



Designation: E1709 – 16^{ε1}

Standard Test Method for Measurement of Retroreflective Signs Using a Portable Retroreflectometer at a 0.2 Degree Observation Angle¹

This standard is issued under the fixed designation E1709; 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 reappraisal. A superscript epsilon (ε) indicates an editorial change since the last revision or reappraisal.

^{ε1} NOTE—Paragraph 6.5.2 was editorially corrected in April 2017.

1. Scope

1.1 This test method covers measurement of the retroreflective properties of sign materials such as traffic signs and symbols (vertical surfaces) using a portable retroreflectometer that can be used in the field. The portable retroreflectometer is a hand-held instrument with a defined standard geometry that can be placed in contact with sign material to measure the retroreflection in a standard geometry. The measurements can be compared to minimum requirements to determine the need for replacement. Entrance and observation angles specified in this test method are those used currently in the United States and may differ from the angles used elsewhere in the world.

1.2 This test method is intended to be used for the field measurement of traffic signs but may be used to measure the performance of materials before placing the sign in the field or before placing the sign material on the sign face.

1.3 This test method covers measurements at a 0.2 degree observation angle. See Test Method E2540 for measurements at a 0.5 degree observation angle.

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 to determine the applicability of regulatory limitations prior to use.*

1.5 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

¹ This test method is under the jurisdiction of ASTM Committee E12 on Color and Appearance and is the direct responsibility of Subcommittee E12.10 on Retroreflection.

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2. Referenced Documents

2.1 ASTM Standards:²

D4956 Specification for Retroreflective Sheeting for Traffic Control

E177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods

E284 Terminology of Appearance

E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

E808 Practice for Describing Retroreflection

E809 Practice for Measuring Photometric Characteristics of Retroreflectors

E810 Test Method for Coefficient of Retroreflection of Retroreflective Sheeting Utilizing the Coplanar Geometry

E2540 Test Method for Measurement of Retroreflective Signs Using a Portable Retroreflectometer at a 0.5 Degree Observation Angle

3. Terminology

3.1 The terminology used in this test method generally agrees with that used in Terminology E284.

3.2 *Definitions*—The delimiting phrase “in retroreflection” applies to each of the following definitions when used outside the context of this or other retroreflection standards.

3.2.1 *annular geometry, n*—the portable instrument retroreflection collection method where an annular area 0.1 degrees wide around the illumination axis collects the retroreflected energy at an angle to the center of the annular area corresponding to a specific observation angle.

3.2.2 *coefficient of retroreflection, R_A, n*—of a plane retroreflecting surface, the ratio of the coefficient of luminous intensity (*R_I*) of a plane retroreflecting surface to its area (*A*), expressed in candelas per lux per square metre (cd · lx⁻¹ · m⁻²).

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.