



Designation: E2024 – 05

# Standard Test Methods for Atmospheric Leaks Using a Thermal Conductivity Leak Detector<sup>1</sup>

This standard is issued under the fixed designation E2024; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

## 1. Scope

1.1 These test methods cover procedures for detecting the sources of gas leaking at the rate of  $4.5 \times 10^{-9}$  mol/s ( $1 \times 10^{-4}$  standard  $\text{cm}^3/\text{s}$ ) or greater. The tests may be conducted on any object that can be pressurized with a tracer gas that is detectable by a thermal conductivity detector. The test sensitivity will vary widely depending on the tracer gas used.

1.2 *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:*<sup>2</sup>

**E543** Specification for Agencies Performing Nondestructive Testing

**E1316** Terminology for Nondestructive Examinations

2.2 *ASNT Documents:*<sup>3</sup>

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

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

2.3 *AIA Standard:*

**NAS-410** Certification and Qualification of Nondestructive Test Personnel<sup>4</sup>

## 3. Terminology

3.1 *Definitions*—For definitions of terms used in these test methods, see Terminology **E1316**, Section E.

<sup>1</sup> These test methods are under the jurisdiction of ASTM Committee **E07** on Nondestructive Testing and are the direct responsibility of Subcommittee **E07.08** on Leak Testing Method.

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<sup>2</sup> 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.

<sup>3</sup> Available from the American Society for Nondestructive Testing, 1711 Arlington Plaza, P.O. Box 28518, Columbus, OH 43228-0518.

<sup>4</sup> Available from the Aerospace Industries Association of America, Inc., 1250 Eye Street, N.W., Washington, DC 20005.

## 4. Summary of Test Method

4.1 *Scanning Method*—This test method sets minimum requirements for a thermal conductivity leak detector. It provides for calibration of the detector and gives procedures for pressurizing the test object, locating leaks and estimating the leakage rate.

4.2 *Accumulation Method*—The accumulation method is sometimes the only practical method for accessing complex shaped flanges or sections of pressurized vessels to be leak tested. It may be achieved by entrapping or enclosing an area of a test component with a suitable covering and sampling the buildup of tracer gas concentration with the thermal conductivity leak detector. The acceptance criteria is based on the tracer gas concentration detected by the thermal conductivity detector after an accumulation time from leakage from the leak(s) into the known sample volume.

## 5. Significance and Use

5.1 These test methods are useful for locating and estimating the size of pressurized gas leaks, either as quality control tests or as field inspection procedures. Also, they are valuable as pretests before other more time consuming and more sensitive leak tests are employed. These test methods are semi-quantitative techniques used to locate leaks but cannot be used to quantify except for approximation. These test methods may be used in an accept-reject test mode.

## 6. Basis of Application

6.1 The following items are subject to contractual agreement between the parties using or referencing these test methods:

### 6.2 *Personnel Qualification*

6.2.1 If specified in the contractual agreement. Personnel performing examinations to these test methods shall be qualified in accordance with a nationally or internationally recognized NDT personnel qualification practice or standard such as **ANSI/ASNT-CP-189**, **SNT-TC-1A**, **NAS-410**, or 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.