



# Standard Practice for Performance Evaluation and Long-Term Stability of Computed Radiography Systems<sup>1</sup>

This standard is issued under the fixed designation E2445/E2445M; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

## 1. Scope

1.1 This practice describes the evaluation of Computed Radiology (CR) systems for industrial radiology. It is intended to ensure that the evaluation of image quality, as far as this is influenced by the CR system, meets the needs of users of this standard, and their customers, and enables process control and long-term stability of the CR system.

1.2 This practice specifies the fundamental parameters of CR systems to be measured to determine baseline performance, and to track the long term stability of the system. These tests are for applications up to 320kV. When greater than 320kV or when a gamma source is used, these tests may still be used to characterize a system, but may need to be modified as agreed between the user and cognizant engineering organization (CEO).

1.3 The CR 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 degradation and to identify when an action needs to be taken when the system degrades by a certain level.

1.4 The use of gauges<sup>2</sup> provided in this standard is mandatory for each test. In the event these tests or gauges are not sufficient, the user, in coordination with the CEO shall develop additional or modified tests, test objects, gauges, or image quality indicators to evaluate the CR system. Acceptance levels for these ALTERNATE tests shall be determined by agreement between the user and CEO.

<sup>1</sup> 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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<sup>2</sup> The sole source of supply of the apparatus shown in Appendix X2 known to the committee at this time is Rockwell Collins' ARINC, 1300 Thomas Drive, Panama City Beach, FL 32408, Phone: 405-605-7095, ARINC part number A0295224002 (USAF design) or A0295224003 (NAVAIR design). The NAVAIR design includes two additional test targets that are not used in this test standard. If you are aware of alternative suppliers, please provide this information to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend.<sup>1</sup>

1.5 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the standard.

1.6 *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:<sup>3</sup>

E746 Practice for Determining Relative Image Quality Response of Industrial Radiographic Imaging Systems

E1316 Terminology for Nondestructive Examinations

E1647 Practice for Determining Contrast Sensitivity in Radiology

E2002 Practice for Determining Total Image Unsharpness in Radiology

E2007 Guide for Computed Radiography

E2033 Practice for Computed Radiology (Photostimulable Luminescence Method)

E2446 Practice for Classification of Computed Radiology Systems

## 3. Terminology

3.1 *Definitions*—The definition of terms relating to gamma- and X-radiology, which appear in Terminology E1316, Guide E2007, and Practice E2033 shall apply to the terms used in this practice.

### 3.2 Definitions of Terms Specific to This Standard:

3.2.1 *aliasing*—artifacts that appear in an image when the spatial frequency of the input is higher than the output is capable of reproducing.

<sup>3</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.