



Standard Test Method for Daytime Colorimetric Properties of Fluorescent Retroreflective Sheeting and Marking Materials for High Visibility Traffic Control and Personal Safety Applications Using 45°:Normal Geometry¹

This standard is issued under the fixed designation E2301; 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 (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This test method describes the instrumental measurement of the colorimetric properties (CIE tristimulus values, luminance factors, and chromaticity coordinates) of fluorescent-retroreflective sheeting and marking materials when illuminated by daylight.

1.2 This test method is generally applicable to any sheeting or marking material having combined fluorescent and retroreflective properties used for daytime high visibility traffic control and personal safety applications.

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

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

[D2244 Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates](#)

[E179 Guide for Selection of Geometric Conditions for Measurement of Reflection and Transmission Properties of Materials](#)

[E284 Terminology of Appearance](#)

[E308 Practice for Computing the Colors of Objects by Using the CIE System](#)

[E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method](#)

[E1164 Practice for Obtaining Spectrometric Data for Object-Color Evaluation](#)

[E1767 Practice for Specifying the Geometries of Observation and Measurement to Characterize the Appearance of Materials](#)

[E2152 Practice for Computing the Colors of Fluorescent Objects from Bispectral Photometric Data](#)

[E2153 Practice for Obtaining Bispectral Photometric Data for Evaluation of Fluorescent Color](#)

2.2 CIE Document:

[CIE 15:2004 Colorimetry](#)³

3. Terminology

3.1 *Definitions*—The definitions contained in Guide [E179](#), Terminology [E284](#), and Practice [E1164](#) are applicable to this test method.

4. Summary of Test Method

4.1 This test method provides a procedure for measuring the colorimetric properties of fluorescent-retroreflective sheeting and markings under simulated daylight illumination. Colorimetric properties are determined for CIE D65, which approximates outdoor illumination at midday, and Daylight 15 000 K, which is an alternate D illuminant chosen to represent low ambient light/dawn/dusk daylight illumination conditions (see CIE 15:2004).

4.2 This test method requires the use of a calibrated bispectrometer (two-monochromator spectrometer) with either 45:0 or 0:45 geometry that can measure the specimen's Donaldson matrix (see Practice [E2153](#)).

¹ This test method is under the jurisdiction of ASTM Committee [E12](#) on Color and Appearance and is the direct responsibility of Subcommittee [E12.05](#) on Fluorescence.

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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 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>.