



Standard Practice for Electromagnetic (Eddy Current) Examination of Ferromagnetic Cylindrical Bar Product Above the Curie Temperature¹

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^{ε1} NOTE—Changes were made editorially in July 2013.

1. Scope*

1.1 This practice covers procedures for eddy current examination of hot ferromagnetic bars above the Curie temperature where the product is essentially nonmagnetic, but below 2100 °F (1149 °C).

1.2 This practice is intended for use on bar products having diameters of ½ in. (12.7 mm) to 8 in. (203 mm) at linear throughput speeds up to 1200 ft/min (366 m/min). Larger or smaller diameters may be examined by agreement between the using parties.

1.3 The purpose of this practice is to provide a procedure for in-line eddy current examination of bars during processing for the detection of major or gross surface discontinuities.

1.3.1 The types of discontinuities capable of being detected are commonly referred to as: slivers, laps, seams, roll-ins (scale, dross, and so forth), and mechanical damage such as scratches, scores, or indentations.

1.4 This practice does not establish acceptance criteria. They must be specified by agreement between the using parties.

1.5 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.6 *This practice 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.*

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. Referenced Documents

2.1 ASTM Standards:²

E543 Specification for Agencies Performing Nondestructive Testing

E1316 Terminology for Nondestructive Examinations

2.2 Other Documents:

SNT-TC-1A Recommended Practice for Personnel Qualification and Certification in Nondestructive Testing³

ANSI/ASNT-CP-189 Standard for Qualification and Certification of NDT Personnel³

2.3 AIA Standard:

NAS 410 Certification and Qualification of Nondestructive Testing Personnel⁴

3. Terminology

3.1 Standard terminology relating to electromagnetic testing may be found in Terminology E1316, Section C: Electromagnetic Testing.

4. Summary of Practice

4.1 *Principle*—The major advantage of examining ferromagnetic bar product above the Curie temperature with eddy currents is the enhanced signal-to-noise ratio obtained without the need for magnetic saturation.

4.2 *Sensors*—This examination may be performed with various types or designs of encircling coils or with probe coils that are fixed or rotating.

4.2.1 One or more exciter or sensor coils is used to encircle the bar through which the product to be examined is passed. When the hot bar is in close proximity to the sensing and

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>.

⁴ Available from Aerospace Industries Association of America, Inc. (AIA), 1000 Wilson Blvd., Suite 1700, Arlington, VA 22209-3928, <http://www.aia-aerospace.org>.