



Standard Test Method for Leaks Using Bubble Emission Techniques¹

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1. Scope

1.1 This test method covers procedures for detecting or locating leaks, or both, by bubble emission techniques. A quantitative measure is not practical. The normal limit of sensitivity for this test method is 4.5×10^{-10} mol/s (1×10^{-5} Std cm³/s).²

1.2 Two techniques are described:

1.2.1 Immersion technique, and

1.2.2 Liquid application technique.

NOTE 1—Additional information is available in ASME Boiler and Pressure Vessel Code, Section V, Article 10-Leak Testing, and Guide E 479.

1.3 *This standard does not purport to address 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 479 Guide for Preparation of a Leak Testing Specification³

E 1316 Terminology for Nondestructive Examinations³

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

ASME Boiler and Pressure Vessel Code, Section V, Article 10-Leak Testing⁵

2.3 *Military Standard:*

MIL-L-25567D Leak Detection Compound Oxygen Systems⁶

3. Terminology

3.1 *Definitions*—For definitions of terms used in this standard, see Terminology E 1316, Section E.

4. Summary of Test Method

4.1 The basic principle of this method consists of creating a pressure differential across a leak and observing for bubbles in a liquid medium located on the low pressure side. The sensitivity of the method is dependent on the pressure differential, the gas used to create the differential, and the liquid used for testing. As long as the pressure differential can be maintained across the area to be tested, this method can be used.

5. Personnel Qualification

5.1 It is recommended that personnel performing leak testing attend a dedicated training course on the subject and pass a written examination. The training course should be appropriate for NDT level II qualification according to Recommended Practice No. SNT-TC-1A of the American Society for Nondestructive Testing or ANSI/ASNT Standard CP-189.

6. Significance and Use

6.1 The immersion technique is frequently used to locate leaks in sealed containers. Leaks in a container can be seen independently. Leak size can be approximated by the size of the bubble. It is not suitable for measurement of total system leakage.

6.2 The liquid film technique is widely applied to components and systems that can not easily be immersed and is used to rapidly locate leaks. An approximation of leak size can be made based on the type of bubbles formed, but the technique is not suitable for measuring leakage rate. It can be used with a vacuum box to test vessels which cannot be pressurized or where only one side is accessible.

¹ This test method is under the jurisdiction of ASTM Committee E-7 on Non-destructive Testing and is the direct responsibility of Subcommittee E07.08 on Leak Testing.

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² The gas temperature is referenced to 0°C. To convert to another gas reference temperature, T_{ref} , multiply the leak rate by $(T_{ref} + 273)/273$.

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

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

⁵ Available from American Society of Mechanical Engineers, 345 E. 47th Street, New York, NY 10017.

⁶ Available from Standardization Documents Order Desk, Bldg. 4 Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094, Attn: NPODS.