



Standard Guide for Detection and Evaluation of Discontinuities by Contact Pulse-Echo Straight-Beam Ultrasonic Methods¹

This standard is issued under the fixed designation E1901; 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 guide covers procedures for the contact ultrasonic examination of bulk materials or parts by transmitting pulsed ultrasonic waves into the material and observing the indications of reflected waves. This guide covers only examinations in which one search unit is used as both transmitter and receiver (pulse-echo). This guide includes general requirements and procedures that may be used for detecting discontinuities, locating depth and distance from a point of reference and for making a relative or approximate evaluation of the size of discontinuities as compared to a reference standard.

1.2 This guide complements Practice E114 by providing more detailed procedures for the selection and calibration of the inspection system and for evaluation of the indications obtained.

1.3 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.

1.4 *This guide 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 guide to establish the appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*²

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

E127 Practice for Fabricating and Checking Aluminum Alloy Ultrasonic Standard Reference Blocks

¹ This guide is under the jurisdiction of ASTM Committee E07 on Nondestructive Testing and is the direct responsibility of Subcommittee E07.06 on Ultrasonic Method.

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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.

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

E428 Practice for Fabrication and Control of Metal, Other than Aluminum, Reference Blocks Used in Ultrasonic Testing

E543 Specification for Agencies Performing Nondestructive Testing

E1158 Guide for Material Selection and Fabrication of Reference Blocks for the Pulsed Longitudinal Wave Ultrasonic Testing of Metal and Metal Alloy Production Material

E1316 Terminology for Nondestructive Examinations

2.2 *ASNT Standard:*

SNT-TC-1A Recommended Practice for Personnel Qualification and Certification in Nondestructive Testing Personnel³

2.3 *ANSI/ASNT Standard:*

ANSI/ASNT CP-189 ASNT Standard for Qualification and Certification of Nondestructive Testing Personnel³

2.4 *Aerospace Industries Association Document:*

NAS-410 NAS Certification and Qualification of Nondestructive Test Personnel⁴

2.5 *ISO Standard*⁵

ISO 9712 Non-destructive testing — Qualification and certification of NDT personnel

3. Terminology

3.1 *Definitions*—For definitions of terms used in this guide, see Terminology E1316.

4. Basis for Application

4.1 *Contractual Agreement*—The using parties shall agree on the applicable procedural requirements, as listed herein, prior to the examination of any material.

³ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.

⁴ Available from Aerospace Industries Association of America, Inc. (AIA), 1000 Wilson Blvd., Suite 1700, Arlington, VA 22209-3928, <http://www.aia-aerospace.org>.

⁵ Available from International Organization for Standardization (ISO), 1, ch. de la Voie-Creuse, CP 56, CH-1211 Geneva 20, Switzerland, <http://www.iso.org>.

*A Summary of Changes section appears at the end of this standard