



Designation: B548 – 03 (Reapproved 2017)

Standard Test Method for Ultrasonic Inspection of Aluminum-Alloy Plate for Pressure Vessels¹

This standard is issued under the fixed designation B548; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This test method covers pulse-echo ultrasonic inspection of aluminum-alloy plate of thickness equal to or greater than 0.500 in. (12.7 mm) for use in the fabrication of pressure vessels. The ultrasonic test is employed to detect gross internal discontinuities oriented in a direction parallel to the rolled surface such as cracks, ruptures, and laminations, and to provide assurance that only plate that is free from rejectable discontinuities is accepted for delivery.

1.2 The inspection method and acceptance criteria included in this standard shall be limited to plate of the following aluminum alloys: 1060, 1100, 3003, Alclad 3003, 3004, Alclad 3004, 5050, 5052, 5083, 5086, 5154, 5254, 5454, 5456, 5652, 6061, and Alclad 6061.

1.3 This test method applies only to ultrasonic tests using pulsed longitudinal waves which are transmitted and received by a search unit containing either a single crystal or a combination of electrically interconnected multiple crystals. Ultrasonic tests employing either the through-transmission or the angle-beam techniques are not included.

1.4 This test method shall be used when ultrasonic inspection as prescribed herein is required by the contract, purchase order, or referenced plate specification.

1.5 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.6 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

1.7 *This international standard was developed in accordance with internationally recognized principles on standard-*

ization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.

2. Referenced Documents

2.1 The following documents of the issue in effect on date of material purchase form a part of this specification to the extent referenced herein:

2.2 *ASTM Standards:*²

E114 Practice for Ultrasonic Pulse-Echo Straight-Beam Contact Testing

E214 Practice for Immersed Ultrasonic Testing by the Reflection Method Using Pulsed Longitudinal Waves (Withdrawn 2007)³

E317 Practice for Evaluating Performance Characteristics of Ultrasonic Pulse-Echo Testing Instruments and Systems without the Use of Electronic Measurement Instruments

2.3 *Other Standards:*

ASNT Recommended Practice for Nondestructive Testing Personnel Qualification and Certification—Ultrasonic Testing Method—SNT-TC-1A⁴

3. Summary of Method

3.1 The plate is inspected ultrasonically by scanning one rolled surface with a beam of pulsed longitudinal waves which is oriented in a direction perpendicular to the entry surface of the plate. The ultrasound is transmitted into the plate either by the direct contact, immersion, or liquid-column coupling method. During the scan, an indication representing the first back reflection is observed on the A-scan screen of the test instrument.

3.2 When the test system sensitivity level is appropriately adjusted, a discontinuity is detected during the scan by noting

¹ This test method is under the jurisdiction of ASTM Committee B07 on Light Metals and Alloys and is the direct responsibility of Subcommittee B07.03 on Aluminum Alloy Wrought Products.

Current edition approved July 1, 2017. Published July 2017. Originally approved in 1971. Last previous edition approved in 2009 as B548 – 03 (2009). DOI: 10.1520/B0548-03R17.

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For Annual Book of ASTM Standards volume information, refer to the standard's Document Summary page on the ASTM website.

³ The last approved version of this historical standard is referenced on www.astm.org.

⁴ Available from American Society for Nondestructive Testing (ASNT), P.O. Box 28518, 1711 Arlingate Ln., Columbus, OH 43228-0518, <http://www.asnt.org>.