



AEROSPACE MATERIAL SPECIFICATION

AMS2658™**REV. E**Issued 1980-04
Revised 2026-05

Superseding AMS2658D

Hardness and Conductivity Inspection of Wrought Aluminum Alloy Parts

RATIONALE

AMS2658E results from a Five-Year Review and update of this specification with changes to clarify usage of hardness and conductivity requirements (see 3.3.1, 3.3.2, 3.3.3, 8.6, and 8.7), reintroduce limited electrical conductivity values for clad products based on 60-Hz meter restrictions and provide information on limitations (see Table 2, 8.4, and 8.5), relocate Definitions and provide definition for parts (see 2.4), relocate reference information for 6XXX alloys (see 8.3), and update Applicable Documents (see Section 2).

1. SCOPE

1.1 Purpose

This specification establishes hardness and electrical conductivity acceptance criteria for finished or semifinished parts made from wrought aluminum alloys after heat treatment (see 8.6).

1.2 Application

This specification has been used typically for nondestructive testing of wrought aluminum alloy parts to aid in determining correctness of alloy, temper, and/or heat treatment, but usage is not limited to such applications.

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: 1-877-606-7323 (U.S. and Canada only) or 1-724-776-4970 (outside U.S. and Canada), www.sae.org.

AMS2355 Quality Assurance, Sampling and Testing, Aluminum Alloys and Magnesium Alloy, Wrought Products (Except Forging Stock), and Rolled, Forged, or Flash Welded Rings

AMS2770 Heat Treatment of Wrought Aluminum Alloy Parts

AS7766 Terms Used in Aerospace Metals Specifications

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Documents

Standard, visit Sharing Hub

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 E10 Brinell Hardness of Metallic Materials

ASTM E18 Rockwell Hardness of Metallic Materials

ASTM E110 Rockwell and Brinell Hardness of Metallic Materials by Portable Hardness Testers

ASTM E1004 Determining Electrical Conductivity Using the Electromagnetic (Eddy Current) Method

2.3 ANSI Publications

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

ANSI H35.1/ H35.1M Alloy and Temper Designation Systems for Aluminum

2.4 U.S. Government Publications

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

MIL-STD-1537 Electrical Conductivity Test for Verification of Heat Treatment of Aluminum Alloys, Eddy Current Method

2.5 Definitions

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

2.5.1 PARTS

Parts are usually identified by a part number, produced from raw material in accordance with the requirements of a drawing, and usually tested by nondestructive techniques only. Parts are heat treated by or for a fabricator in accordance with a drawing, purchase order, fabrication order, or heat-treatment specification. At the time of heat treatment, parts may resemble raw material.

3. TECHNICAL REQUIREMENTS

3.1 Equipment

The equipment used for hardness and electrical conductivity testing shall meet the requirements of ASTM E10, ASTM E18, ASTM E1004, or MIL-STD-1537, as applicable.

3.1.1 Calibration

Periodic calibration of electrical conductivity testing equipment and instrument conductivity standards shall be performed in accordance with the requirements of MIL-STD-1537.

3.1.2 Verification

The hardness test equipment when in use shall be checked against test blocks at least once per day to ensure accurate and repeatable results. The conductivity test equipment shall require a periodic standardization every hour of continuous operation. Equipment that does not provide accurate or repeatable results shall be corrected and recalibrated.

3.2 Procedure

3.2.1 Hardness

Shall be determined in accordance with ASTM E10 for Brinell hardness or ASTM E18 for Rockwell hardness. Where it is impractical due to size or configuration, portable hardness testing in accordance with ASTM E110 may be used.

3.2.2 Electrical Conductivity

Shall be determined in accordance with ASTM E1004 or MIL-STD-1537.

3.3 Hardness and Conductivity

Parts shall conform to the hardness and electrical conductivity values in Table 1 for bare alloys and Table 2 for clad alloys after heat treatment or annealing in accordance with the applicable specification. Alloys/temper not contained herein shall meet the hardness and electrical conductivity requirements on the drawing, purchase order, or as specified by the cognizant engineering organization.

3.3.1 Hardness and Conductivity of Mill Heat Treated Raw Material and Parts

Raw material and parts that were heat treated by the raw material producer and have not received additional thermal processing should not be rejected if they meet acceptance testing required by the applicable raw material specification (see 8.6).

3.3.2 Hardness and Conductivity of Clad Alloys

3.3.2.1 Hardness and conductivity values in Table 2 are for sheet with cladding intact. Clad sheet over 0.091 inch (2.31 mm) in nominal thickness can result in incorrect hardness and conductivity values from the cladding thickness. When permitted by the purchaser, removal of the cladding in local areas may be performed to obtain valid hardness and conductivity values. The hardness and conductivity values for bare aluminum in Table 1 shall be used when evaluating hardness and conductivity values after removal of cladding.

3.3.2.2 Conductivity values in Table 2 for clad alloys are only applicable to meters operating at 60 kHz.

3.3.3 Lower conductivity values from the applicable material specification for 7XXX alloys in T7X tempers may be used in lieu of the values in Tables 1 and 2 provided all associated conditional acceptance criteria and corrosion testing from the material specification are met (see 8.7).

3.3.3.1 Exfoliation-corrosion testing shall not be used as an acceptance criteria for meeting a stress-corrosion resistance requirement.

3.3.3.2 Material used for the conditional testing shall be taken from destructively testing parts or from excess raw material from the same product form and cast lot as the affected parts. Test material shall have been solution heat treated and aged with affected parts.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for Inspection

The inspection source shall be responsible for the performance of all required tests. The purchaser reserves the right to perform any confirmatory testing deemed necessary to ensure that hardness and conductivity conform to specified requirements.

4.2 Classification of Tests

Not applicable.