



Standard Practice for Ultrasonic Testing of Polyethylene Butt Fusion Joints¹

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^{ε1} NOTE—Subsection 5.2 corrected editorially in September 2016.

1. Scope

1.1 This standard practice establishes procedures for ultrasonic testing (UT) of butt fusion joints in polyethylene pipe. Although high density polyethylene (HDPE) and medium density polyethylene (MDPE) materials are most commonly used, the procedures described may apply to other types of polyethylene.

NOTE 1—The notes in this specification are for information only and shall not be considered part of this specification.

NOTE 2—This standard references HDPE and MDPE for pipe applications as defined by Specification D3350.

1.2 This standard practice does not address ultrasonic examination of electrofusion joints (coupling joints), socket joints, or saddles.

1.3 This practice provides two ultrasonic examination procedures. Each has its own merits and requirements for examination and shall be selected as agreed upon in a contractual document.

1.3.1 *Examination Procedure A, Time of Flight Diffraction (TOFD)*, uses a pair of probes, one transmitting and the other receiving. The procedure requires access to both sides of the joint from one surface. Provided that position encoding is used, the procedure can be conducted by semi-automated or automated means that provide recoded imaging.

1.3.2 *Examination Procedure B, Phased Array Ultrasonic Testing (PAUT)*, uses low velocity refracting wedges or water gaps to produce angled compression mode pulses. The procedure can be applied where access is limited to one side of the joint from one surface. Provided that position encoding is used, the procedure can be conducted by semi-automated or automated means that provide recoded imaging.

1.4 The practice is intended to be used on thicknesses of 9 to 60 mm (0.375 to 2.4 in.) and diameters 100 mm (4 in.) and greater. Greater and lesser thicknesses and lesser diameters may be tested using this standard practice if the technique can

be demonstrated to provide adequate detection on mockups of the same wall thickness and geometry.

1.5 This practice does not specify acceptance criteria.

1.6 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the standard.

1.7 *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 The following documents form a part of this practice to the extent specified herein.

2.2 *ASTM Standards*:²

D3350 Specification for Polyethylene Plastics Pipe and Fittings Materials

E494 Practice for Measuring Ultrasonic Velocity in Materials

E543 Specification for Agencies Performing Nondestructive Testing

E1316 Terminology for Nondestructive Examinations

E2373 Practice for Use of the Ultrasonic Time of Flight Diffraction (TOFD) Technique

E2700 Practice for Contact Ultrasonic Testing of Welds Using Phased Arrays

F2620 Practice for Heat Fusion Joining of Polyethylene Pipe and Fittings

2.3 *ASNT Standards*:³

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

¹ This practice 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.

³ Available from American Society for Nondestructive Testing (ASNT), P.O. Box 28518, 1711 Arlingate Ln., Columbus, OH 43228-0518, <http://www.asnt.org>.