



Designation: E 1815 – 96

Standard Test Method for Classification of Film Systems for Industrial Radiography¹

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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 the 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:

E 94 Guide for Radiographic Testing²

E 999 Guide for Controlling the Quality of Industrial Radiographic Film Processing²

E 1079 Practice for Calibration of Transmission Densitometers²

E 1316 Terminology for Nondestructive Examinations²

2.2 ANSI Standards:³

PH 2.18 Photography (Sensitometry)—Density Measurements, Spectral Conditions

PH 2.19 Photography Density Measurements—Part 2: Geometric Conditions for Transmission Density

PH 2.40 Root Mean Square (rms) Granularity of Film (Images on One Side Only) Method of Measuring

2.3 ISO Standards:³

ISO 5-2 Photography Density Measurements—Part 2: Geo-

metric Conditions for Transmission Density

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

ISO 7004 Photography—Industrial Radiographic Film, Determination of ISO Speed and Average Gradient When Exposed to X and Gamma Radiation

3. Terminology

3.1 *Definitions*—For definitions of terms used in this test method, refer to Terminology E 1316.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *film system*—the film and associated film-processing requirements according to the criteria established by the manufacturers of the film and processing chemicals.

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

3.2.3 *granularity, σ_D* —the stochastic density fluctuations in the radiograph that are superimposed to the object image.

3.2.4 *ISO speed S*—determined by the dose K_s , measured in gray at a specified optical density, D , in the radiograph.

4. Significance and Use

4.1 This test method provides a relative means for classification of film systems used for industrial radiography. The film system consists of the film and associated processing system (the type of processing and processing chemistry). Section 6 describes specific parameters used for this test method. In general, the classification for hard X rays, as described in Section 6, can be transferred to other radiation energies and metallic screen types, as well as screens without films. The usage of film system parameters outside the energy ranges specified may result in changes to a film/system performance classification.

4.1.1 The film performance is described by signal and noise parameters. The signal is represented by gradient and the noise by granularity.

4.1.2 A film is assigned a particular class if it meets all four of the minimum performance parameters: for Gradient G at $D = 2.0$ and $D = 4.0$, granularity σ_D at $D = 2.0$, and gradient/noise ratio at $D = 2.0$.

4.2 This test method describes how the parameters shall be

¹ This test method is under the jurisdiction of ASTM Committee E-7 on Nondestructive Testing and is the direct responsibility of Subcommittee E07.01 on Radiology (X and Gamma) Method.

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² Annual Book of ASTM Standards, Vol 03.03.

³ Available from American National Standards Institute, 11 W. 42nd St., 13th Floor, New York, NY 10036.