



AEROSPACE MATERIAL SPECIFICATION	AMS2630™	REV. E
	Issued 1960-06 Revised 2021-11 Superseding AMS2630D	
Inspection, Ultrasonic Product Over 0.5 Inch (12.7 mm) Thick		

RATIONALE

AMS2630E is the result of a Five-Year Review and update of the specification. The revision updates inspection methodology to be consistent with AMS2631 including changes to criteria (1.3), clarifying instrument requirements (3.2, 3.2.1.1), revising agreement requirements (3.2.2), updating requirements for curved surfaces (3.4.2), updating reference standards and procedure (3.2.4.3), updating and including calculations for electronic gating (3.4.9.1), adding an alternative FBH methodology (4.1.1) and the associated FBH conversion (Table 4), and updating Figure 5 for clarity.

1. SCOPE

1.1 Purpose

This specification covers procedures for ultrasonic inspection, by pulse-echo procedures, of flat, rectangular, round, cylindrical, and contoured products having a thickness or cross-sectional dimension greater than 0.5 inch (12.7 mm), using either contact or immersion methods, and using the longitudinal-wave or shear-wave modes or combinations of the two, as necessary. This specification may apply to testing finished machined parts provided the parts can meet the basic testability requirements, such as size, contour, metallurgical structure, and thickness.

1.2 Parts with section thickness both over 0.5 inch (12.7 mm) and 0.5 inch (12.7 mm) and under may be tested using this procedure and AMS2632, as applicable.

1.3 Cylindrical bar and billet, between nominally 5 inches (127 mm) in diameter and nominally 10 inches (254 mm), may be inspected in accordance with AMS2628 using the acceptance criteria of AMS2628 Class A to satisfy all classes of AMS2630 except Class AA.

1.4 Application

This procedure has been used typically for locating and defining internal defects such as cracks, voids, laminations, and other structural discontinuities which may or may not be exposed to the surface, 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.

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 © 2021 SAE International

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, 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:

For more information on this standard, visit
<https://www.sae.org/standards/content/AMS2630E/>

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.

AMS2628 Enhanced Ultrasonic Immersion Inspection for Titanium Alloy and Other Metal Alloy Billets

AMS2631 Ultrasonic Inspection, Titanium and Titanium Alloy Bar, Billet, and Plate

AMS2632 Inspection, Ultrasonic, of Thin Materials, 0.5 Inch (12.7 mm) and Under in Cross-Sectional Thickness

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 E127 Fabrication and Control of Flat Bottomed Hole Ultrasonic Standard Reference Blocks

ASTM E317 Evaluating Performance Characteristics of Ultrasonic Pulse-Echo Testing Systems Without the Use of Electronic Measurement Instruments

ASTM E1065 Evaluating Characteristics of Ultrasonic Search Units

ASTM E1316 Standard Terminology for Nondestructive Examinations

2.3 AIA Publications

Available from the Aerospace Industries Association, 1000 Wilson Boulevard, Suite 1700, Arlington, VA 22209-3928, www.aia-aerospace.org.

NAS410 Nondestructive Testing Personnel Qualification and Certification

2.4 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

2.5 ASNT Publications

Available from American Society for Nondestructive Testing, P.O. Box 28518, 1711 Arlingate Lane, Columbus, OH 43228-0518, 800-222-2768 (inside U.S. and Canada), 614-274-6003 (outside USA), www.asnt.org.

SNT-TC-1A Recommended Practice, Personnel Qualification and Certification in Nondestructive Testing

2.6 A4A Publications

Available from Airlines for America (A4A), 1275 Pennsylvania Avenue, NW, Suite 1300, Washington, DC 20004, 202-626-4062, www.airlines.org.

Spec 105 Guidelines for Training and Qualifying Personnel in Nondestructive Testing Methods

2.7 Other Publications

Nondestructive Testing Handbook, Current Edition: Volume 7, Ultrasonic Testing (UT) (Available from ASNT).

Sonics, by T. F. Hueter and R. H. Bolt, 1955; John Wiley & Sons, Inc., 605 Third Avenue, New York, NY 10016.

Ultrasonic Testing of Materials, by J. Krautkramer and H. Krautkramer (Translation of 2nd revised German edition), 1969; Springer-Verlag New York, 175 Fifth Avenue, New York, NY 10010.

3. TECHNICAL REQUIREMENTS

3.1 Qualification

3.1.1 Personnel

Shall be qualified and certified in accordance with NAS410. Alternate procedures, such as SNT-TC-1A or Spec 105, may be used if specified on the drawing or purchase order. It is the supplier's responsibility to ensure that personnel are certified and function within the limits of the applicable specification or procedure.

3.1.2 Facilities

Shall be subject to survey and approval by purchaser of the inspected product. Ultrasonic test facility equipment shall include, but not be limited to, the basic ultrasonic test instrument, search units (transducers), appropriate ultrasonic references, couplant materials, fixtures, reference specifications, and immersion tanks where applicable. Reference specifications and documentation necessary to verify the qualification of equipment and test personnel shall be available upon request.

3.2 Ultrasonic Test System

3.2.1 Basic Ultrasonic Test Instrument

Shall be capable of producing, receiving, amplifying, and displaying high-frequency electrical pulses at the required frequencies and energy levels. The ultrasonic instrument shall be of a pulse-reflection (echo), pulse-transmission type. Gates, distance-amplitude correction systems, and other electronic aids to ultrasonic testing and interpretation shall be used as required. An alarm system, a recorder, an auto-stop device, or combination of these, may be used.

3.2.1.1 Instrument Requirements

The instrument performance characteristics shall be evaluated in accordance with ASTM E317 or original manufacturer's requirements with acceptance in accordance with Table 1.

Table 1 - Instrument requirements

Characteristic	Requirement
Signal to noise ⁽¹⁾	2:1
Vertical linearity, percent of full scale	≤5
Horizontal linearity, percent of full scale	≤3
Gain or attenuator accuracy	±2 dB per 20 dB of control range
Voltage regulation—Voltage fluctuations shall not cause amplitude variations exceeding:	±5%

⁽¹⁾ ASTM E127 reference block 1-0300.

3.2.1.2 Alarm

3.2.1.2.1 Alarms and visual monitoring of the A-scan are not required when C-scan data collection is used.

3.2.1.2.2 For unrecorded stop on defect inspections, test criteria, and part configuration determine alarm use feasibility. When alarms cannot be used, this must be agreed upon by purchaser and vendor. Audible and/or visual alarms and/or stop on defect systems shall be used in conjunction with visual monitoring to identify signals which exceed the level established for the test. Alarm systems used for this purpose shall be capable of being adjusted to alarm at any point in the display range and shall be automatically triggered by indications exceeding the set level. The sound level produced by an audible alarm during operation shall be sufficiently above ambient to ensure being heard by the operator.