Maintaining Traffic Sign Retroreflectivity

- FHWA Minimum Levels of Retroreflectivity Ruling, established in 2008 and revised in 2012
- Replace non-compliant traffic signs to meet federal retroreflectivity standards
- Improve sign brightness and visibility to help meet safety goals

In 2008, the Manual of Uniform Traffic Control Devices (MUTCD) was revised to include a standard for a minimum level of retroreflectivity that must be maintained for traffic signs on all roads open to public travel. The Minimum Levels of Retroreflectivity Ruling was revised in June of 2012 with several important changes.

- The compliance date to implement and use an assessment or management method designed to maintain regulatory and warning sign retroreflectivity at or above the established minimum levels is June 13, 2014.
- The compliance date for replacement of signs identified as not meeting minimum retroreflectivity levels has been eliminated; however, elimination of the compliance date does not eliminate the regulatory requirement to comply with the MUTCD Standard. Even without a specific date, agencies still need to replace signs they identify as not meeting the established minimum retroreflectivity levels. According to the FHWA:
  - ***Signs identified through an agency's method as below the minimum established retroreflectivity levels have exhausted their useful service life and need to be replaced because they do not meet the needed function of being adequately visible at night.*** *Similar to other occurrences of signs that are no longer serviceable, agencies are expected to prioritize replacement of these signs based on engineering considerations such as the relative importance of the sign to the safety of the road user, volumes and speed of nighttime traffic, and optimal use of limited resources, among others.*

  Signs that are no longer serviceable might demand a higher priority for replacement over other non-compliant signs that are replaced by systematic upgrading or routine maintenance schedules.
- While minimum performance levels still exist for guide and street name signs, these types of signs are excluded from the assessment/management method compliance date. The final rule states that "types of signs other than regulatory or warning are to be added to an agency's management or assessment method as resources allow."
- The final rule adds a new Option statement exempting existing historic street name signs within a locally identified historic district from the Standards regarding color, letter size, and other design features, including retroreflectivity.

Summary of the Minimum Maintained Retroreflectivity Levels Table

- White copy on overhead guide signs must be made from prismatic sheeting.
- White copy on ground mounted street name signs cannot be made from Type I sheeting.
- Warning signs (black on yellow or orange) cannot be made from Type I sheeting.
- Regulatory signs (black on white) must retain a minimum retroreflectivity level of ≥ 50 cd/lx/m²
- Stop signs (white on red) have a minimum contrast ratio of ≥ 3:1 (white reflectivity divided by red reflectivity) (older stop signs—especially south-facing signs—are at risk of noncompliance due to ink fading).
- While use of Type I sheeting—with an initial retroreflectivity value of 70 cd/lx/m²—is allowed for regulatory signs, sign life will be short and may result in poor life cycle value. The same holds true for guide sign copy made from lower performance reflective sheeting.

Minimum Maintained Retroreflectivity Levels[1]

Sign Color	Sheeting Type (ASTM D4956-04)				Additional Criteria
	Beaded Sheeting			Prismatic Sheeting	
	I	II	III	III, IV, VI, VII, VIII, IX, X	
White on Green	W*; G ≥ 7	W*; G ≥ 15	W*; G ≥ 25	W ≥ 250; G ≥ 25	Overhead
	W*; G ≥7	W ≥ 120; G ≥ 15			Ground-mounted
Black on Yellow or Black on Orange	Y*; 0*	Y ≥ 50; 0 ≥ 50			[2]
	Y*; 0*	Y ≥ 75; 0 ≥ 75			[3]
White on Red	W ≥ 35; R ≥ 7				[4]
Black on White	W ≥ 50				

[1] The minimum maintained retroreflectivity levels shown in this table are in units of cd/lx/m2 measured at an observation angle of 0.2° and an entrance angle of -4.0°.
[2] For text and fine symbol signs measuring at least 1200 mm (48 in) and for all sizes of bold symbol signs
[3] For text and fine symbol signs measuring less than 1200 mm (48 in)
[4] Minimum Sign Contrast Ratio ≥ 3:1 (white retroreflectivity ÷ red retroreflectivity)
* This sheeting type should not be used for this color for this application.

Summary of Assessment/Management Methods

Method	Process	Advantages	Disadvantages
Visual Nighttime Inspection	Trained sign inspector, moving vehicle	Relatively quick and inexpensive	Annual process, trained inspectors and consistent quality assurance/control program required
Measured Retroreflectivity	Measure signs with a retroreflectometer	Provides a measurement of retroreflectivity	Annual process, large time and resource commitment, does not take road geometry into consideration and may not accurately represent what a driver sees
Expected Life	Determine expected life, replace at end of service life	Very easy to use and plan, can use preexisting asset management systems	Does not account for other failure modes
Blanket Replacement	All signs in a corridor or of a specific type are replaced at specific intervals	No need to track signs or assess retroreflectivity, easiest method to manage	May result in replacement of signs that have remaining service life
Control Signs	Replacement based on performance of control signs	Less costly and time consuming than monitoring all signs in the field	Creating and setting up appropriate control environment, sample-based
Other Engineering-based Methods	Varies with method	Varies with method	Varies with method

Potential funding sources for sign replacement programs include:

- National Highway System
- Surface Transportation Program
- Interstate Maintenance Program (IMP)
- Highway Safety Improvement Plan (HSIP)
- High Risk Rural Roads (HRRR)

For details and additional information about the Minimum Levels of Retroreflectivity Ruling, we recommend reviewing the FHWA's Sign Retroreflectivity Toolkit. To learn more about bright, durable 3M prismatic reflective sheeting, traffic sign upgrade services and flexible funding programs, contact your 3M representative or visit www.3M.com/roadwaysafety.

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