



Standard Practice for Detection of Large Inclusions in Bearing Quality Steel by the Ultrasonic Method¹

This standard is issued under the fixed designation E588; 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.

1. Scope

1.1 This practice covers a procedure for the rating of rectangular steel sections by immersion ultrasonic techniques. Its purpose is to provide information on the content of large inclusions or clusters of small inclusions for determining the suitability of a steel lot for bearing applications. This practice in no manner defines or establishes limits of acceptability.

1.2 For this document, large inclusions are defined in ultrasonic terms as those having a reflecting area equivalent to or larger than a $\frac{1}{64}$ -in. diameter flat-bottom hole in a steel reference block of similar properties and thickness. In metallographic terms, large inclusions, defined in this way, are of approximately the same size as the smallest detectable sizes revealed by the macroscopic methods of Test Methods E45. In some cases, inclusions smaller than those described previously can be detected either individually or in clusters, depending on their type, chemical composition, orientation to the ultrasonic beam and distance from the sound entry surface of the specimen.

1.3 *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

E45 Test Methods for Determining the Inclusion Content of Steel

¹ This practice is under the jurisdiction of ASTM Committee A01 on Steel, Stainless Steel and Related Alloys and is the direct responsibility of Subcommittee A01.28 on Bearing Steels.

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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.

E214 Practice for Immersed Ultrasonic Testing by the Reflection Method Using Pulsed Longitudinal Waves (Withdrawn 2007)³

E428 Practice for Fabrication and Control of Metal, Other than Aluminum, Reference Blocks Used in Ultrasonic Testing

E543 Specification for Agencies Performing Nondestructive Testing

E1316 Terminology for Nondestructive Examinations

2.2 ASNT Documents:

SNT-TC-1A Recommended Practice for Personnel Qualification and Certification in Nondestructive Testing⁴

ASNT-CP-189 Standard for Qualification and Certification of Nondestructive Testing Personnel⁴

3. Terminology

3.1 *Definitions*—For definitions of terms used in this practice, see Terminology E1316.

4. Basis of Application

4.1 *Agreements Between Using Parties*—In order for this practice to be effectively used, the following items require agreement between the using parties.

4.1.1 *Evaluation of Nondestructive Testing Agencies*—An agreement is required as to whether the nondestructive testing agency, as defined in Specification E543, must be formally evaluated and qualified to perform the examination. If such an evaluation is specified, a documented procedure such as Specification E543 shall be used as the basis for evaluation.

4.1.2 *Personnel Qualification*—Nondestructive testing (NDT) personnel shall be qualified in accordance with a nationally recognized NDT personnel qualification practice or standard such as ASNT CP-189, SNT-TC-1A, or a similar document. The practice or standard used and its applicable

³ The last approved version of this historical standard is referenced on www.astm.org.

⁴ Available from American Society for Nondestructive Testing (ASNT), P.O. Box 28518, 1711 Arlingate Ln., Columbus, OH 43228-0518, <http://www.asnt.org>.