



Designation: E 747 – 97

Standard Practice for Design, Manufacture and Material Grouping Classification of Wire Image Quality Indicators (IQI) Used for Radiology¹

This standard is issued under the fixed designation E 747; 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 reappraisal. A superscript epsilon (ε) indicates an editorial change since the last revision or reappraisal.

1. Scope

1.1 This practice² covers the design, material grouping classification, and manufacture of wire image quality indicators (IQI) used to indicate the quality of radiologic images.

1.2 This practice is applicable to X-ray and gamma-ray radiology.

1.3 This practice covers the use of wire penetrameters as the controlling image quality indicator for the material thickness range from 6.4 to 152 mm (0.25 to 6.0 in.).

1.4 The values stated in inch-pound units are to be regarded as standard.

1.5 *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:

B 139 Specification for Phosphor Bronze Rod, Bar, and Shapes³

B 150 Specification for Aluminum Bronze Rod, Bar, and Shapes³

B 161 Specification for Nickel Seamless Pipe and Tube⁴

B 164 Specification for Nickel-Copper Alloy Rod, Bar, and Wire⁴

B 166 Specification for Nickel-Chromium-Iron Alloys (UNS N06600, N06601, and N06690) and Nickel-Chromium-Cobalt-Molybdenum Alloy (UNS N06617) Rod, Bar, and Wire⁴

E 1025 Practice for Design, Manufacture, and Material Grouping Classification of Hole-Type Image Quality Indicators (IQI) Used for Radiology⁵

E 1316 Terminology for Nondestructive Examinations⁵

3. Terminology

3.1 *Definitions*—The definitions of terms in Terminology E 1316, Section D, relating to gamma and x-radiology, shall apply to the terms used in this practice.

4. Wire IQI Requirements

4.1 The quality of all levels of examination shall be determined by a set of wires conforming to the following requirements:

4.1.1 Wires shall be fabricated from materials or alloys identified or listed in accordance with 7.2. Other materials may be used in accordance with 7.3.

TABLE 1 Wire IQI Sizes and Wire Identity Numbers

SET A		SET B	
Wire Diameter in. (mm)	Wire Identity	Wire Diameter in. (mm)	Wire Identity
0.0032 (0.08) ^A	1	0.010 (0.25)	6
0.004 (0.1)	2	0.013 (0.33)	7
0.005 (0.13)	3	0.016 (0.4)	8
0.0063 (0.16)	4	0.020 (0.51)	9
0.008 (0.2)	5	0.025 (0.64)	10
0.010 (0.25)	6	0.032 (0.81)	11
SET C		SET D	
Wire Diameter in. (mm)	Wire Identity	Wire Diameter in. (mm)	Wire Identity
0.032 (0.81)	11	0.10 (2.5)	16
0.040 h(1.02)	12	0.126 (3.2)	17
0.050 (1.27)	13	0.160 (4.06)	18
0.063 (1.6)	14	0.20 (5.1)	19
0.080 (2.03)	15	0.25 (6.4)	20
0.100 (2.5)	16	0.32 (8)	21

^A The 0.0032 wire may be used to establish a special quality level as agreed upon between the purchaser and the supplier.

TABLE 2 Wire Diameter Tolerances, (mm)

Wire Diameter (<i>d</i>), mm	Tolerance, mm
0.000 < <i>d</i> ≤ 0.125	±0.0025
0.125 < <i>d</i> ≤ 0.25	±0.005
0.25 < <i>d</i> ≤ 0.5	±0.01
0.50 < <i>d</i> ≤ 1.6	±0.02
1.6 < <i>d</i> ≤ 4	±0.03
4.0 < <i>d</i> ≤ 8	±0.05

¹ This practice is under the jurisdiction of ASTM Committee E-7 on Nondestructive Testing and is the direct responsibility of Subcommittee E07.01 on Radiographic Practice and Penetrators.

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² For ASME Boiler and Pressure Vessel Code applications see related Practice SE-747 in Section II of that Code.

³ Annual Book of ASTM Standards, Vol 02.01.

⁴ Annual Book of ASTM Standards, Vol 02.04.

⁵ Annual Book of ASTM Standards, Vol 03.03.