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Standard Specification for Steel Castings, Surface Acceptance Standards, Magnetic Particle and Liquid Penetrant Inspection[1]

This standard is issued under the fixed designation A 903/A 903M; 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 specification covers acceptance criteria for the surface inspection of steel castings when nondestructively examined by magnetic particle or liquid penetrant inspection.

1.2 This specification is to be used wherever the inquiry, contract, order, or specification states that the acceptance standards for magnetic particle or liquid penetrant inspection shall be in accordance with Specification A 903/A 903M.

1.3 The values stated in either inch-pound units or SI units are to be regarded separately as standard. Within the text the SI units are shown in brackets. The values stated in each system are not exact equivalents; therefore each system must be used independently of the other. Combining values from the two systems may result in a nonconformance with this specification.

2. Referenced Documents

2.1 *ASTM Standards:*

E 165 Test Method for Liquid Penetrant Examination[2]

E 709 Guide for Magnetic Particle Examination[2]

3. Terminology

3.1 *Definitions:*

3.1.1 *linear indications*—an indication whose length is equal to or greater than three times its width shall be classified as a linear indication.

3.1.2 *nonlinear indications*—an indication whose length is less than three times its width shall be classified as nonlinear.

3.1.3 *relevant indications*—relevant indications are indications which result from mechanical discontinuities. Only indications whose major dimension exceeds 1⁄16 in. [1.6 mm] shall be considered relevant.

4. Ordering Information

4.1 The inquiry and order should indicate the following information:

4.1.1 *Nondestructive Practice*—Practice E 165 for liquid penetrant inspection or Guide E 709 for magnetic particle inspection. Unless a specific technique within a practice is specified, the choice shall be the option of the manufacturer.

4.1.2 *Personnel Qualifications*.

4.1.3 *Extent of Inspection*—The number of castings and the extent of casting surfaces to be examined.

4.1.4 *Acceptance Level*—If more than one acceptance level is specified for different locations, a nondestructive test drawing identifying acceptance levels and locations should accompany the inquiry and order.

4.1.5 *Supplementary Requirements*, if any.

5. Personnel Qualifications

5.1 Personnel performing examination shall be qualified in accordance with an acceptable written procedure as agreed upon between the purchaser and manufacturer.

6. Evaluation of Indications

6.1 All relevant indications shall be evaluated in terms of the acceptance criteria.

6.2 Mechanical discontinuities are indicated by bleed-out of the penetrant or retention of the magnetic particle examination medium. However, false indications may be produced by localized surface irregularities, metallurgical discontinuities, or magnetic permeability variations. Any indication in excess of the acceptance criteria which is believed to be false may be reexamined. Surface conditioning may precede reexamination. When agreed upon between the manufacturer and purchaser, the liquid penetrant method may be used to verify the presence of surface discontinuities which had been previously indicated by the magnetic particle method.

6.3 Broad areas of fluorescence, pigmentation, or particle accumulation which may mask indications of discontinuities are unacceptable, and such areas will be cleaned and reexamined.

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[1] This specification is under the jurisdiction of ASTM Committee A01 on Steel, Stainless Steel, and Related Alloys and is the direct responsibility of Subcommittee A01.18 on Castings.

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

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