Designation: E1316 – 24

Standard Terminology for Nondestructive Examinations[1]

This standard is issued under the fixed designation E1316; 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.

INDEX OF TERMS

Section

1. Scope*

1.1 This standard covers the terminology used in the standards prepared by the E07 Committee on Nondestructive Testing. These nondestructive testing (NDT) methods include: acoustic emission, electromagnetic testing, gamma- and X-radiology, leak testing, liquid penetrant testing, magnetic particle testing, neutron radiology and gauging, ultrasonic testing, and other technical methods.

1.2 Committee E07 recognizes that the terms examination, testing, and inspection are commonly used as synonyms in nondestructive testing. For uniformity and consistency in E07 nondestructive testing standards, Committee E07 encourages the use of the terms examination or inspection and their derivatives when describing the application of nondestructive test methods. In a specific standard, either examination or inspection shall be used consistently throughout the document. Similarly, E07 encourages the use of the term test and its derivatives when referring to the body of knowledge of a nondestructive testing method. There are, however, appropriate exceptions when the term test and its derivatives may be used to describe the application of a nondestructive test, such as measurements which produce a numeric result (for example, when using the leak testing method to perform a leak test on a component, or an ultrasonic measurement of velocity). Additionally, the term test should be used when referring to the NDT method, that is, Radiologic Testing (RT), Ultrasonic Testing (UT), and so forth. (Example: Radiologic Testing (RT) is often used to examine material to detect internal discontinuities.)

NOTE 1—The following sentences clarify this policy and illustrate its use:

(a) Nondestructive testing methods are used extensively for the examination or inspection of materials and components.

(b) The E07 Committee on Nondestructive Testing has prepared many documents to promote uniform usage of the nondestructive testing methods that are applied to examine or inspect materials and components.

(c) Radiologic Testing (RT) is often used to inspect material to detect internal discontinuities.

(d) Magnetic Particle Testing (MT), Liquid Penetrant Testing (PT), and Visual Testing (VT) are often used to examine the surface of a component.

(e) The Bubble Leak Testing (BLT) method is sometimes used to leak test a pressure containing component to detect leaks.

(f) A guide for Nondestructive Testing of additively manufactured materials will describe several methods but a practice will focus on a single inspection method.

1.3 Section A defines terms that are common to multiple NDT methods, whereas the subsequent sections define terms pertaining to specific NDT methods.

1.4 As shown on the chart below, when a nondestructive examination or inspection produces an indication, the indication is subject to interpretation as false, nonrelevant, or relevant. If it has been interpreted as relevant, the necessary subsequent evaluation will result in the decision to accept or reject the material. With the exception of accept and reject, which retain the meaning found in most dictionaries, all the

[1] This terminology is under the jurisdiction of ASTM Committee E07 on Nondestructive Testing and is the direct responsibility of Subcommittee E07.92 on Editorial Review.

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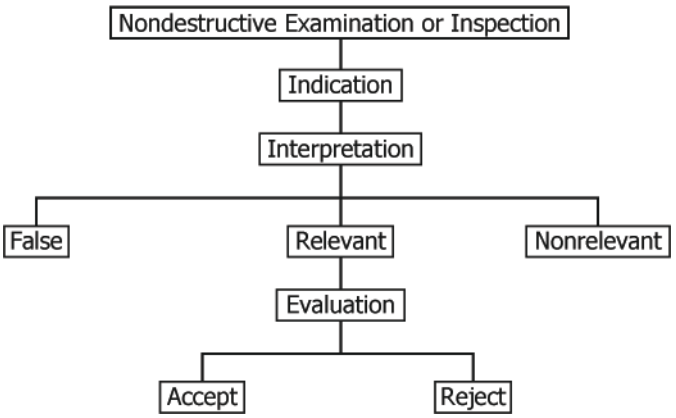
***A Summary of Changes section appears at the end of this standard**

words used in the chart are defined in Section A.



1.5 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

E94 Guide for Radiographic Examination Using Industrial Radiographic Film

E1106 Test Method for Primary Calibration of Acoustic Emission Sensors

E1781 Practice for Secondary Calibration of Acoustic Emission Sensors

NOTE 2—This standard defines the terminology used in the standards prepared by Committee E07 on Nondestructive Testing and published in the *Annual Book of ASTM Standards*, Volumes 03.03 and 03.04.

3. Significance and Use

3.1 The terms found in this standard are intended to be used uniformly and consistently in all nondestructive testing standards. The purpose of this standard is to promote a clear understanding and interpretation of the NDT standards in which they are used.

4. Terminology

4.1 *Definitions*—The definitions provided below have been broken up into sections; each section is arranged in alphabetical order.

[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.

Section A: Common NDT Terms

The terms defined in Section A are the direct responsibility of Subcommittee E07.92, Editorial Review.

acceptable quality level, *n*—the maximum percent defective or the maximum number of units defective per hundred units that, for the purpose of sampling test, can be considered satisfactory as a process average.

calibration, instrument, *v*—the comparison of an instrument with, or the adjustment of an instrument to, a known reference(s) often traceable to the National Institute of Standards and Technology (NIST). (See also **standardization, instrument**.)

cognizant engineering organization, *n*—the company, government agency or other authority responsible for the design, or end use, of the material or component for which nondestructive testing is required.

DISCUSSION—In addition to design personnel, the cognizant engineering organization could include personnel from engineering, material and process engineering, stress analysis, nondestructive testing, quality assurance and others, as appropriate.

defect, *n*—one or more flaws whose aggregate size, shape, orientation, location, or properties do not meet specified acceptance criteria and are rejectable.

Digital Imaging and Communication for Nondestructive Evaluation (DICONDE), *n*—a vendor-neutral digital data storage and transmission protocol that defines the organization of NDT image data and associated metadata in a standard electronic format.

DISCUSSION—DICONDE is based on and inherits from the universally adopted medical standard, DICOM, which facilitates the interoperability of imaging equipment through data storage and network communication protocols.

discontinuity, *n*—a lack of continuity or cohesion; an intentional or unintentional interruption in the physical structure or configuration of a material or component.

evaluation, *n*—determination of whether a relevant indication is cause to accept or to reject a material or component.

examination, *n*—a procedure for determining a property (or properties) or other conditions or characteristics of a material or component by direct or indirect means.

DISCUSSION—Examples include utilization of X-rays or ultrasonic waves for the purpose of determining (directly or by calculation) flaw content, density, or (for ultrasound) modulus; or detection of flaws by induction of eddy currents, observing thermal behavior, AE response, or utilization of magnetic particles or liquid penetrants.

false indication, *n*—an NDT indication that is interpreted to be caused by a condition other than a discontinuity or imperfection.