



Standard Practice for Manufacturing Characterization of Computed Radiography Systems¹

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1. Scope

1.1 This practice describes the manufacturing characterization of computed radiography (CR) systems, consisting of a particular phosphor imaging plate (IP), scanner, software, and an image display monitor, in combination with specified metal screens for industrial radiography.

1.2 The practice defines system tests to be used to characterize the systems of different suppliers and make them comparable for users.

1.3 This practice is intended for use by manufacturers of CR systems or certification agencies to provide quantitative results of CR system characteristics for nondestructive testing (NDT) user or purchaser consumption. Some of these tests require specialized test phantoms to ensure consistency of results among suppliers or manufacturers. These tests are not intended for users to complete, nor are they intended for long term stability tracking and lifetime measurements. However, they may be used for this purpose, if so desired.

1.4 The CR system performance is described by the basic spatial resolution, contrast, signal and noise parameters, and the equivalent penetrameter sensitivity (EPS). Some of these parameters are used to compare with DDA characterization and film characterization data (see Practice E2597 and Test Method E1815).

NOTE 1—For film system characterization, the signal is represented by the optical density of 2 (above fog and base) and the noise as granularity. The signal-to-noise ratio is normalized by the aperture (similar to the basic spatial resolution) of the system and is part of characterization. This normalization is given by the scanning circular aperture of 100 μm of the micro-photometer, which is defined in Test Method E1815 for film system characterization.

1.5 The measurement of CR systems in this practice is restricted to a selected radiation quality to simplify the procedure. The properties of CR systems will change with radiation energy but not the ranking of CR system performance. Users of

this practice may carry out the tests at different or additional radiation qualities (X-ray or gamma ray) if required.

1.6 The values stated in SI are to be regarded as the standard.

1.7 *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 to determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:²

- E746 Practice for Determining Relative Image Quality Response of Industrial Radiographic Imaging Systems
- E1165 Test Method for Measurement of Focal Spots of Industrial X-Ray Tubes by Pinhole Imaging
- E1316 Terminology for Nondestructive Examinations
- E1815 Test Method for Classification of Film Systems for Industrial Radiography
- E2002 Practice for Determining Total Image Unsharpness and Basic Spatial Resolution in Radiography and Radioscopy
- E2007 Guide for Computed Radiography
- E2033 Practice for Computed Radiology (Photostimulable Luminescence Method)
- E2445 Practice for Performance Evaluation and Long-Term Stability of Computed Radiography Systems
- E2597 Practice for Manufacturing Characterization of Digital Detector Arrays
- E2903 Test Method for Measurement of the Effective Focal Spot Size of Mini and Micro Focus X-ray Tubes

2.2 ISO Standard:³

- ISO 17636-2 Non-Destructive Testing of Welds—Radiographic Testing—Part 2: X- and Gamma Ray Technologies with Digital Detectors

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), 1, ch. de la Voie-Creuse, CP 56, CH-1211 Geneva 20, Switzerland, <http://www.iso.org>.