



Standard Practice for Examination of Drillstring Threads Using the Alternating Current Field Measurement Technique¹

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1. Scope

1.1 This practice describes procedures to be followed during alternating current field measurement examination of drillstring threads on tubulars used for oil and gas exploration and production for detection and, if required, sizing of service-induced surface breaking discontinuities transverse to the pipe.

1.2 This practice is intended for use on threads in any metallic material.

1.3 This practice does not establish acceptance criteria. Typical industry practice is to reject these connections on detection of a confirmed crack.

1.4 While the alternating current field measurement technique is capable of detecting discontinuities in these connections, supplemental surface NDT methods such as magnetic particle testing for ferrous metals and penetrant testing for non-ferrous metals may detect more discontinuities.

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

1.6 *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*:²

E543 Specification for Agencies Performing Nondestructive Testing

E1316 Terminology for Nondestructive Examinations

E2216 Guide for Evaluating Disposal Options for Concrete from Nuclear Facility Decommissioning

2.2 *ASNT Standards*³

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

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

3. Terminology

3.1 For definitions of terms relating to this practice refer to Terminology **E1316**, Section A, Common NDT terms, and Section C, Electromagnetic testing. The following definitions are specific to the alternating current field measurement technique:

3.2 *Definitions*:

3.2.1 *detector*—one or more coils or elements used to sense or measure a magnetic field; also known as a receiver.

3.2.2 *exciter*—a device that generates a time varying electromagnetic field, usually a coil energized with alternating current (AC); also known as a transmitter.

3.2.3 *uniform field*—as applied to nondestructive testing with magnetic fields, the area of uniform magnetic field over the surface of the material under examination produced by a parallel induced alternating current, which has been passed through the testpiece and is observable beyond the direct coupling of the exciting coil.

3.3 *Definitions of Terms Specific to This Standard*:

3.3.1 *alternating current field measurement system*—the electronic instrumentation, software, probes, and all associated components and cables required for performing an examination using the alternating current field measurement technique.

3.3.2 *box*—the female thread in a drillstring connection.

3.3.3 *B_x*—the x component of the magnetic field, parallel to the thread root, the magnitude of which is proportional to the current density set up by the electric field.

¹ This practice is under the jurisdiction of ASTM Committee E07 on Nondestructive Testing and is the direct responsibility of Subcommittee E07.07 on Electromagnetic 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>.