



Standard Practice for Ultrasonic Pulse-Echo Straight-Beam Examination by the Contact Method¹

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This standard has been approved for use by agencies of the Department of Defense.

1. Scope

1.1 This practice² covers ultrasonic examination of materials by the pulse-echo method using straight-beam longitudinal waves introduced by direct contact of the search unit with the material being examined.

1.2 This practice shall be applicable to development of an examination procedure agreed upon by the users of the document.

1.3 The values stated in inch-pound units are to be regarded as the standard.

1.4 *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.*

2. Referenced Documents

2.1 ASTM Standards:

E 317 Practice for Evaluating Performance Characteristics of Ultrasonic Pulse-Echo Testing Systems Without the Use of Electronic Measurement Instruments³

E 543 Practice for Evaluating Agencies that Perform Non-destructive Testing³

E 1316 Terminology for Nondestructive Examinations³

2.2 ASNT Standards:

SNT-TC-1A Recommended Practice for Personnel Qualification and Certification in Nondestructive Testing⁴

ANSI/ASNT CP-189 ASNT Standard for Qualification and Certification of Nondestructive Testing Personnel⁴

2.3 Military Standard:

MIL-STD-410 Nondestructive Testing Personnel Qualification and Certification (Eddy Current, Liquid Penetrant,

Magnetic Particle, Radiographic and Ultrasonic)⁵

3. Terminology

3.1 Refer to Terminology E 1316 for definitions of terms used in this practice.

4. Basis of Application

4.1 Purchaser-Supplier Agreements:

The following items require agreement between the using parties for this practice to be used effectively:

4.1.1 *Qualification of Nondestructive Testing Agencies*—Agreement is required as to whether the nondestructive testing agency, as defined in Practice E 543 must be formally evaluated and qualified to perform the examination. If such evaluation and qualification is specified, a documented procedure such as Practice E 543 shall be used as the basis for evaluation.

4.1.2 *Personnel Qualification*—Nondestructive testing (NDT) personnel shall be qualified in accordance with a nationally recognized NDT personnel qualification practice or standard such as ANSI/ASNT-CP-189, SNT-TC-1A, MIL-STD-410, or a similar document. The practice or standard used and its applicable revision shall be specified in the contractual agreement between the using parties.

4.1.3 *Extent of Examination*—The extent of the examination shall be determined by agreement of the using parties.

4.1.4 *Time of Examination*—The time of examination shall be determined by agreement of the using parties.

4.1.5 *Interpretation Criteria*—The criteria by which the ultrasonic signals and part acceptability will be evaluated and shall be determined by agreement of the using parties.

5. Significance and Use

5.1 A series of electrical pulses is applied to a piezoelectric element (transducer) which converts these pulses to mechanical energy in the form of pulsed waves at a nominal frequency. This transducer is mounted in a holder so it can transmit the waves into the material through a suitable wear surface and couplant. The assembly of transducer, holder, wearface, and electrical connector comprise the search unit.

5.2 Pulsed energy is transmitted into materials, travels in a

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² For ASME Boiler and Pressure Vessel Code applications see related Practice SE-114 in Section II of that Code.

³ *Annual Book of ASTM Standards*, Vol 03.03.

⁴ Available from American Society for Nondestructive Testing, 1711 Arlington Plaza, P.O. Box 28518, Columbus, OH 43228-0518.

⁵ Available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.