



Standard Practice for Radiological Examination Using Digital Detector Arrays¹

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1. Scope

1.1 This practice establishes the minimum requirements for radiological examination for metallic and nonmetallic material using a digital detector array (DDA) system.

1.2 The requirements in this practice are intended to control the quality of radiologic images and are not intended to establish acceptance criteria for parts or materials.

1.3 This practice covers the radiologic examination with DDAs including DDAs described in Practice E2597 such as a device that contains a photoconductor attached to a Thin Film Transistor (TFT) read out structure, a device that has a phosphor coupled directly to an amorphous silicon read-out structure, and devices where a phosphor is coupled to a CMOS (Complementary metal-oxide-semiconductor) array, a Linear Detector Array (LDA) or a CCD (charge coupled device) crystalline silicon read-out structure.

1.4 The DDA shall be selected for an NDT application based on knowledge of the technology described in Guide E2736, and of the selected DDA properties provided by the manufacturer in accordance with Practice E2597.

1.5 The requirements of this practice and Practice E2737 shall be used together and both be approved by the CEO Level 3 in Radiography before inspection of production hardware. The requirements of Practice E2737 will provide the baseline evaluation and long term stability test procedures for the DDA system.

1.6 The requirements in this practice shall be used when placing a DDA into NDT service and, before being placed into service, an established baseline of system qualification shall be performed in accordance with Practice E2737.

1.7 Techniques and applications employed with DDAs are diverse. This practice is not intended to be limiting or restrictive. Refer to Guides E94, E1000, E2736, Terminology E1316, Practice E747 and E1025, Fed. Std. Nos. 21CFR 1020.40 and 29 CFR 1910.96 for a list of documents that provide additional information and guidance.

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

E94 Guide for Radiographic Examination

E543 Specification for Agencies Performing Nondestructive Testing

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

E1000 Guide for Radioscopy

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

E1316 Terminology for Nondestructive Examinations

E1647 Practice for Determining Contrast Sensitivity in Radiology

E1742 Practice for Radiographic Examination

E2002 Practice for Determining Total Image Unsharpness in Radiology

E2597 Practice for Manufacturing Characterization of Digital Detector Arrays

E2736 Guide for Digital Detector Arrays

E2737 Practice for Digital Detector Array Performance Evaluation and Long-Term Stability

2.2 AWS Documents:³

AWS A2.4 Symbols for Welding and Nondestructive Testing

2.3 Aerospace Industries Association Document:⁴

NAS 410 Certification & Qualification of Nondestructive Test Personnel

2.4 Government Standards:

NIST Handbook 114 General Safety Standard for Installations Using Non-medical X-ray and Sealed Gamma Ray Sources, Energies up to 10 MeV⁵

DoD Contracts any specifications called out on the DoDISS (Department of Defense Index of Specifications and

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 American Welding Society (AWS), 550 NW LeJeune Rd., Miami, FL 33126, <http://www.aws.org>.

⁴ Available from Aerospace Industries Association of America, Inc. (AIA), 1000 Wilson Blvd., Suite 1700, Arlington, VA 22209-3928, <http://www.aia-aerospace.org>.

⁵ Available from National Institute of Standards and Technology (NIST), 100 Bureau Dr., Stop 1070, Gaithersburg, MD 20899-1070, <http://www.nist.gov>.