
\texttt{etrorereflectivity}

hat's
From “Effective” Date of Final Rule (January 22, 2008):

- **Jan 22, 2012** (4 years from 2008): Identify and begin using method(s)
- **Jan 22, 2015** (7 years from 2008): Replace identified regulatory, warning, and ground mounted guide signs
- **Jan 22, 2018** (10 years from 2008): Replace identified street name and overhead guide signs
Compliance Dates such an issue with local and State governments that members of Congress started asking FHWA - WHY?

- **Nov 30, 2010** - In Federal Register, FHWA asked for comments regarding 7 Compliance Dates in 2009 MUTCD
  - 3 on *Maintaining Minimum Sign Retroreflectivity*
  - 4 new in the 2009 MUTCD
    (One Way Signs; Horizontal Alignment Warning Signs; Yellow Change / Red Clearance Intervals; and Pedestrian Intervals / Signal Phases)

- **Jan 11, 2011** - FHWA Administrator Mendez asked 36 members of the NCUTCD for their opinion

- **Jan 14, 2011** - Comment period ended, FHWA received over 600 sets of comments

- **June, 2011** – Congressional legislation submitted under bill **S.1216**
• Expressed major concerns with 2009 MUTCD to FHWA
  – Change in letter size on Street Name Signs
  – Compliance dates for retroreflectivity
  – The change in definition of the term “Standard”
    • Added text: “Standard statements shall not be modified or compromised based on engineering judgment or engineering study.”
Proposed Revisions to Compliance Dates

- **August 31, 2011** – FR Notice of Proposed Amendments

- Proposes to revise MUTCD Table I-2 and *eliminate, extend OR revise* many of the 58 target compliance dates.
  - Eliminate compliance dates of 46 items
    (but NOT the *requirements* in the MUTCD)
  - Extend and/or revise the dates of 4 items
    (under which establishing a retro maintenance method falls)
  - No change in dates for the other 8 items
**Proposed Revisions to Compliance Dates**

- **BE AWARE** - The NPA *does not* say it will *eliminate* any regulations or *all* the compliance dates.

- Compliance dates are not for new installations or replacements – they affect replacement of deficient in-service TCDs *currently in the field* that don’t meet new requirements.

- *Standard* and *Guidance* requirements in MUTCD 2A-08 *have not changed*
How does this affect Retroreflectivity?

• Jan 2012 compliance date to implement an assessment or management method MAY be extended 2 years, and would affect Regulatory & Warning signs

• Proposed not to have specific date to implement the method for guide & other signs

• Jan 2015 and Jan 2018 compliance dates for replacement of deficient in-service signs are proposed for elimination
  – BUT any sign a jurisdiction identifies as not meeting established min retro levels would STILL need to be replaced.
  – Essentially the NPA will eliminate any latitude agencies had in replacing deficient devices by some point in the future!
How does this affect *Retroreflectivity*?

- Agencies should be prepared to defend their replacement scheduling decisions if liability issues arise.

- **Reminder:** agencies are *still* required to meet ALL MUTCD requirements regarding Min Retro Levels, Street Name Letter Heights, Crashworthy Supports, etc *NOW* for all *new installations* and *replacements*.

- **COMMENT NOW!**
  60-day comment period for this NPA ends **October 31, 2011**

http://mutcd.fhwa.dot.gov/
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.,)
Minimum Retroreflectivity Levels for Blue and Brown Traffic Signs

- Publication No. FHWA-HRT-08-029
- April 2008

### Table 17. Minimum MR levels.

<table>
<thead>
<tr>
<th>Sign Color</th>
<th>Sheet Type (ASTM D4956 04)</th>
<th>Additional Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Beaded Sheeting</td>
<td>Prismatic Sheeting</td>
</tr>
<tr>
<td></td>
<td>I</td>
<td>III, IV, VI, VII, VIII, IX, X</td>
</tr>
<tr>
<td>White on green or white on blue</td>
<td>W*; G ≥ 7</td>
<td>W ≥ 250; G ≥ 25</td>
</tr>
<tr>
<td>White on brown</td>
<td>W*; G ≥ 7</td>
<td>W ≥ 120; G ≥ 15</td>
</tr>
<tr>
<td>White on brown</td>
<td>W*; Br ≥ 7, Br ≥ 15</td>
<td>W ≥ 350; Br ≥ 20</td>
</tr>
<tr>
<td></td>
<td>W*; Br ≥ 7</td>
<td>W ≥ 150; Br ≥ 15</td>
</tr>
</tbody>
</table>

