



Standard Practice for Leaks Using Ultrasonics¹

This standard is issued under the fixed designation E1002; 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 *Practice A, Pressurization*—This practice covers procedures for calibration of ultrasonic instruments, location, and estimated measurements of gas leakage to atmosphere by the airborne ultrasonic technique.²

1.2 In general practice this should be limited to leaks detected by two classifications of instruments, Class I and Class II. Class I instruments should have a minimum detectable leak rate of 6.7×10^{-7} mol/s (1.5×10^{-2} std. cm³/s at 0°C) or more for the pressure method of gas leakage to atmosphere. Class II instruments should have a minimal detectable leak rate of 6.7×10^{-6} mol/s (1.5×10^{-1} std. cm³/s at 0°C) or more for the pressure method of gas leakage to atmosphere. Refer to Guide E432 for additional information.

1.3 *Practice B, Ultrasonic Transmitter*—For object under test not capable of being pressurized but capable of having ultrasonic tone placed/injected into the test area to act as an ultrasonic leak trace source.

1.3.1 This practice is limited to leaks producing leakage of 6.7×10^{-6} mol/s (1.5×10^{-1} std. cm³/s at 0°C) or greater.

1.4 The values stated in SI units are to be regarded as the standard.

1.5 *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 consult and establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:³

E432 Guide for Selection of a Leak Testing Method

¹ This practice is under the jurisdiction of ASTM Committee E07 on Nondestructive Testing and is the direct responsibility of Subcommittee E07.08 on Leak Testing Method.

Current edition approved July 1, 2011. Published July 2011. Originally approved in 1986. Last previous edition approved in 2005 as E1002 - 05. DOI: 10.1520/E1002-11.

² This technique is sometimes called “ultrasonic translation.”

³ 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.

E543 Specification for Agencies Performing Nondestructive Testing

E1316 Terminology for Nondestructive Examinations

2.2 Other Documents:

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

NAS-410 Certification and Qualification of Nondestructive Personnel⁵

3. Terminology

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

4. Summary of Practice

4.1 *Practice A*—This practice sets minimum requirements for an ultrasonic detector (Classifications I and II). It provides for sensitivity validation of the detector and gives procedures for pressurizing the test object, locating leaks, and estimating the leakage rates.

4.2 *Practice B*—This practice sets minimum requirements for an ultrasonic detector used in conjunction with an ultrasonic transmitter. It gives procedures for locating leaks using an electronically generated ultrasonic leak tracer source.

5. Basis of Application

5.1 The following items are subject to contractual agreement between parties using or referencing this practice.

5.2 Personnel Qualification

5.2.1 If specified in the contractual agreement, personnel performing examinations to this practice shall be qualified in accordance with a national or internationally recognized NDT personnel qualification practice or standard such as ANSI/ASNT-CP-189, SNT-TC-1A, NAS-410, or a similar document and certified by the employer or certifying agency, as applicable. The practice or standard used and its applicable revision shall be identified in the contractual agreement between the using parties.

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

⁵ Available from Aerospace Industries Association of America, Inc. (AIA), 1000 Wilson Blvd., Suite 1700, Arlington, VA 22209-3928, <http://www.aia-aerospace.org>.