

## Introduction

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### What Is Retroreflectivity?

“Retroreflectivity” describes how light is reflected from a surface and returned to its original source (“retro”-reflector). Traffic signs are made with retroreflective sheeting materials to increase their visibility at night. Maintaining traffic sign retroreflectivity is important to promoting nighttime traffic safety.

Traffic signs use technology with small glass beads or prismatic reflectors that reflect light from vehicle headlamps back to the vehicle and the driver’s eyes, thus making the sign appear more bright and visible to the driver.

The figure on the next page shows how retroreflectivity works to assist nighttime driving. There needs to be a light source (vehicle headlamps), a target (traffic sign), and a receptor (driver’s eyes).

Recently adopted language in the MUTCD now requires all agencies that maintain roadways open to public travel to adopt a sign maintenance program designed to maintain traffic sign retroreflectivity at specific levels.

- Defines retroreflectivity and its importance to traffic safety
- Introduces the MUTCD
- Identifies new MUTCD retroreflectivity requirements for sign maintenance
- Outlines your agency’s responsibilities under the new requirements
- Discusses how proper sign maintenance can help protect your agency legally

### The Manual on Uniform Traffic Control Devices

The Manual on Uniform Traffic Control Devices, published by the U.S. Department of Transportation—Federal Highway Administration, sets forth basic principles of traffic signs: namely to promote safety and efficiency on our public roads. Traffic signs inform motorists of regulations, warn of potential hazards on or near the roadway, and help ensure that motorists reach their destinations as safely and efficiently as possible. The MUTCD establishes uniform standards for traffic signs. Recently adopted language in the MUTCD now requires all agencies that maintain roadways open to public travel to adopt a sign maintenance program designed to maintain traffic sign retroreflectivity at or above specific levels.

## Retroreflectivity Requirements

### Why Are Retroreflectivity Standards Important?

Highway statistics nationwide reveal that the nighttime fatal crash rate is approximately three times that of the daytime crash rate, measured in million miles traveled. Every public agency responsible for maintaining public highways and streets is required to use retroreflective materials on traffic control devices to facilitate driver safety. Moreover, improving nighttime visibility of traffic signs is ever more important as the older driver population increases.

### What Are the New Requirements?

For years, the MUTCD has required signs to be either illuminated or made with retroreflective sheeting materials. (For specific language in the MUTCD, visit <http://mutcd.fhwa.dot.gov/>.) Most signs in the United States fall in the latter category, but these materials have a limited life. They degrade over time. Until now, little information has existed to determine when signs should be replaced based on their retroreflectivity. The 2003 MUTCD Edition, Revision 2, identifies minimum required retroreflectivity levels. If a sign falls below this minimum value, it needs to be replaced. Different types and quality of sheeting materials are available, and the effective life of a sign (that is, its retroreflectivity) will depend largely upon which material is chosen. To meet the requirements, all agencies must implement a traffic sign maintenance program by using one of the MUTCD's predetermined methods. Failure to use one of the methods could result in lawsuits from drivers or their families who suffer injury or death attributable to substandard sign retroreflectivity maintenance. Agencies will not need to measure retroreflectivity levels of all their signs, but they do need to implement a program that regularly evaluates and assesses the nighttime performance of their signs.

### Compliance Dates

#### January 2012

By this date, all agencies will have to establish a sign maintenance program that can regularly address the new minimum sign retroreflectivity requirements.

#### January 2015

By this date, all agencies must comply with the new retroreflectivity requirements for most of their traffic signs they have installed, including all red or white "regulatory" signs (such as STOP signs and Speed Limit signs), yellow "warning" signs, and green/white "guide" signs.

#### January 2018

By this date, all agencies must comply with the new retroreflectivity requirements for overhead guide signs and all street name signs.



## Retroreflectivity Requirements

All agencies responsible for maintaining traffic signs in their area are required to comply with the new MUTCD requirements. These include the following agencies:

- State
- County
- City/township
- Federal land management
- Tribal Governments
- Private entities

### Responsibilities of Public Agencies

Public agencies—including State, county, and local/township agencies, as well as the Federal land management agencies (e.g., National Park Service, U.S. Forest Service, and U.S. Fish and Wildlife) and Tribal Governments that maintain roads open to public travel—have to comply with the minimum retroreflectivity requirements for their traffic signs. Public agencies should devote resources to retain the visibility and legibility of traffic signs, as well as ensuring that signs remain properly mounted and in good working condition.

### Sign Management and Tort Liability

In addition to improving safety for drivers, FHWA believes that the selection of a reasonable method for maintaining sign retroreflectivity might serve to defend public agencies in tort liability claims and litigation. Public agencies that demonstrate a reasonable maintenance policy as outlined in the MUTCD should be better equipped to successfully defend against tort litigation involving claims of improper sign retroreflectivity. Once an agency implements one of the methods, it will be in compliance with the MUTCD requirements even if some individual signs do not meet the minimum retroreflectivity levels at a given point in time (within the restrictions of the compliance dates). For example, a sign might be covered with graffiti the week after the inspection. If that sign was compliant at the time of the inspection, the responsible agency would still be considered in compliance with MUTCD requirements. The minimum levels of retroreflectivity do not imply that an agency needs to measure the retroreflectivity of every sign in its jurisdiction. Instead, agencies must implement one of the methods designed to maintain the minimum retroreflectivity levels.



