



Standard Test Method for Classification of Film Systems for Industrial Radiography¹

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^{ε1} NOTE—Research Report number and ISO Standards updated editorially in June 2013

1. Scope

1.1 This test method covers a procedure for determination of the performance of film systems used for industrial radiography. This test method establishes minimum requirements that correspond to system classes.

1.2 This test method is to be used only for direct exposure-type film exposed with lead intensifying screens. The performance of films exposed with fluorescent (light-emitting) intensifying screens cannot be determined accurately by this test method.

1.3 The values stated in SI units are to be regarded as standard. The values given in parentheses are for information only.

1.4 *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:*²

E94 Guide for Radiographic Examination

E1316 Terminology for Nondestructive Examinations

2.2 *ISO Standards:*³

ISO 5-2 Photography Density Measurements—Part 2: Geometric Conditions for Transmission Density

ISO 5-3 Photography and Graphic Technology—Density Measurements—Part 3: Spectral Conditions

ISO 7004 Photography—Industrial Radiographic Films, Determination of ISO Speed, ISO average gradient and ISO

gradients G2 and G4 When Exposed to X and Gamma Radiation

ISO 11699-1 Non-Destructive Testing—Industrial Radiographic Film—Part 1: Classification of Film Systems for Industrial Radiography

ISO 11699-2 Non-Destructive Testing—Industrial Radiographic Film—Part 2: Control of Film Processing by Means of Reference Values

ISO/IEC 17025 General Requirements for the Competence of Testing and Calibration Laboratories

2.3 *European CEN Standard:*³

EN 584-1 Non-Destructive Testing—Industrial Radiographic Film—Part 1: Classification of Film Systems for Industrial Radiography

3. Terminology

3.1 *Definitions*—For definitions of terms used in this test method, refer to Terminology E1316.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *characteristic curve*—curve showing the relationship between the common logarithm of exposure logK, and the optical density *D*.

3.2.2 *diffuse density*—quantitative measure of film blackening (optical density) as determined by a densitometer. It is the sum of all transmitted and scattered light into the half sphere behind the film.

3.2.3 *film gradient G*—the slope of the characteristic curve at a specified optical density, *D*, and a measure of the contrast of the film system.

3.2.4 *film system*—the film and associated film-processing requirements in accordance with the criteria established by the manufacturers of the film and processing chemicals.

3.2.5 *film system class*—classification taking into account of limiting values given in Table 1.

3.2.6 *gradient/noise ratio*—ratio of the gradient *G* and the granularity σ_D . It relates directly to the signal/noise ratio. All further parameters determining the signal, such as the modulation transfer function or the energy of the radiation, are considered to be constant.

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 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>.