



Designation: E280 – 98 (Reapproved 2004)^{ε1}

Standard Reference Radiographs for Heavy-Walled (4½ to 12-in. [114 to 305-mm]) Steel Castings¹

This standard is issued under the fixed designation E280; 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 Department of Defense.

^{ε1} NOTE—Editorial changes were made throughout in January 2004.

1. Scope

1.1 These reference radiographs² for heavy-walled steel castings are applicable to nominal section thicknesses of 4½ to 12 in. [114 to 305 mm] and consists of two sets as follows:

1.1.1 *2-MV X rays and Cobalt-60*—This includes cobalt-60 or equivalent isotope radiation and from 2 MV up to 4 MV X rays. Set of 28 plates in 8½ by 11 in. [216 by 279 mm] ring binders.

1.1.2 4-MV to 30-MV X rays.

1.1.3 Each set consists of three categories of graded discontinuities in increasing severity levels, and three categories of ungraded discontinuities furnished as examples only, as follows:

1.1.3.1 *Category A*—Gas porosity; severity levels 1 through 5.

1.1.3.2 *Category B*—Sand and slag inclusions; severity levels 1 through 5.

1.1.3.3 *Category C*—Shrinkage; 3 types:

(1) *Type 1*—Severity levels 1 through 5.

(2) *Type 2*—Severity levels 1 through 5.

(3) *Type 3*—Severity levels 1 through 5.

1.1.3.4 *Category D*—Crack; one illustration D5 in pre-1972 documents.

1.1.3.5 *Category E*—Hot tear; one illustration D3 in pre-1972 documents.

1.1.3.6 *Category F*—Insert; one illustration EB2 in pre-1972 documents.

1.2 *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 appro-*

priate safety and health practices and determine the applicability of regulatory limitations prior to use.

2. Referenced Documents

2.1 *ASTM Standards*:³

E94 *Guide for Radiographic Examination*

E1316 *Terminology for Nondestructive Examinations*

2.2 *ASTM Adjuncts*:⁴

Reference Radiographs for Heavy-Walled (4½ to 12-in. [114 to 305-mm]) Steel Castings:

Volume I, 2-MV X Rays and Cobalt-60⁵

Volume II, 4-MV to 30-MV X Ray⁶

3. Terminology

3.1 *Definitions*—for definitions of terms used in this document, see Terminology E1316, section D.

4. Significance and Use

4.1 These reference radiographs are reproductions of original radiographs and are supplied as a means for establishing the categories and severity levels of discontinuities in steel castings that may be revealed by radiographic examination. They may be used in accordance with contractual specifications.

4.2 Radiographs for evaluation are to be compared with these reference radiographs for classification on the basis of the category and severity level of the discontinuity.

4.3 The use of this document is not intended to be restricted to the specific energy level or to the absolute thickness limits that are contained in the document title. The title is intended to be descriptive, not restrictive. The document may be used where there is no other applicable document, for other energy

¹ These reference radiographs are under the jurisdiction of ASTM Committee E07 on Nondestructive Testing and are the direct responsibility of Subcommittee E07.02 on Reference Radiographs.

Current edition approved January 1, 2004. Published February 2004. Originally approved in 1965. Last previous edition approved in 1998 as E280 - 98. DOI: 10.1520/E0280-98R04E01.

² For ASME Boiler and Pressure Vessel Code applications see related Reference Radiographs SE 280 in Section V 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 ASTM Headquarters.

⁵ Order RRE028001.

⁶ Order RRE028002.