



Standard Practice for Controlling Quality of Radiological Examination by Using Representative Quality Indicators (RQIs)¹

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1. Scope

1.1 This practice covers the radiological examination of unique materials or processes, or both, for which conventionally designed image quality indicators (IQIs), such as those described in Practices E 747 and E 1025, may be inadequate in controlling the quality and repeatability of the radiological image.

1.2 Where appropriate, representative image quality indicators (RQIs) may also represent criteria levels of the acceptance or rejection of images of discontinuities.

1.3 This practice is applicable to most radiological methods of examination.

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 543 Practice for Evaluating Agencies that Perform Non-destructive Testing²

E 747 Practice for Design, Manufacture, and Material Grouping Classification of Wire Image Quality Indicators (IQI) Used for Radiology²

E 1000 Guide for Radioscopy²

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

E 1441 Guide for Computed Tomography (CT) Imaging²

2.2 ASNT Standards:³

SNT-TC-1A Recommended Practice for Personnel Qualification in Nondestructive Testing

ANSI/ASNT CP-189 Standard for Qualification and Certification of Nondestructive Testing Personnel

2.3 Aerospace Industries Association Document:

NAS 410 Certification and Qualification of Nondestructive Testing Personnel⁴

3. Terminology

3.1 *Definitions*—For definitions of terms used in this practice, refer to Terminology E 1316.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *representative quality indicator (RQI)*—a real part, or a fabrication of similar geometry in radiologically similar material to a real part, that has features of known characteristics that represent all of the features for which the parts to be purchased are being examined.

4. Summary of Practice

4.1 The information from an RQI image may be used to control all of the parameters necessary for production examination images (which look essentially like the RQI images) and is particularly effective in the practice of radioscopy and tomographic techniques. Refer to Guides E 1000 and E 1441, respectively.

4.2 The designer may also use the RQI, when in compliance with the requirements set out in this practice, to set accept or reject criteria, as applicable, to that part design.

5. Significance and Use

5.1 The use of RQIs is a significant departure from normal practice in industrial radiology because it is not a standard design and is dependent on the application, material, and process and therefore cannot be a simple plaque or wire. The use of an RQI provides documented evidence that radiologic images have the level of quality necessary to reveal those nonconformances for which the parts are being examined by ensuring adequate spatial resolution and contrast sensitivity in the areas of interest.

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 *Annual Book of ASTM Standards*, Vol 03.03.

³ Available from American Society for Nondestructive Testing, 1711 Arlingate Plaza, P.O. Box 28518, Columbus, OH 43228-0518.

⁴ Available from Aerospace Industries Association of America, Inc., 1250 Eye St., NW, Washington, DC 20005.