



Designation: E 1390 – 90 (Reapproved 2000)

## Standard Guide for Illuminators Used for Viewing Industrial Radiographs<sup>1</sup>

This standard is issued under the fixed designation E 1390; 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 approval. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

### 1. Scope

1.1 This guide provides the recommended minimum requirements for illuminators used for viewing industrial film radiographs using transmitted light.

1.2 The illuminator has to ensure the same safety for personnel, or users of any electric apparatus, as specified by electrical standards applicable in the country in which the illuminator is used.

### 2. Referenced Documents

- 2.1 *ASTM Standards*:  
E 1316 Terminology for Nondestructive Examinations<sup>2</sup>

### 3. Terminology

3.1 *Definitions*—For definitions of terms used in this guide, see Terminology E 1316.

### 4. Significance and Use

4.1 The function of the illuminator is to provide sufficient illumination and viewing capabilities to visually review industrial film radiographs by light transmitted through them for the purpose of identification and interpretation of the images.

4.2 This guide is to be used primarily for the manufacturer of illuminators and is not intended to be applicable to the users of illuminators. Requirements, if imposed on users, should be established by contractual agreement.

### 5. Design Characteristics

5.1 *General*—The illuminator shall consist of a housing with one or more of the sides containing a viewing screen illuminated from the inside of the housing. The viewing screen may also be the diffusing screen. There shall be thermal protection to prevent overheating, and subsequent damage to the radiographs placed on the viewing screen. The housing or system may or may not require ventilation. A rheostat or suitable electrical circuit shall be provided to vary the light intensity.

5.2 *Viewing Screen*—The viewing screen shall be easy to clean and made of material which is resistant to scratches. The

size of the screen shall allow the user to view the radiograph without excessive glare. If the illuminator is to be used for viewing radiographs of various sizes, masks of various sizes and configurations, for example, circular or rectangular, shall be provided. Alternately, an adjustable aperture may be used.

### 6. Illumination Requirements<sup>3</sup>

#### 6.1 Luminance:

6.1.1 The luminance (or brightness) of the transmitted light through the radiograph shall not be less than 30 cd/m<sup>2</sup> for film densities equal or less than 2.5, and 10 cd/m<sup>2</sup> for film densities greater than 2.5.

NOTE 1—Where possible, approximately 100 cd/m<sup>2</sup> or higher luminance should be used.

6.1.2 To achieve the maximum luminance value, that is, 10 cd/m<sup>2</sup>, given in 6.1.1, the illuminator brightness shall be at least 10<sup>5</sup> cd/m<sup>2</sup>. This should be determined with a suitably calibrated photometer or telephotometer placed at the center of the viewing surface. Follow manufacturer's instructions in using the photometer.

6.1.3 When servicing is required, it shall usually be sufficient to follow manufacturer's recommendations in, for example, replacing a bulb.

6.2 *Spectral Characteristics of Illuminator Light Source*—The color of the light used to illuminate the radiograph is normally "white." However, in the case of colored film bases, light with adapted colors may be used if they have been recommended by the film manufacturers.

6.3 *Diffusion of Light*—If the illuminator has a diffusing screen, the light shall be sufficiently divergent so that both eyes of the observer receive rays from all parts of the screen. The divergence factor shall exceed 0.7 (see 9.1.1).

6.4 *Uniformity of Illumination*—The screen shall be uniformly illuminated, the uniformity factor  $g$  being higher than 0.5 (see 9.1.2).

### 7. Anti-Glare Protection

7.1 The illuminator shall be fitted with an anti-glare switch or device that minimizes the probability of the operator being subjected to excessive glare when the radiograph is removed. This switch or device may be manual or automatic.

<sup>1</sup> This guide 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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<sup>2</sup> *Annual Book of ASTM Standards*, Vol 03.03.

<sup>3</sup> Luminance requirements are intended to be satisfied by the illuminator manufacturer.