

Recommendations of Special Task Force on Maintaining Minimum Retroreflectivity

Approved by NCUTCD Council – June 29, 2006

Changes in cyan proposed by NACE.

Changes in yellow proposed by RWSTC as modified by the NCUTCD Council.

Section 2A.09 Maintaining Minimum Retroreflectivity

Support:

Retroreflectivity is one of several factors associated with maintaining nighttime sign visibility (see Section 2A.22).

Standard:

Public agencies or officials having jurisdiction shall use an assessment or management method to maintain traffic sign retroreflectivity at or above the recommended minimum levels established in the Guidance below.

Support:

Conformance with the above Standard is retained achieved by having establishing a method in place and using the method to maintain the minimum retroreflectivity levels established in this Section and implementing a systematic process for sign replacement, rather than providing the minimum retroreflectivity level for every individual sign at every point in time.

Guidance:

Except for those signs specifically identified in the Option in this Section, one or more of the following assessment or management methods should be used to maintain traffic sign retroreflectivity at or above the recommended minimum levels identified in Table 2A-3:

- A. Visual Nighttime Inspection – The retroreflectivity of an existing sign is assessed by a trained sign inspector conducting a visual inspection from a moving vehicle during nighttime conditions. Signs that are visually identified by the inspector to have retroreflectivity below the minimum levels should be replaced.
- B. Measured Sign Retroreflectivity – Sign retroreflectivity is measured using a retroreflectometer. Signs with retroreflectivity below the minimum levels should be replaced.
- C. Expected Sign Life – When signs are installed, the installation date is labeled or recorded so that the age of a sign is known. The age of the sign is compared to the expected sign life. The expected sign life is based on the experience of sign retroreflectivity degradation in a geographic area compared to the minimum levels. Signs older than the expected life should be replaced.
- D. Blanket Replacement – All signs in an area/corridor, or of a given type, should be replaced at specified intervals. This eliminates the need to assess retroreflectivity or track the life of individual signs. The replacement interval is based on the expected sign life, compared to the minimum levels, for the shortest-life material used on the affected signs.
- E. Control Signs – Replacement of signs in the field is based on the performance of a sample of control signs. The control signs might be a small sample located in a maintenance yard or a sample of signs in the field. The control signs are monitored to determine the end of retroreflective life for the associated signs. All field signs represented by the control sample should be replaced before the retroreflectivity levels of the control sample reach the minimum levels.
- F. Other Methods – Agencies are not limited to these five proposed methods, as they can also develop their own methods based on using documented engineering judgement or studies that demonstrate that deviations are appropriate.

Support:

Additional information about these methods is contained in the 2005 Edition of FHWA's "Maintaining Traffic Sign Retroreflectivity" (see Section 1A.11).

Option:

Highway agencies may exclude the following signs from the retroreflectivity maintenance guidelines described in this Section:

- A. Parking, Standing, and Stopping signs (R7 and R8 series).
- B. Walking/Hitchhiking/Crossing signs (R9 series, R10-1 through R10-4b).
- C. Adopt-A-Highway signs.
- D. All signs with blue or brown backgrounds.
- E. Bikeway signs that are intended for exclusive use by bicyclists or pedestrians.

Table 2A-3. Recommended Minimum Maintained Retroreflectivity Levels

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*; O*	Y ≥ 50; O ≥ 50			⊕
	Y*; O*	Y ≥ 75; O ≥ 75			⊕
White on Red	W ≥ 35; R ≥ 7			⊕	
Black on White	W ≥ 50			–	
<p>⊕ 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°.</p> <p>⊖ For text and fine symbol signs measuring at least 1200 mm (48 in) and for all sizes of bold symbol signs</p> <p>⊗ For text and fine symbol signs measuring less than 1200 mm (48 in)</p> <p>⊙ Minimum Sign Contrast Ratio ≥ 3:1 (white retroreflectivity ÷ red retroreflectivity)</p> <p>* This sheeting type should not be used for this color for this application.</p>					
Bold Symbol Signs					
<ul style="list-style-type: none"> • W1-1, -2 – Turn and Curve • W1-3, -4 – Reverse Turn and Curve • W1-5 – Winding Road • W1-6, -7 – Large Arrow • W1-8 – Chevron • W1-10 – Intersection in Curve • W1-11 – Hairpin Curve • W1-15 – 270 Degree Loop • W2-1 – Cross Road • W2-2, -3 – Side Road • W2-4, -5 – T and Y Intersection • W2-6 – Circular Intersection • W3-1 – Stop Ahead 		<ul style="list-style-type: none"> • W3-2 – Yield Ahead • W3-3 – Signal Ahead • W4-1 – Merge • W4-2 – Lane Ends • W4-3 – Added Lane • W4-5 – Entering Roadway Merge • W4-6 – Entering Roadway Added Lane • W6-1, -2 – Divided Highway Begins and Ends • W6-3 – Two-Way Traffic • W10-1, -2, -3, -4, -11, -12 – Highway-Railroad Advance Warning 		<ul style="list-style-type: none"> • W11-2 – Pedestrian Crossing • W11-3 – Deer Crossing • W11-4 – Cattle Crossing • W11-5 – Farm Equipment • W11-6 – Snowmobile Crossing • W11-7 – Equestrian Crossing • W11-8 – Fire Station • W11-10 – Truck Crossing • W12-1 – Double Arrow • W16-5p, -6p, -7p – Pointing Arrow Plaques • W20-7a – Flagger • W21-1a – Worker 	
Fine Symbol Signs – Symbol signs not listed as Bold Symbol Signs.					
Special Cases					
<ul style="list-style-type: none"> • W3-1 – Stop Ahead: Red retroreflectivity ≥ 7 • W3-2 – Yield Ahead: Red retroreflectivity ≥ 7; White retroreflectivity ≥ 35 • W3-3 – Signal Ahead: Red retroreflectivity ≥ 7; Green retroreflectivity ≥ 7 • W3-5 – Speed Reduction: White retroreflectivity ≥ 50 • For non-diamond shaped signs such W14-3 (No Passing Zone), W4-4p (Cross Traffic Does Not Stop), or W13-1, -2, -3, -5 (Speed Advisory Plaques), use largest sign dimension to determine proper minimum retroreflectivity level. 					

Additional motion passed by RWSTC:

“Before any table is inserted into the MUTCD, FHWA should provide substantial clarification regarding the process and frequency for updating or changing the table of retroreflectivity values.”