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Minimum Retroreflectivity Assessment of Traffic Signs

Tools for Achieving MUTCD Compliance using
Nighttime Visual Inspection Methods

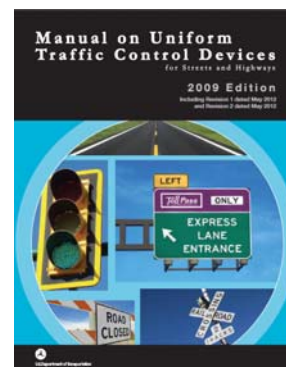
Paul Matuschka 28 March 2014

New MUTCD Requirement – Unchanged by Revision

2A.09 Maintaining Minimum Retroreflectivity

Standard:

Public agencies or officials having jurisdiction shall use an assessment or management method that is designed to maintain sign retroreflectivity at or above the minimum levels in Table 2A-3.



- "SHALL" statement, meaning it must be satisfied
- Each agency shall implement a method by [June 13, 2014](#)

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What's New? MUTCD Requirements

MUTCD Introduction (Compliance Dates):
 Implementation and continued use of an assessment or management method that is designed to maintain ~~traffic~~ **regulatory and warning** sign retroreflectivity at or above the established minimum levels

- ~~January 22, 2012~~ **June 13, 2014**
- ~~Replace identified regulatory, warning, ground mounted guide signs (except street name)~~
 — January, 2015
- ~~Replace identified street name & overhead guide signs~~
 — January, 2018

TRAFFIC SIGN RETRO *New Compliance Dates – How Does It Affect You?* U.S. Department of Transportation Federal Highway Administration *Safe Roads for a Safer Future*
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Methods and Procedures Sign Retro Requirements

- Visual Nighttime Inspection
 - Comparison Panel Procedure
 - Calibration Signs Procedure
 - Consistent Parameters Procedure
- Measured Sign Retroreflectivity
- Expected Sign Life
- Blanket Replacement
- Control Signs

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Visual Nighttime Inspections selected by 40% of agencies as compliance method

- Unless using a 60+ year old driver (constant parameters method), **MUST HAVE A VISUAL REFERENCE OF KNOWN REFLECTIVITY LEVEL** in order to comply
- Old signs are not reliable, newer signs give false positives, creating waste by raising replacement costs

Nighttime visual inspections must be done in accordance with the procedures described by the FHWA in order to comply with the standard

Designed for Compliant Visual Nighttime Inspections



- Calibration Signs Procedure
- Comparison Panel Procedure

Kit Contents



- All of the essential task-specific tools in one easy to use kit

Engineering Standards

Calibration Signs and Comparison Panels

- NOT traffic signs with standard sheeting
- Engineering standards, each is precisely manufactured to MUTCD minimum levels of retroreflectivity
- Reliably measured per ASTM E-810 and certified accurate
- Manufactured using **Orientation Insensitive** sheeting per AASHTO M-268

- Don't "guess" on the performance of old, retired signs with unpredictable retroreflectivity levels

MUTCD Cross Reference Tool

PANEL SELECTION CHART – Minimum Maintained Retroreflectivity Levels

Sign Color	Sheeting Type (ASTM D4956-09)			
	Beaded Sheeting			
Avery Dennison Sheeting Type	T-1500 EG	NA	T-3500A HI	T-650 Omni
White on Green	W _v ; G ≥ 7 1	W _v ; G ≥ 15 2	W _v ; G ≥ 25 3	W ≥ 250
	W _v ; G ≥ 7 1		W ≥ 120 5 ; G ≥ 15 2	
Black on Yellow or Black on Orange	Y _v ; O _v	6 3	Y ≥ 50; O ≥ 50	
	Y _v ; O _v	8 5	Y ≥ 75; O ≥ 75	
White on Red			W ≥ 35 10 ; R ≥ 7 11	
Black on White			W ≥ 50 12 8	

MINIMUM RÉTRO-REFLECTIVE STANDARD COMPARISON PANEL

Panel Number: **12**

Target R_a (cd/lx/m²): **50**

Actual R_a (cd/lx/m²):

Certified by: S.K.

Expiration Date: June 01 2013

NOTE: 1 Thru 12 = Corresponding color codes for 6" x 6" Comparison Panels

NOTE: 1 Thru 8 = Corresponding color codes for 24" x 24" Calibration Signs

Each Calibration Sign and Comparison Panel features an ID label matched to Table 2A-3

Recommended Procedure

Two Step Process

1. Establish visual threshold in maintenance yard with Calibration Signs, conduct nighttime inspection
2. Note marginal signs, then use Comparison Panels for secondary inspection as necessary

Consider secondary inspections during the safety of daylight hours

FHWA Inspection Essentials

- Trained inspector
- Nighttime inspection
- Tie visual observation to minimum values by using one of the following compliance methods:
 - Calibration signs procedure
 - Comparison panels procedure

For more information, including complete training information, visit <http://www.fhwa.dot.gov/retro>

Inspection Overview

- Any vehicle, any age inspector
- Properly aimed low beam headlights
- Before leaving the maintenance yard, the inspector views calibration signs to calibrate their eyes
- View signs at distances from 100 to 600 feet
- Calibration signs must be used to establish a performance threshold

Visual inspections lacking a performance threshold hold little value, and do not fully comply with FHWA recommendations for visual sign assessments

Using Calibration Signs



- Installed in maintenance yard
- Viewed by trained inspector at distances of 100 to 600 feet

Field Procedures

Visually compare field signs with calibration signs

- Signs brighter remain in service
- Signs dimmer are marked for replacement
- Only marginal signs need secondary review using Comparison Panels

- For safety, conduct inspection with a driver and passenger (recorder)

Comparison Panels Procedure



Safely pull off roadway

- Clamp comparison panel that corresponds with marginal sign
- Illuminate sign and panel with LED light
- If comparison panel is brighter than sign, schedule the sign for replacement

- Always wear compliant reflective safety garments
- Detailed procedures available from Avery Dennison, and the FHWA

Comparison Panels Procedure



Daytime panel use

- Use larger, brighter light source included in kit to overcome daytime luminance
- Same pass/fail criteria
- Texas Transportation Institute (TTI) engineering study demonstrates effectiveness in daytime

- Daytime use of panels may reduce an agency's overtime costs, and offer improved safety by keeping workers off of their roadways at night

TTI Study Conclusions

“Daytime evaluations using comparison panels can be as effective as nighttime evaluations. However, daytime evaluations using comparison panels should be conducted using a bright spotlight, such as the one included in the Avery Dennison comparison panels kit.”



The FHWA does not formally approve or disapprove alternate methods supported by engineering studies – this is the responsibility of the using agency

MRS Kit Value – Reliable Compliance

- Cost-effective, simple to use with existing workforce
- Complement blanket replacement and expected sign life management methods by allowing agencies to save passing signs
- Engineered standards produced to match MUTCD requirements – no guessing
- Old and discarded signs approximating MUTCD minimum levels hard to find, unreliable

Please contact your authorized kit reseller, or Avery Dennison for more information. Visit us at www.reflectives.averydennison.com

Questions



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