* W* represents the minimum retroreflectivity requirement for the respective color. G and Br are the grader and brightness coefficients, respectively.
Retro Increases for Complex Visual Conditions or Roadways With Glare

ALSO IN Publication No. FHWA-HRT-08-029

- Current values represent *dark rural environments*.
- Complex visual conditions (roadways with glare) *require twice as much retroreflectivity*
- If *fixed roadway lighting* is added, retro need increases **15%**
## 2011 Traffic Sign Retroreflective Sheeting Identification Guide

This document is intended to help identify sign sheeting materials for rigid signs and their common specification designations. It is not a qualified product list. FHWA does not endorse or approve sign sheeting materials. Many other sheeting materials not listed here are available for delineation and construction/work zone uses.

### Retroreflective Sheeting Materials Made with Glass Beads

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ASTM D4956-04</strong></td>
<td>I</td>
<td>II</td>
<td>II</td>
<td>III</td>
<td>III</td>
<td>III</td>
<td>III</td>
</tr>
<tr>
<td><strong>ASTM D4956-09</strong></td>
<td>I</td>
<td>II</td>
<td>II</td>
<td>III</td>
<td>III</td>
<td>III</td>
<td>III</td>
</tr>
<tr>
<td><strong>AASHTO M268-10</strong></td>
<td>(1)</td>
<td>(1)</td>
<td>(1)</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td><strong>Manufacturer</strong></td>
<td>Several</td>
<td>Avery</td>
<td>Nippon Carbide</td>
<td>3M™</td>
<td>ATSM, Inc.</td>
<td>Avery</td>
<td>Nippon Carbide</td>
</tr>
<tr>
<td><strong>Brand Name</strong></td>
<td>Engineer Grade</td>
<td>Super Engr Grade</td>
<td>Super Engr Grade</td>
<td>High Intensity</td>
<td>High Intensity</td>
<td>High Intensity</td>
<td>High Intensity</td>
</tr>
<tr>
<td><strong>Series</strong></td>
<td>Several</td>
<td>T-2000</td>
<td>15000</td>
<td>2800</td>
<td>3800</td>
<td>ATSM HI</td>
<td>T-5500</td>
</tr>
<tr>
<td><strong>NOTES:</strong></td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
<td>(3)</td>
<td>(4)</td>
<td>(4)</td>
<td>(4)</td>
</tr>
</tbody>
</table>

1. Sheet material does not meet minimum AASHTO classification criteria.
2. Glass bead Engineer Grade sheeting is uniform without any patterns or identifying marks. Section 2A.08 of the 2009 MUTCD (http://mutcd.fhwa.dot.gov) does not allow this sheeting type to be used for new yellow or orange signs, or new legends on green signs.
3. Material no longer sold in the United States as of the date of this publication.
4. Section 2A.08 of the 2009 MUTCD (http://mutcd.fhwa.dot.gov) does not allow this sheeting type to be used for new legends on green overhead signs.

- ASTM D4956-04 is referenced in Table 2A-3 of the 2009 MUTCD.
- ASTM D4956-09 is the most current ASTM sign sheeting specification (the 2009 version is designated by "-09").
- AASHTO M268-10 Types for this Guide are based only on retroreflective properties and not other unique AASHTO requirements such as color.

### Manufacturer Contact Information

- **3M** - http://www.3M.com/tss
- Avery Dennison - http://www.reflectives.averydennison.com
- Oracal - http://www.oracal.com
- **ATSM, Inc.** - http://www.atsminc.com
- **Nippon Carbide** - http://www.nikkalite.com
- Reflexite - http://www.reflexite.com

FHWA Publication Number: FHWA-SA-11-14. For additional copies of this document, please send request to report.cust@dot.gov.
Compliance Kits
### Compliance Kits

**Calibration Signs and Comparison Panels**

- Kit consists of a full set of **8 Calibration Sign Standards** and **12 Comparison Panel Standards**

- NOT actual traffic signs – but designed to engineering standards, precisely manufactured to MUTCD minimum levels of retroreflectivity (guaranteed for 2 years)

- Reliably measured per ASTM E 810 and certified accurate

- Will conduct formal engineering study evaluating this as a **daytime technique** and submit to FHWA for review

[www.reflectives.averydennison.com](http://www.reflectives.averydennison.com)
Sign Management Software

