



# Standard Test Method for Photopic Luminance of Photoluminescent (Phosphorescent) Markings<sup>1</sup>

This standard is issued under the fixed designation E 2073; 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.

*This standard has been approved for use by agencies of the Department of Defense.*

## 1. Scope

1.1 This test method covers a procedure for determining the photopic luminance of photoluminescent (phosphorescent) markings. It does not cover scotopic or mesopic measurements.

1.2 When reference is made regarding photoluminescence in the text of this test method, it implies phosphorescence.

1.3 The values stated in SI units are the standard. The values given in parentheses are provided for information purposes 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:*<sup>2</sup>

**E 284** Terminology of Appearance

**E 308** Practice for Computing the Colors of Objects by Using the CIE System

**E 1316** Terminology for Nondestructive Examinations

**E 2072** Specification for Photoluminescent (Phosphorescent) Safety Markings

2.2 *Other Standards:*

**Publication CIE No. 69 (1987)** Methods of characterizing illuminance meters and luminance meters; Performance, characteristics and specifications<sup>3</sup>

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee E12 on Color and Appearance, and is the direct responsibility of Subcommittee E12.13 on Photoluminescent Safety Markings.

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<sup>2</sup> 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.

<sup>3</sup> Available from U.S. National Committee of the CIE (International Commission on Illumination), C/o Thomas M. Lemons, TLA-Lighting Consultants, Inc., 7 Pond St., Salem, MA 01970, <http://www.cie-usnc.org>.

## 3. Terminology

3.1 Definitions of terms in Terminology **E 284** and Terminology **E 1316** are applicable to this specification.

## 4. Significance and Use

4.1 To assess how photoluminescent markings perform under identical test conditions, the luminance shall be measured in accordance with this test method (see Specification **E 2072**).

## 5. Apparatus

5.1 *Illuminance Meter*—To measure the illumination of the activating light source on the surface of the photoluminescent marking, use an illuminance meter calibrated to measure illuminance in lux (fc), with the following features: spectral error,  $f_1'$ ,  $\leq 5\%$ ; UV response,  $u$ ,  $\leq 0.5\%$ ; resolution 1.0 lux; and linearity error,  $f_3$ ,  $\leq 0.5\%$  (see Public. CIE No. 69).

5.2 *Luminance Meter*—To measure the photopic luminance of photoluminescent markings, use a luminance meter with the following minimum features (see **Publication CIE No. 69**): spectral error,  $f_1'$ ,  $\leq 5\%$ ; UV response,  $u$ ,  $\leq 0.5\%$ ; resolution at least 0.1 mcd/m<sup>2</sup>; linearity error,  $f_3$ ,  $\leq 0.5\%$ ; signal-to-noise-ratio: at least 10:1 for all measurements. The instrument shall have been calibrated within the preceding 12 months using photometric standards traceable to a national standards institute.

## 6. Sampling, Test Specimens and Test Units

6.1 *Method of Sampling*—Take a minimum of three samples. Each sample shall be of a minimum size of at least 45 mm (1<sup>3</sup>/<sub>4</sub> in.) in diameter. Select samples at random. If a manufacturer, samples shall be representative of the production lot, coded and identified to correspond to production batch codes, and shall be numbered consecutively. Paints shall be applied in compliance with the manufacturer's application instructions.