



Standard Practice for Determining Total Image Unsharpness and Basic Spatial Resolution in Radiography and Radioscopy¹

This standard is issued under the fixed designation E2002; 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 practice covers the design and basic use of a gauge used to determine the total image unsharpness and the basic spatial resolution of film radiographs or of digital images taken with CR imaging plates, digital detector arrays, or radioscopy systems.

1.2 This practice is applicable to radiographic and radioscopy imaging systems utilizing X-ray and gamma ray radiation sources.

1.3 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.4 The gauge described can be used effectively with tube voltages up to 600 kV. When using source voltages in the megavolt range the results may not be completely satisfactory.

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:²

E747 Practice for Design, Manufacture and Material Grouping Classification of Wire Image Quality Indicators (IQI) Used for Radiology

E1025 Practice for Design, Manufacture, and Material Grouping Classification of Hole-Type Image Quality Indicators (IQI) Used for Radiology

E1316 Terminology for Nondestructive Examinations

E1815 Test Method for Classification of Film Systems for

Industrial Radiography

2.2 ISO Standards³

ISO 19232-1 Non-destructive Testing—Image Quality of Radiographs—Part 1: Image Quality Indicators (Wire Type)—Determination of Image Quality Value

ISO 19232-2 Non-destructive Testing—Image Quality of Radiographs—Part 2: Image Quality Indicators (Step/Hole Type)—Determination of Image Quality Value

ISO 19232-5 Non-destructive Testing—Image Quality of Radiographs—Part 5: Determination of Image Unsharpness Value Using Duplex Wire Type Image Quality Indicators

ISO/IEC 17050-1 Conformity Assessment—Supplier's Declaration of Conformity—Part 1: General Requirements

2.3 CEN Standard:

EN-462-5:1996 Nondestructive Testing—Image Quality of Radiographs—Part 5: Image Quality Indicators (Duplex Wire Type)—Determination of Total Image Unsharpness Value⁴

3. Terminology

3.1 *Definitions*—Definitions of terms applicable to this practice may be found in Terminology **E1316**.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *basic spatial image resolution (SR_b^{image}) value*—determined from the smallest number of the duplex wire pair, which is not separable by visual inspection or from the smallest number of the duplex wire pair with less than 20% modulation depth in a linearized profile, and corresponds to $\frac{1}{2} \cdot U_T$. U_T may be U_T^{visual} or $U_T^{20\%}$.

3.2.2 *duplex wire type image quality indicator*—duplex wire type image quality indicator (IQI) specifically designed to assess the total image unsharpness and basic spatial image resolution of a radiograph or a digital image and composed of a series of pairs of wire elements made of high density metal.

¹ This practice is under the jurisdiction of ASTM Committee E07 on Nondestructive Testing and is the direct responsibility of Subcommittee E07.01 on Radiology (X and Gamma) Method.

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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 Available from International Organization for Standardization (ISO), ISO Central Secretariat Chemin de Blandonnet 8, CP 401, 1214 Vernier, Geneva, Switzerland, <http://www.iso.org>.

⁴ Available from British Standards Institute (BSI), 389 Chiswick High Rd., London W4 4AL, U.K., <http://www.bsi-global.com>.