## Local Maintenance

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This pamphlet presents in detail what may be the most practical inspection method for smaller agencies: the Consistent Parameters Procedure of the Visual Inspection Method. For more information on these alternative methods, please reference the "Sign Retroreflectivity Guidebook".

### **Description of the Visual Inspection Method— Consistent Parameters Procedure**

As implied by its name, the Visual Inspection Method relies on a visual inspection of signs at night to assess their compliance with the MUTCD's retroreflectivity requirements. Of all the maintenance methods listed in the MUTCD, the Visual Inspection Method is probably the most practical for a small agency with limited resources because it requires practically no additional equipment and no sign inventories.

The Visual Inspection Method includes three different procedures. Your agency must select one of the three procedures. The most practical procedure for small agencies is the Consistent Parameters Procedure. The other two procedures included in the Visual Inspection Method are the Calibrated Signs Procedure and the Comparison Panel Procedure. Both of these procedures require special signs or panels that must be purchased or fabricated. The signs and panels also require special handling and storing. For these reasons, the Consistent Parameters Procedure of the Visual Inspection Method is probably the most practical way for small agencies to meet the MUTCD minimum sign retroreflectivity requirements.

Simply stated, inspectors using this procedure assess the visibility and retroreflectivity of traffic signs as they approach the signs on the roadway during nighttime conditions. If the signs are bright enough to be detected and read, then they are okay as is. If the signs are deemed marginal, they should be scheduled for replacement. If some signs are not bright enough, they should be replaced as soon as possible.

- Describes the Consistent Parameters Procedure for the Visual Inspection Method
- Lists the Consistent Parameter procedure requirements
- Suggests guidelines for establishing your inspection program

### **Consistent Parameter Procedure Requirements**

The following conditions must be met to properly assess the retroreflectivity of signs using the Consistent Parameters Procedure option of the Visual Inspection Method:

- Inspections must be conducted at night.
- Inspectors must be 60 years or older.
- Inspectors must conduct inspections from a sports utility vehicle (SUV) or pickup truck, model year 2000 or later.
- Inspectors must go through training. Training courses are available at many Local Technology Assistance Program (LTAP) centers. <http://www.ltapt2.org>.

The Visual Inspection Method is most practical for smaller agencies that have limited resources.

### Guidelines for Establishing an Inspection Protocol

Your agency should develop specific guidelines for conducting nighttime inspections. The content of these guidelines is up to you and your agency. However, in general, the following considerations should be taken into account.

**Consistency of testing conditions.** Conduct inspections during consistent nighttime conditions whenever possible (e.g., always conduct inspections on clear nights, when there is no rain or fog). Keep the interior light of the inspection vehicle off. Use a pen light for recording the results of the inspection. Use at least three ratings: adequate, marginal, and fail.

**Speed of vehicle appropriate to the roadway.** Conduct inspections at normal roadway operating speeds. If you have to slow or stop the vehicle to read the sign, this usually means the sign should be replaced.

**Vehicle position.** Signs should be inspected from the travel lane. Also, evaluate signs at a typical viewing distance (i.e., at a distance that provides the driver adequate time for an appropriate response).

**Type of headlamp and alignment.** Use low-beam headlamps to conduct inspections. Take your inspection vehicle to your local mechanic to verify that the head lamps are aimed properly.

**Safety issues related to conducting the inspections while in a moving vehicle.** If possible, designate a driver for the vehicle. This serves the dual purpose of focusing the inspector on sign evaluation, which promotes consistency and accuracy of results, as well as improving safety for all on the roadway.

**Recordkeeping.** Use a standardized form for tracking inspection results and, if possible, keep these results in a file cabinet or computer database for ease of reference and comparison purposes later.

### Checklist for Establishing an Inspection Procedure

- Consistency of testing conditions
- Vehicle speed
- Vehicle position
- Headlamp type
- Procedural safety issues
- Recordkeeping
- Replacement
- Frequency
- Compliance Dates

**Replacement.** Any sign not legible to the inspector at a typical viewing distance and typical speed should be replaced as soon as possible. Signs rated as marginal should be scheduled for replacement.

**Frequency.** There is no specific requirement for how often you should conduct the inspections. Generally, most agencies perform inspections on an annual basis.

## Retroreflectivity Requirements

BY JANUARY  
**2012**

All agencies must establish and implement a sign maintenance program addressing the minimum sign retroreflectivity requirements.



BY JANUARY  
**2015**

All agencies must comply with the new retroreflectivity requirements for most of their traffic signs they have installed, including all red or white "regulatory" signs (such as STOP and Speed Limit signs), yellow "warning" signs, and green/white "guide" signs.



BY JANUARY  
**2018**

All agencies must comply with the new retroreflectivity requirements for overhead guide signs and all street name signs.



For more information on these regulations please see the "Sign Retroreflectivity Guidebook" or visit the website [http://safety.fhwa.dot.gov/roadway\\_dept/night\\_visib/sign\\_retro\\_4page.pdf](http://safety.fhwa.dot.gov/roadway_dept/night_visib/sign_retro_4page.pdf). You may also visit [http://safety.fhwa.dot.gov/roadway\\_dept/night\\_visib/policy\\_guide/sign\\_15mins/](http://safety.fhwa.dot.gov/roadway_dept/night_visib/policy_guide/sign_15mins/) for more details.

All information on this pamphlet comes from the "Sign Retroreflectivity Guidebook".