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Standard Reference Radiographs for Ductile Iron Castings¹

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1. Scope

1.1 This standard extends the application of steel casting reference radiographs E446, E186, and E280 to ductile iron castings when determined appropriate for specific applications (see Section 4).

1.2 The reference radiograph films are an adjunct to E446, E186, or E280, and must be purchased separately from ASTM International, if needed (see 2.1). Categories and severity levels for each discontinuity type represented by these reference radiographs are described within each applicable standard above.

NOTE 1—The basis of application for these reference radiographs requires a prior purchaser supplier agreement of radiographic examination attributes and classification criterion as described in Sections 4, 5, and 6 of this standard.

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
- E94 Guide for Radiographic Examination
 - E186 Reference Radiographs for Heavy-Walled (2 to 4½-in. (50.8 to 114-mm)) Steel Castings
 - E242 Reference Radiographs for Appearances of Radiographic Images as Certain Parameters are Changed
 - E280 Reference Radiographs for Heavy-Walled (4½ to 12-in. (114 to 305-mm)) Steel Castings
 - E446 Reference Radiographs for Steel Castings Up to 2 in. (50.8 mm) in Thickness
 - E1316 Terminology for Nondestructive Examinations

¹ This reference radiograph is under the jurisdiction of ASTM Committee E07 on Nondestructive Testing and is the direct responsibility of Subcommittee E07.02 on Reference Radiological Images.

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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.

3. Terminology

3.1 *Definitions*—For definitions of terms relating to radiographic examination, see Terminology E1316.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *production radiograph*—a radiograph under review for compliance with this standard.

3.2.2 *Discontinuity type*—a specific discontinuity characterized by its cause and appearance. For example, linear shrinkage is a specific discontinuity type.

3.2.3 *discontinuity category*—a nomenclature system used for grouping discontinuity types. For example, linear shrinkage is assigned category “Ca” where “C” represents the general shrinkage category and “a” represents the specific linear shrinkage discontinuity type.

3.2.4 *discontinuity severity level*—a relative rank in terms of “quantity, size and distribution” of a collection of discontinuities where “1” is the least and “5” is the greatest “quantity, size and distribution” present on the reference radiograph. For example, a severity level of “1” is more restrictive (requires a higher level of fabrication quality) than a severity level of “2”.

3.2.5 *discontinuity class*—an assigned fabrication quality rating characterized by a discontinuity type, category and severity level. For example, “Ca 2” is a discontinuity class comprised of linear shrinkage with a severity level of “2”.

3.2.6 *classification specification*—a set of user defined acceptance criterion that prescribes the radiographic discontinuity class requirements for a specified user casting service application (see Sections 6 and 7).

3.2.7 *graded illustration*—a category of discontinuity that is assigned a severity level.

3.2.8 *ungraded illustration*—a category of discontinuity without an assigned severity level.

3.2.9 *prorating*—assignment of quantity, size and distribution on a production radiograph in proportion to a similar size area of a reference radiograph. For example, a production radiograph covers an area that is smaller than the unit area of a reference radiograph and the extent of discontinuity on the applicable reference radiograph is reduced proportionately.

4. Significance and Use

4.1 The casting process has demonstrated radiographic similarities between internal discontinuities for ductile cast