.sae.org/standards/content/AMS2451/10C/

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.

AMS2434 Plating, Tin-Zinc Alloy

3. TECHNICAL REQUIREMENTS

Shall be in accordance with AMS2451 and as follows:

3.1 Procedure

3.1.1 Tin-zinc alloy plate shall be electrodeposited from low-hydrogen-embrittlement brush plating solution in accordance with processing instructions from the solution manufacturer. When Type 2 is specified, plating shall receive a trivalent chromium conversion coating treatment applied using brush, spray, or dip. Hydrogen embrittlement relief baking shall be performed after any Type 2 supplementary treatment.

3.1.2 When required (refer to AMS2451), parts shall be hydrogen embrittlement relief baked at the temperature and time shown in Table 1.

Table 1 - Post-plating baking conditions

Material	Temperature	Time, Hours Minimum
Carburized parts	275 °F ± 25 °F (135 °C ± 14 °C)	23
Other steels over 55 HRC	275 °F ± 25 °F (135 °C ± 14 °C)	23
Steel parts 40 HRC and higher	340 °F ± 25 °F (171 °C ± 14 °C)	12
Threaded fasteners 31 HRC and higher	340 °F ± 25 °F (171 °C ± 14 °C)	12
PH steels and aged below 1000 °F (538 °C)	340 °F ± 25 °F (171 °C ± 14 °C)	12

3.2 Properties

3.2.1 Composition

The tin-zinc alloy deposit shall contain 70 to 90% by weight tin with the balance being zinc, as determined by a method acceptable to cognizant engineering organization. In case of dispute, one or more of the parts may be stripped of coating, and the resultant solution analyzed by conventional wet chemical methods for relative proportions of tin and zinc.

3.2.2 Corrosion Resistance

3.2.2.1 Parts or specimens with Type 1 plating having a plate thickness of 0.0003 to 0.0005 inch (8 to 13 µm) shall show no evidence of basis metal corrosion after 96 hours of continuous salt spray corrosion testing conducted in accordance with ASTM B117.

3.2.2.2 Parts or specimens with Type 2 plating having a plate thickness of 0.0003 to 0.0005 inch (8 to 13 µm) shall neither show white corrosion products nor basis metal corrosion after 96 hours of continuous salt spray test nor basis metal corrosion after 500 hours of continuous salt spray test conducted in accordance with ASTM B117. The presence of white corrosion product within 0.25 inch (6.4 mm) from the edge of the specimen shall not constitute failure.

3.2.3 Hydrogen Embrittlement

The plating process shall not cause hydrogen embrittlement in steel parts 36 HRC and over, determined in accordance with AMS2451 and 4.1. When specified by the cognizant engineering organization, this requirement may be waived (see 8.4).