



Standard Practice for Digital Detector Array Performance Evaluation and Long-Term Stability¹

This standard is issued under the fixed designation E2737; 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 describes the evaluation of DDA systems for industrial radiology. It is intended to ensure that the evaluation of image quality, as far as this is influenced by the DDA system, meets the needs of users, and their customers, and enables process control and long term stability of the DDA system.

1.2 This practice specifies the fundamental parameters of Digital Detector Array (DDA) systems to be measured to determine baseline performance, and to track the long term stability of the DDA system.

1.3 The DDA system performance tests specified in this practice shall be completed upon acceptance of the system from the manufacturer and at intervals specified in this practice to monitor long term stability of the system. The intent of these tests is to monitor the system performance for degradation and to identify when an action needs to be taken when the system degrades by a certain level.

1.4 The use of the gages provided in this standard is mandatory for each test. In the event these tests or gages are not sufficient, the user, in coordination with the cognizant engineering organization (CEO) may develop additional or modified tests, test objects, gages, or image quality indicators to evaluate the DDA system. Acceptance levels for these ALTERNATE tests shall be determined by agreement between the user, CEO and manufacturer.

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.*

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. Referenced Documents

2.1 *ASTM Standards:*²

- E1025 Practice for Design, Manufacture, and Material Grouping Classification of Hole-Type Image Quality Indicators (IQI) Used for Radiology
- E1316 Terminology for Nondestructive Examinations
- E1742 Practice for Radiographic Examination
- E2002 Practice for Determining Total Image Unsharpness in Radiology
- E2445 Practice for Performance Evaluation and Long-Term Stability of Computed Radiography Systems
- E2597 Practice for Manufacturing Characterization of Digital Detector Arrays
- E2698 Practice for Radiological Examination Using Digital Detector Arrays
- E2736 Guide for Digital Detector Array Radiology

3. Terminology

3.1 *Definitions*—the definition of terms relating to gamma and X-radiology, which appear in Terminology E1316, Practice E2597, Guide E2736, and Practice E2698 shall apply to the terms used in this practice.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *digital detector array (DDA) system*—an electronic device that converts ionizing or penetrating radiation into a discrete array of analog signals which are subsequently digitized and transferred to a computer for display as a digital image corresponding to the radiologic energy pattern imparted upon the input region of the device. The conversion of the ionizing or penetrating radiation into an electronic signal may transpire by first converting the ionizing or penetrating radiation into visible light through the use of a scintillating material.

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.