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Standard Practice for Radiographic Examination Using Digital Detector Arrays¹

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^{ε1} NOTE—10.15.3.2 was revised editorially in September 2018 to remove a duplicate paragraph.

1. Scope

1.1 This practice establishes the minimum requirements for radiographic examination of metallic and nonmetallic materials using digital detector arrays (DDAs).

1.2 The stated requirements of this specification are based on the use of an X-ray generating source. Additionally, some of the tests and requirements may not be applicable to X-ray energy levels >450kV.

1.3 The requirements in this practice are intended to control the quality of radiographic examinations obtained using DDAs and are not intended to establish acceptance criteria for parts or materials.

1.4 This practice covers the radiographic examination with DDAs including DDAs described in Practice E2597/E2597M 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, or a CCD (charge coupled device) crystalline silicon read-out structure.

1.5 The requirements of this practice and Practice E2737 shall be used together. The requirements of Practice E2737 will provide the baseline evaluation and long term stability test procedures for the DDA system. The user of the DDA system shall establish a written procedure that addresses the specific requirements and tests to be used in their application and shall be approved by the Cognizant Radiographic Level 3 before examination of production hardware. This practice also requires the user to perform a system qualification suitable for its intended purpose and to issue a system qualification report (see 9.1).

1.6 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/E2597M.

1.7 Techniques and applications employed with DDAs are diverse. This practice is not intended to be limiting or restrictive. Refer to Guides E94/E94M, E1000, and E2736, Terminology E1316, Practices E747 and E1025, and Federal Standards 21-CFR-1020.40 and 29-CFR-1910.96 for a list of documents that provide additional information and guidance.

1.8 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*²

E94/E94M Guide for Radiographic Examination Using Industrial Radiographic Film

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 Radiography

E1165 Test Method for Measurement of Focal Spots of Industrial X-Ray Tubes by Pinhole Imaging

E1316 Terminology for Nondestructive Examinations

E1742/E1742M Practice for Radiographic Examination

E1817 Practice for Controlling Quality of Radiological Examination by Using Representative Quality Indicators (RQIs)

E2002 Practice for Determining Total Image Unsharpness

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.