



Standard Test Method for Measuring the Coefficient of Retroreflected Luminance of Pavement Markings in a Standard Condition of Continuous Wetting (R_{L-Rain})¹

This standard is issued under the fixed designation E 2176; 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 covers a measurement of the wet retroreflective (R_{L-Rain}) properties of horizontal pavement marking materials, such as traffic stripes and road surface symbols.

1.2 This method of measuring wet retroreflective properties (R_L) of pavement markings utilizes a method of continuously wetting the marking during measurement (see Fig. 1).

NOTE 1—Test Method E 2177 may be used to describe the retroreflective properties of pavement markings in conditions of wetness after a period of rain.

1.3 This test method is most suitable for laboratory use under controlled conditions, but may also be used for field measurements when the necessary controls and precautions are followed.

1.4 This test method specifies the use of reflectometers that can measure pavement markings per Test Method E 1710.² The entrance and observation angles required of the retroreflectometer in this test method are commonly referred to as “30 meter geometry.”²

1.5 This test method has been shown to produce reasonable results for pavement marking systems with optics having an index of refraction greater than 2.0 and structured markings having vertical structures greater than or equal to 3 mm.³ Users should exercise caution when using this test method for

pavement marking systems with optics having an index of refraction less than 2.0 or markings having vertical structures less than 3 mm.

1.6 Results obtained using this test method should not be the sole basis for specifying and assessing the wet retroreflective effectiveness of pavement marking systems. Users should complement the results of this test method with other evaluation results, such as nighttime visual inspections.

1.7 *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.*

NOTE 2—An alternative test method designed to better represent the retroreflective efficiency of pavement marking systems under typical rain events is under development.

2. Referenced Documents

2.1 ASTM Standards:⁴

E 691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

E 965 Test Method for Measuring Pavement Macrotexture Depth Using a Volumetric Technique

E 1710 Test Method for Measurement of Retroreflective Pavement Marking Materials with CEN-Prescribed Geometry Using a Portable Retroreflectometer

E 2177 Test Method for Measuring the Coefficient of Retroreflected Luminance (R_L) of Pavement Markings in a Standard Condition of Wetness

3. Terminology

3.1 *coefficient of retroreflected luminance, R_L* —the ratio of the luminance, L , of a projected surface to the normal illuminance, E , at the surface on a plane normal to the incident light, expressed in candelas per square metre per lux [(cd·m⁻²)/lx].

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 Reference ASTM E 1710. The standard measurement condition is intended to represent the angles corresponding to a distance of 30 m for the driver of a passenger car with an eye height of 1.2 m and a headlight height of 0.65 m above the road. See Appendix X1.

³ The 3 mm minimum vertical structure height is based on a survey of materials evaluated and reported on in: FHWA/VTRC 05-CR3 Wet Night Visibility of Pavement Markings, VTRC (October 2004), FHWA/TX-06/0-5008-1 Evaluation of Wet-Weather Pavement Markings, First Year Report, TTI (Sept 2005), FHWA/TX-07/0-5008-2 Evaluation of Wet-Weather and Contrast Pavement Markings, Final Report, TTI (Aug 2007).

⁴ 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.