



Standard Guide to Obtainable ASTM Equivalent Penetrameter Sensitivity for Radiography of Steel Plates ¼ to 2 in. (6 to 51 mm) Thick with X Rays and 1 to 6 in. (25 to 152 mm) Thick with Cobalt-60¹

This standard is issued under the fixed designation E 592; 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 approval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This guide to obtainable equivalent penetrameter sensitivity covers the minimum penetrameter thicknesses for which the image of the 1T and 2T holes is visible for a few practical radiographic conditions. The values represent near optimum sensitivity for flat steel plates. Radiographic conditions that give higher values of scatter buildup from the specimen or backscattered radiation at the image plane will give poorer sensitivity.

1.2 Eight radiographs that illustrate sensitivities obtainable with practical radiographic systems are included as adjuncts to this guide and may be obtained from ASTM.

1.3 The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are for information only.

1.4 *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:

E 746 Test Method for Determining Relative Image Quality Response of Industrial Radiographic Film²

E 999 Guide for Controlling the Quality of Industrial Radiographic Film Processing²

E 1025 Practice for Design, Manufacture, and Material Grouping Classification of Hole-Type Image Quality Indicators (IQI) Used for Radiology²

E 1316 Terminology for Nondestructive Examinations²

2.2 ANSI Standard:

ANSI PH2.8 Sensitometry of Industrial X-ray Films for Energies up to 3 Million Electron Volts³

2.3 Military Standard:

MIL-STD-271 Nondestructive Testing Requirements for Metals⁴

2.4 ASTM Adjuncts:

Guide for Equivalent Penetrameter Sensitivity Between X Rays and Cobalt-60⁵

3. Terminology

3.1 *Definitions:* —For definitions of terms used in this standard, refer to Terminology E 1316, Section D.

4. Significance and Use

4.1 A key consideration with any radiographic system is its capability to resolve detail (that is, sensitivity). The degree of obtainable sensitivity with a given system is dependent upon several radiographic parameters such as source energy level, film type, type and thickness of intensifying screens, exposure (density), etc. This guide permits the user to estimate the degree of sensitivity that may be obtained with X rays and cobalt-60 gamma rays when using a prescribed set of radiographic parameters. This guide may also be used in conjunction with Test Method E 746 to provide a basis for developing data for evaluation of a user's specific system. This data may assist a user in determining appropriate parameters for obtaining desired degrees of radiographic system sensitivity. An alternate to this approach is the use of those adjunct radiographic illustrations detailed in Section 6.

5. Procedure

5.1 *Sensitivity for ¼ to 2-in. (6 to 51-mm) Thick Steel Using X Rays:*

¹ This guide is under the jurisdiction of ASTM Committee E-7 on Nondestructive Testing and is the direct responsibility of Subcommittee E7.02 on Reference Radiographs.

Current edition approved June 10, 1999. Published August 1999. Originally published as E 592 – 77. Last previous edition E 592 – 94.

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

³ Available from American National Standards Institute, 11 W. 42nd St., 13th Floor, New York, NY 10036.

⁴ Available from Standardization Documents Order Desk, Bldg. 4 Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094, Attn: NPODS.

⁵ Available from ASTM Headquarters. Order RRE0592.

