

Minimum Sign Retroreflectivity Requirements

Updated
August 2012
*with compliance
date revisions*



New Retroreflectivity standards were added to the MUTCD in December 2007 and related compliance dates were revised in May 2012.

The standards are a result of many years of research regarding the needs of the drivers – how many have heard about retroreflectivity before?

The intent of the standards are a solution that meets needs of most involved.

Why Do We Install Signs?

Required by MUTCD?

Most are not

Engineering Decision?

YES!



Why?

**To help drivers
(including older)**

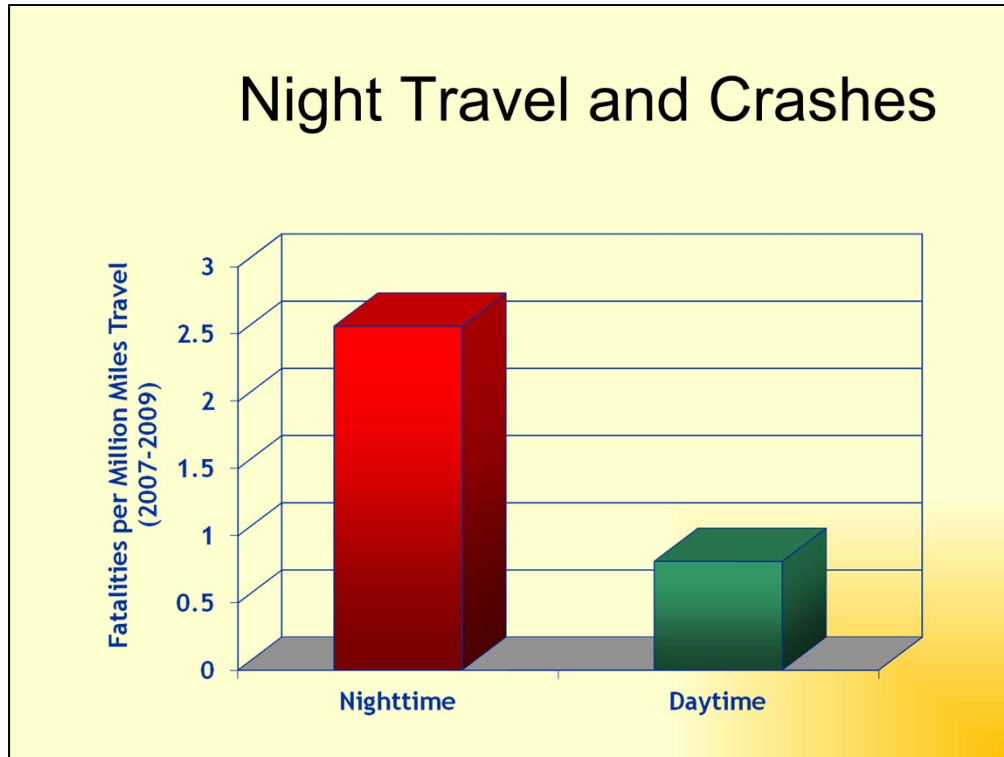
While some signs are required, most are not. The Manual describes application of TCDs (1A.09)

Typically the decision to install a sign is based on Engineering Judgment. The standards/guidance/options come into play to promote uniformity in the application in an effort to help drivers safely navigate (regulate, warn, guide)

Once the decision is made that a sign is needed, the MUTCD requires:

- Same shape and similar color day and night
- Retroreflective or Illuminated

Night Travel and Crashes



Why the big concern?

Only about 25% of travel occurs in dark conditions, but 50% of crashes

The nighttime crash rate is nearly three times that of daytime

Both behavioral (fatigue, alcohol) and engineering contributors to this disparity between nighttime and daytime -- Improving visibility helps everyone

Sources:

- Crash Data – NHTSA Fatal Accident Reporting System
- VMT – FHWA Highway Statistics

Signs Provide Critical Information to Drivers

But, Retroreflectivity Degrades Over Time

When Do We Replace Signs?

Retroreflectivity

Signs are generally adequate when installed.

Signs degrade with sunlight, weather, environmental damage. Daylight and Nighttime degradation varies.

Do you have a method in place to determine when to replace?

Final Rule to Establish Min Reto



- Published on Dec 21, 2007
– Vol 72, No. 245
- Revision #2 of the 2003 Edition of the MUTCD
- Effective Jan 22, 2008

Not all signs have been adequately maintained

Now there are standards and guidance for all agencies to follow

Some agencies may already be in compliance, for other agencies this may raise the visibility of their signs

MUTCD Language

Section 2A.08 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”

New Language (standard)

Major change is in Section 2A.08

Centers around a method to maintain retroreflectivity

**MUTCD Table 2A.3
Minimum Maintained Retroreflectivity Levels**

Sign Color	Sheeting Type (ASTM D4956-04) ①				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			②
	Y*; O*	Y ≥ 75; O ≥ 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 shall not be used for this color for this application.

