
Standard Method of Test for Producing Drawdown Panels and Measuring the Coefficient of Retroreflected Luminance (RL) of Pavement Markings in a Laboratory Panel

AASHTO Designation: TP 130-20 (2022)¹

Technically Revised: 2020

Reviewed but Not Updated: 2022

Technical Subcommittee: 4c, Markings and Coatings



**American Association of State Highway and Transportation Officials
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1. SCOPE

- 1.1. This test procedure is used to determine the retroreflectivity of [M 247](#) Type I highway beads. Beads are dropped on top of a uniform thickness of paint and retroreflectivity is determined with a reflectometer.
- 1.2. The values stated in English units are generally to be regarded as the standard with metric units being in parentheses. Cases exist where only one unit convention is being used and should be considered as the only convention to be used.
- 1.3. *This standard may involve hazardous materials, operations, and equipment. This standard does not purport to address all of the safety concerns associated with its use. It is the responsibility of the user of this procedure to establish appropriate safety and health practices and to determine the applicability of regulatory limitations prior to use.*
- 1.4. *The quality of the results produced by this standard are dependent on the competence of the personnel performing the procedure and the capability, calibration, and maintenance of the equipment used. Agencies that meet the criteria of [R 18](#) are generally considered capable of competent and objective testing/sampling/inspection/etc. Users of this standard are cautioned that compliance with [R 18](#) alone does not completely assure reliable results. Reliable results depend on many factors; following the suggestions of [R 18](#) or some similar acceptable guideline provides a means of evaluating and controlling some of those factors.*

2. REFERENCED DOCUMENTS

- 2.1. AASHTO Standards:
 - [M 247](#), Glass Beads Used in Pavement Markings
 - [M 348](#), Waterborne White and Yellow Traffic Paints
 - [R 18](#), Establishing and Implementing a Quality Management System for Construction Materials Testing Laboratories
 - [T 346](#), Glass Beads Used in Pavement Markings
- 2.2. ASTM Standards:

- [D8008](#), Standard Practice for Representative Field Sampling of Traffic Paints
- [E1710](#), Test Method for Measurement of Retroreflective Pavement Marking Materials with CEN-Prescribed Geometry Using a Portable Retroreflectometer

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 meter per lux $[(\text{cd} \cdot \text{m}^{-2})/\text{lx}]$. Because of the low luminance of pavement markings, the units commonly used are millicandelas per square meter per lux $[(\text{mcd} \cdot \text{m}^{-2})/\text{lx}]$.
- 3.2. *portable retroreflectometer*—an instrument that can be used in the field or laboratory for measuring the coefficient of retroreflected luminance, R_L .

4. SUMMARY OF TEST METHOD

- 4.1. This test procedure is used to predict the retroreflectivity of [M 247](#), Type I glass beads in waterborne paint using a laboratory simulation of a field striping operation. Measured quantities of glass beads are dropped on top of a repeatable, uniform thickness of paint on top of a glass panel. When the paint is dry (after 24 hours), the retroreflectivity is measured using a 30 m geometry portable retroreflectometer.

5. SIGNIFICANCE AND USE

- 5.1. One of the characteristics of a pavement marking is the coefficient of retro reflected luminance, R_L . Under identical conditions of headlight illumination and driver viewing, larger values of R_L correspond to higher levels of visual performance at corresponding geometry.

6. APPARATUS

- 6.1. For waterborne paint, water for clean up;
- 6.2. 4 in. drawdown bar; thickness capability from 15-30 mils (375-750 microns);
- 6.3. Flat substrate 6 by 24 in. made of $\frac{1}{8}$ in. glass, aluminum, or slate;
- 6.4. Support fixture to hold substrate firmly in place during drawdown;
- 6.5. Balance to 0.01 g accuracy;
- 6.6. Splitters to obtain representative glass bead sample (large 16:1, small 1:1);
- 6.7. Weighing dishes and containers for beads and paint;
- 6.8. Bead drop box (see Figure 1) with dimensions of approximately $5\frac{1}{2}$ by $19\frac{1}{2}$ in. by 14 in. (producing a 4 by 18 in. stripe) filled with 10 layers of $\frac{1}{4}$ in. screening spaced 1 in. apart, with support bar to hold beads in swivel mounted on top;