



Standard Practice for Magnetic Particle Examination of Steel Forgings¹

This standard is issued under the fixed designation A275/A275M; 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.

This standard has been approved for use by agencies of the U.S. Department of Defense.

1. Scope*

1.1 This practice² covers a procedure for magnetic particle examination of steel forgings. The procedure will produce consistent results upon which acceptance standards can be based. This practice does not contain acceptance standards or recommended quality levels.

1.2 Only direct current or rectified alternating (full or half wave) current shall be used as the electric power source for any of the magnetizing methods. Alternating current is not permitted because its capability to detect subsurface discontinuities is very limited and therefore unsuitable.

1.2.1 Portable battery powered electromagnetic yokes are outside the scope of this practice.

NOTE 1—Guide E709 may be utilized for magnetic particle examination in the field for machinery components originally manufactured from steel forgings.

1.3 The minimum requirements for magnetic particle examination shall conform to practice standards of Practice E1444/E1444M. If the requirements of this practice are in conflict with the requirements of Practice E1444/E1444M, the requirements of this practice shall prevail.

1.4 This practice and the applicable material specifications are expressed in both inch-pound units and SI units. However, unless the order specifies the applicable “M” specification designation [SI units], the material shall be furnished to inch-pound units.

1.5 The values stated in either SI units or inch-pound 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 non-conformance 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:³

A508/A508M Specification for Quenched and Tempered Vacuum-Treated Carbon and Alloy Steel Forgings for Pressure Vessels

A788/A788M Specification for Steel Forgings, General Requirements

E709 Guide for Magnetic Particle Testing

E1444/E1444M Practice for Magnetic Particle Testing

2.2 Other Document:

Recommended Practice No. SNT-TC-1A, Supplement B-Magnetic Particle Method⁴

3. Terminology

3.1 Definitions:

3.1.1 *indication*—the visual magnetic particle buildup resulting from leakage fields in the magnetic field.

3.1.2 *linear indication*—an indication in which the length is at least three times the width. The minimum length of indications to be considered linear shall be $\frac{1}{16}$ in. [1.6 mm].

3.1.3 *magnetic flux*—the product of the magnetic induction and the area of a surface (or cross section) when the magnetic induction is uniformly distributed and normal to the plane of the surface. The concept that the magnetic field is flowing along the lines of force suggests that these lines are therefore “flux” lines, and they are called magnetic flux.

3.1.4 *magnetic particle method of examination*—a method for detecting discontinuities on or near the surface in suitably

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 A01.06 on Steel Forgings and Billets.

Current edition approved May 1, 2015. Published May 2015. Originally approved in 1944. Last previous edition approved in 2013 as A275/A275M – 08 (2013). DOI: 10.1520/A0275_A0275M-15.

² For ASME Boiler and Pressure Vessel Code applications see related Method SA-275/SA-275M in Section II of that Code.

³ 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.

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