The numbers are also in the MUTCD (this was somewhat controversial)

The chart is a little complex, so Example 1: a curve warning sign

black on yellow

*Type I (eng grade) should not be used

Any other type okay and should have a yellow retro level of 50 or 75

(2) Since curve is not text or fine symbol, should meet 50

Black not retroreflective, so don't have to measure it.

Example 2: Stop Sign

Any type sheeting meets initially

Both white and red have to meet retro levels: White ≥ 35, Red ≥ 7

(3) Need contrast ratio ≥ 3:1 (e.g. red=20, white must ≥ 60)

Methods to Maintain Retro



- Visual Nighttime Inspection
 - Calibration Signs
 - Comparison Panels
 - Consistent Parameters
- Measured Sign Retro
- Expected Sign Life
- Blanket Replacement
- Control Signs
- Future Method Based On Engineering Study
- Combination Of Any

Methods Intro

So those are the numbers you need to meet, but remember the requirement is to have a method that maintains those minimums.

The rule provided much versatility – many methods are available

Basics are in the brochure

(http://safety.fhwa.dot.gov/roadway_dept/night_visib/policy_guide/sign_15mins/sign_15mins.pdf),

Research details are in the “Methods Report” on-line at FHWA nighttime visibility site.

Each method has some advantages and disadvantages that should be considered.

Combining methods can help minimize the concerns/disadvantages.

Keep in mind the goal is to have visible signs that at least meet the needs of drivers during nighttime.

MUTCD Language

Section 2A.08 Maintaining Minimum Retroreflectivity

- “Support:
Compliance... is achieved by having a method in place and using the method to maintain the minimum levels established in Table 2A-3.
Provided that... a method is being used, an agency would be in compliance... even if there are some individual signs that do not meet the... levels at a particular point in time.

This support statement helps to limit an agency’s liability: compliance is by implementing a maintenance method, even if some signs do not meet levels at a particular time.

It is not meant as an easy out: the maintenance method must be designed to maintain the minimum requirements for sign retroreflectivity.

Exempt Signs

- Parking/Standing/Stopping
- Walking/Hitchhiking
- Adopt-A-Highway
- Blue or Brown Backgrounds
- Exclusive Use of Bikes or Peds

Note: Must still meet other requirements in MUTCD (inspections, retroreflective, etc,)



Several signs are exempted. The research for blue and brown retroreflectivity has been completed since the standards were adopted. Report FHWA-HRT-08-029 provides minimum recommended retroreflectivity levels for blue and brown signs.

Compliance Date Final Rule



Federal Register

- May 14, 2012
- Eliminated 46 items
- Revised 4 others items
- Safety related compliance dates maintained (8)
- Revision #2 of the 2009 MUTCD

The final rule also adds a new Option statement exempting existing historic street name signs within a locally identified historic district from the Standards and Guidance of Section 2D.43 regarding street sign color, letter size, and other design features, including retroreflectivity.

2009 MUTCD Revision 1 deals with change in Engineering Judgment definition – not part of this presentation

Updated Sign Retroreflectivity Compliance Dates

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

The dates for having a method selected and in use was extended 2.5 years. Guide signs have been removed from the first compliance dates...however, they are to be added to an agency's management or assessment method as resources allow.

The compliance dates for signs below the minimums have been removed without these “target” compliance dates, each agency must prioritize and justify their schedule of sign replacement. Signs identified through an agency’s maintenance method as being 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.

Agencies are expected to prioritize replacement of wornout signs based on engineering considerations, similar to other traffic control devices.

Why were guide signs removed from compliance dates ?

- Regulatory and warning signs constitute the highest priority for assessing retro of existing signs
- Including guide signs would increase the economic burden
- Section 2A.08 still requires a method for all signs, including guide signs

When do I have to replace my worn out signs?

- Agencies are expected to prioritize replacement of these signs based on engineering considerations, similar to other traffic control devices.
- It is expected that the use of the assessment or management method would serve to identify and program the replacement of signs that are found to or expected to be below the minimum retroreflectivity levels.

Note: The compliance date of June 13, 2014 applies only to the implementation and continued use of an assessment or management method that is designed to maintain regulatory and warning sign retroreflectivity at or above the minimum retroreflectivity levels in Table 2A-3. Agencies are expected to add signs other than regulatory or warning to their method as resources allow, per the footnote to the Compliance Date Table (I-2).

Do guide signs and street name signs still have to meet the minimums?

- **Yes.** The standards for minimum retroreflectivity requirements still apply to guide signs. The compliance date for guide signs (including street name signs) have been eliminated. However, agencies are expected to add these signs to their method as resources allow.

More Information

- MUTCD Website:
<http://mutcd.fhwa.dot.gov>
- Nighttime Visibility Website:
<http://www.fhwa.dot.gov/retro>
 - Regulations/Standards
 - Technical Guidance
 - Implementation Tools
 - Frequently Asked Questions
 - Research

Here are some sources that you can easily access to gain further information on retroreflectivity.

(Recommend handing out copies of the summary brochure:

http://safety.fhwa.dot.gov/roadway_dept/night_visib/policy_guide/sign_15mins/sign_15mins.pdf

at any live presentation.)