

A red and grey reflective marker machine is shown in the foreground, positioned on a road surface. The machine has a vertical grey post with a red top section and a red base. A white dashed line is visible on the road surface. In the background, there is a grassy field and a clear blue sky.

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Do your pavement markings pass the test?

Understanding the test methods for determining retroreflectivity will help you choose the right pavement markings for your roads and drivers.

ASTM Retroreflectivity Test Methods

Measured pavement marking reflectivity results vary widely depending on the test. These methods can help you see the differences of reflectivity between pavement markings under different conditions.



E1710-18 Dry Method

This test method measures the dry retroreflective (RL) properties of horizontal pavement marking materials—such as traffic stripes and road surface symbols. It's performed using a portable or mobile retroreflectometer at the CEN-prescribed geometry in dry conditions.



E2832-12 Wet-Continuous Method

This test method measures the wet retroreflective (RL-2) properties of horizontal pavement marking materials—such as traffic stripes and road surface symbols. It's performed using a portable or mobile retroreflectometer to measure the retroreflection at the prescribed geometry in a standard condition of wetness—which is achieved with a wetting apparatus that continuously wets the measurement area with a consistent spray of water during measurement.



E2177-19 Wet Recovery Method

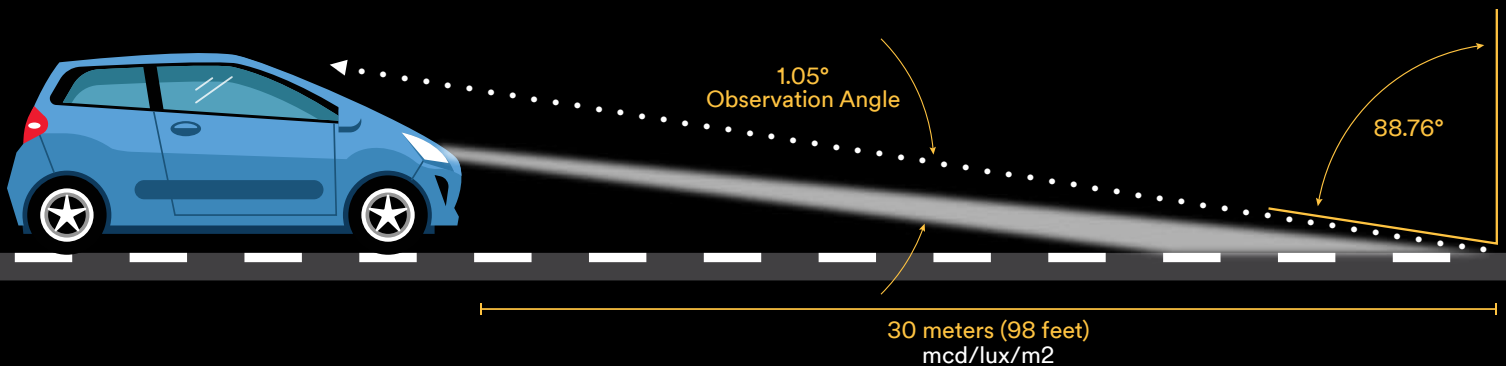
This test method measures the wet retroreflective (RL) properties of horizontal pavement marking materials—such as traffic stripes and road surface symbols. It's performed using a portable or mobile retroreflectometer to measure the retroreflection at the prescribed geometry in a standard condition of wetness, 45 seconds after the measurement area of a pavement marking has been wetted with 3 liters of water (applied to the measurement area).

ASTM Test Method Requirements

	E1710-18 Dry Method	E2832-12 Wet-Continuous Method	E2177-19 Wet Recovery Method
	Measure reflectivity of pavement markings under dry conditions	Measure reflectivity of pavement markings under condition of continuous wetting	Measure reflectivity of pavement markings under condition of standard wetness
Sample requirements: minimum 0.5% grade, open to traffic two weeks	No requirements	Required	Recommended
Differentiate dry reflective materials	Excellent	N/A	N/A
Differentiate wet reflective materials	N/A	Excellent	Good
Instrument type	Internal or external beam	External beam	Internal or external beam
Measurement duration	10 sec	3 min	1 min 30 sec
Total time including setup	2–3 min	5–10 min	3–5 min
Equipment requirements	Reflectometer	Reflectometer, rain box, spray unit, water, stopwatch	Reflectometer, 3 liter or greater water pitcher or bucket, water, stopwatch
Water requirements	None	<1 liter	3 liters

How the optics are measured.

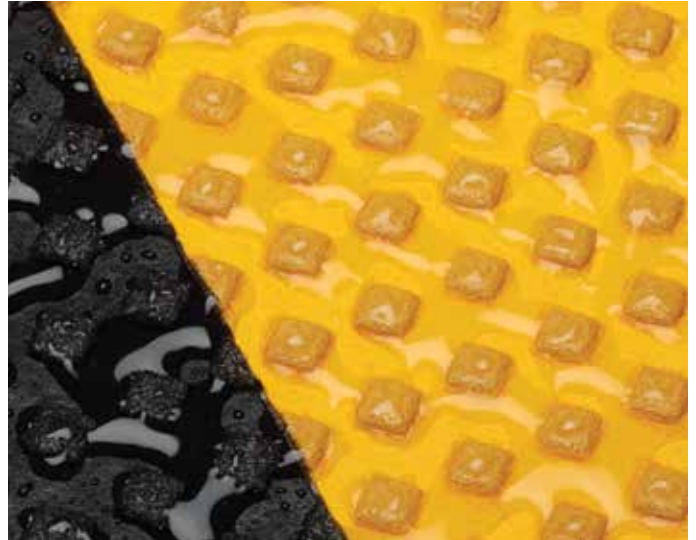
Pavement markings are viewed at extreme horizontal angles that are very different from what is seen with sign sheeting. Modern instruments measure reflectivity approximate to what is seen at 30 meters. Due to the extreme angles and optical systems, pavement marking retroreflectivity numbers are extremely low and measured in millicandelas, which are one-thousandth of the unit used to measure sign sheeting.



Understanding the results.

Different test methods yield different reflectivity results. Specifications need to be aligned with desired test methods and all markings must be measured with the same method.

Pavement marking materials can be developed to deliver reflectivity performance over a wide range of values. There are trade-offs of wet and dry reflectivity for each product design. Dry reflective performance does not directly correlate to wet reflective performance.



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