



Standard Test Method for Measurement of the Effective Focal Spot Size of Mini and Micro Focus X-ray Tubes¹

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1. Scope

1.1 The image quality and the resolution of X-ray images highly depend on the characteristics of the focal spot. The imaging qualities of the focal spot are based on its two dimensional intensity distribution as seen from the imaging place.

1.2 This test method provides instructions for determining the effecting size (dimensions) of mini and micro focal spots of industrial X-ray tubes. It is based on the European standard, EN 12543–5, Non-destructive testing - Characteristics of focal spots in industrial X-ray systems for use in non-destructive testing - Part 5: Measurement of the effective focal spot size of mini and micro focus X-ray tubes.

1.3 This standard specifies a method for the measurement of effective focal spot dimensions from 5 up to 300 μm of X-ray systems up to and including 225 kV tube voltage, by means of radiographs of edges. Larger focal spots should be measured using Test Method E1165 Standard Test Method for Measurement of Focal Spots of Industrial X-Ray Tubes by Pinhole Imaging.

1.4 The same procedure can be used at higher kilovoltages by agreement, but the accuracy of the measurement may be poorer.

1.5 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this 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.*

¹ This test method 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

- E1165 Test Method for Measurement of Focal Spots of Industrial X-Ray Tubes by Pinhole Imaging
- E1255 Practice for Radioscopy
- E1742 Practice for Radiographic Examination
- E1815 Test Method for Classification of Film Systems for Industrial Radiography
- E2002 Practice for Determining Total Image Unsharpness in Radiology
- E2033 Practice for Computed Radiology (Photostimulable Luminescence Method)
- E2446 Practice for Classification of Computed Radiology Systems
- E2597 Practice for Manufacturing Characterization of Digital Detector Arrays
- E2698 Practice for Radiological Examination Using Digital Detector Arrays

2.2 European Standards:³

- EN 12543–5 Non-destructive testing—Characteristics of focal spots in industrial X-ray systems for use in non-destructive testing - Part 5: Measurement of the effective focal spot size of mini and micro focus X-ray tubes

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

3.1.1 *actual focal spot*—the X-ray producing area of the target as viewed from a position perpendicular to the target surface.

3.1.2 *effective focal spot*—the X-ray producing area of the target as viewed from the image plane.

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 National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.