



Standard Practice for In Situ Examination of Ferromagnetic Heat-Exchanger Tubes Using Remote Field Testing¹

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1. Scope

1.1 This practice describes procedures to be followed during remote field examination of installed ferromagnetic heat-exchanger tubing for baseline and service-induced discontinuities.

1.2 This practice is intended for use on ferromagnetic tubes with outside diameters from 0.500 to 2.000 in. (12.70 to 50.80 mm), with wall thicknesses in the range from 0.028 to 0.134 in. (0.71 to 3.40 mm).

1.3 This practice does not establish tube acceptance criteria; the tube acceptance criteria must be specified by the using parties.

1.4 The values stated in either inch-pound units or SI units are to be regarded separately as standard. The values stated in each system may 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.

1.5 *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 practice 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 543 Practice for Agencies Performing Nondestructive Testing²

E 1316 Terminology for Nondestructive Examinations²

2.2 Other Documents:

ASNT SNT-TC-1A Recommended Practice for Nondestructive Testing Personnel Qualification and Certification³

Can CGSB-48.9712-95 Qualification of Nondestructive Testing Personnel, Natural Resources Canada⁴

3. Terminology

3.1 *General*—Definitions of terms used in this practice can be found in Terminology E 1316, Section A, “Common NDT Terms,” and Section C, “Electromagnetic Testing.”

3.2 Definitions:

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

3.2.2 *exciter, n*—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 *nominal tube, n*—a tube or tube section meeting the tubing manufacturer’s specifications, with relevant properties typical of a tube being examined, used for reference in interpretation and evaluation.

3.2.4 *remote field, n*—as applied to nondestructive testing, the electromagnetic field which has been transmitted through the test object and is observable beyond the direct coupling field of the exciter.

3.2.5 *remote field testing, n*—a nondestructive test method that measures changes in the remote field to detect and characterize discontinuities.

3.2.6 *using parties, n*—the supplier and purchaser.

3.2.6.1 *Discussion*—The party carrying out the examination is referred to as the “supplier,” and the party requesting the examination is referred to as the “purchaser,” as required in *Form and Style for ASTM Standards*, October 1999. In common usage outside this practice, these parties are often referred to as the “operator” and “customer,” respectively.

3.3 Definitions of Terms Specific to This Standard:

3.3.1 *flaw characterization standard, n*—a standard used in addition to the RFT system reference standard, with artificial or service-induced flaws, used for flaw characterization.

3.3.2 *nominal point, n*—a point on the phase-amplitude diagram representing data from nominal tube.

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 Methods.

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² *Annual Book of ASTM Standards*, Vol 03.03.

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

⁴ Available from CGSB Sales Centre; Place du Portage, Phase 3, 6B1; 11 Laurier Street, Hull QC, Canada K1A 1G6.