- **Signs Plugin**, UT LTAP — Safety Software Suite, FREE GIS plugins for Crash Analysis, SIMS, Intersection Analysis, RSAs, ADA Ramps, etc
- **SimpleSigns**, Rowekamp — Iowa based co, specifically designed for small communities, maintain signs, track sign age, orientation, etc
- **SignProx**, Eric Green, KY LTAP — Efficient inventory, manage, and maintain signs, GPS integration, designed to ensure compliance with new retroreflectivity regulations.
- **SignWorks**, PubWorks — GIS Asset Mgmt, Fleet Maint, Signs, Service Requests, Work Orders, Mapviewer, Data Collector, etc
- **RoadSoft GIS/Signs**, MI LTAP — Asset Mgmt/Inventory, Safety Analysis, Workflow Mgmt, Mapping, Data Collection, Proj. Estimator
Retro Management Tools

- **MN Sign Maintenance/Management Handbook**
  - Rules, Maintenance Methods, Financial Budgeting, Policy Development/Implementation, Effectiveness of Traffic Signs
  - Section on *How to Remove Unnecessary and Ineffective Signs*

- **Pavement Marking Management Systems, IA & MN**
  - FHWA Nighttime Visibility Website

- **Sign Retroreflectivity Guidebook/CD**
  - Designed to help small agencies make decisions on Retro requirements. Includes: Steps to Implementation, *Interactive Budget Estimation Tool*, *Sample Forms and Letters*, and Funding and Technical Resources.
Minimum Pavement Marking Retroreflectivity

• New MUTCD Section 3A-03

• FHWA proposed first-ever standards for maintaining minimum levels of reflectivity of pavement markings.

• Federal Register Notice of Proposed Rulemaking, April 22, 2010

• 120 day public comment period ended August 20, 2010

• (Originally it was proposed that...) agencies would have:
  – 4 years to establish & implement a PM maintenance method
  – 6 years to replace PM that fail to meet the new regulations
# Minimum Pavement Marking Retroreflectivity

- **Table 3A-1** Minimum Maintained Retroreflectivity Levels for Longitudinal Pavement Markings

<table>
<thead>
<tr>
<th>Posted Speed Limit (mph)</th>
<th>Two lane roads with centerline markings only</th>
<th>All other roads</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; = 30</td>
<td>Not applicable</td>
<td>Not applicable</td>
</tr>
<tr>
<td>35 - 50</td>
<td>100</td>
<td>50</td>
</tr>
<tr>
<td>&gt; = 55</td>
<td>250</td>
<td>100</td>
</tr>
</tbody>
</table>
Minimum Pavement Marking Retroreflectivity

**MUTCD Section 3A-03** includes subtle but important distinctions that categorize PM into 3 general types:

- **Not required to be retroreflective** - PM where ambient illumination assures adequate visibility, or only needed in the daytime.

- **Required to be retroreflective, but not subject to min levels** – Some examples of exceptions include crosswalk markings, other transverse markings, words, symbols, arrows, etc.
  - Some are exempt under certain conditions, such as presence of continuous *roadway lighting* or *raised retro pavement markers.*

- **Subject to minimum retroreflectivity levels** – WHITE and YELLOW longitudinal PM that are required by the MUTCD – center lines, edge lines, lane lines, and channelizing lines.
Requirements of Center Line Pavement Markings

- MUTCD Section 3B-01

  **Standard** –
  - Center Line Markings *shall* be placed on all paved urban arterials & collectors with traveled way of 20ft or more, and an **ADT of 6,000** vehicles per day or greater.

  **Guidance** –
  - Center Line Markings *should* be placed on paved urban arterials & collectors with traveled way of 20ft or more, and an **ADT of 4,000** vehicles per day or greater.
  - Center Line Markings *should also* be placed on all *rural* arterials & collectors with traveled way of 20ft or more, and an **ADT of 3,000** vehicles per day or greater.
Retroreflectivity Websites

• ATSSA Retroreflectivity Clearinghouse
  www.retroreflectivity.net
  – Primer on retroreflectivity
  – Common questions & resources

• FHWA Nighttime Visibility Website
  http://safety.fhwa.dot.gov/roadway_dept/night_visib/
  – Summary Brochure & Final Rule
  – Power Point Presentations
  – Local Agency Retro Toolkit
  – Frequently Asked Questions
  – *Pavement Marking* Retro Updates

• http://www.minimumreflectivity.org