

NCUTCD Recommended Changes to Pavement Marking Retroreflectivity

Section 3A.03, Maintaining Minimum Retroreflectivity of Longitudinal Pavement Markings

On April 22, 2010, the FHWA published a Notice of Proposed Amendments (NPA) in the *Federal Register* for minimum levels of retroreflectivity for longitudinal pavement markings. The text on the following pages was approved by the NCUTCD Council in General Session at the June 30, 2010 meeting in Chicago, Illinois. The text represents recommended changes to the NPA issued by FHWA. Additions to the FHWA NPA language are shown as underlined blue font and deletions are shown as ~~double-strikethrough red font~~. These recommended changes represent the most recent effort by the NCUTCD to provide input to the FHWA on minimum marking retroreflectivity. This language supersedes language (sans minimum values) approved by the NCUTCD at the January 2009 meeting and submitted to the FHWA. The text below explains the basis for the recommended changes in the NPA language.

Lines	Summary of Change	Explanation of Recommended Change
26-27	Remove reference to the table from the standard statement	Due to the recent change in the definition of a standard (the addition of the phrase that standards cannot be modified on the basis of judgment or study), the NCUTCD recommends that the minimum retroreflectivity values be referenced in a guidance statement. This would result in a requirement to have a method and a recommendation that the method maintain the markings to the levels shown in the table.
29-30, 32, 35	Wording change	Editorial changes to better clarify that the requirements or recommendations are described in the listed sections.
41-43	New paragraph	A new paragraph is added to better clarify that optional markings are not required to be maintained. There was confusion regarding this issue among MTC and NCUTCD members and this language is recommended to clarify that minimum retroreflectivity maintenance applies only to required or recommended long lines.
44-49	Relocated and revised paragraph	The first paragraph of the support statement in the NPA has been changed to a standard and relocated to be with the other standard paragraphs. This change is necessary because of the recent change in the definition of a standard. The editorial changes associated with this paragraph are needed because of the change from a support to a standard statement.
50-55	Relocated and revised paragraph	The second paragraph of the support statement in the NPA remains as a support statement, but is relocated because of its relation to the preceding paragraph (the support statement that is changed to a standard). Additional occurrences are added to the list.
57-59	New paragraph	The reference to the table of minimum levels has been moved to the new guidance statement. This change is needed because of the revised definition of a standard.
Table	Revised value	The value for a centerline in the high speed category is reduced to 150 mcd/m ² /lux. Several agencies commented that their required initial values for yellow markings are less than 250 and that such a high value is unrealistic to maintain, particularly in the snow belt states.
Table, Note 1	Additional language	Language is added to clarify that the minimum retroreflectivity levels apply to clean and dry markings. This change is needed to address questions on whether the values represented minimums for wet markings.
Table, Note 3C	Additional language	A third exception is added for locations that have delineators. The need for this exception was identified by numerous snow belt states that indicate they cannot maintain markings at all during the winter and that drivers rely upon delineation for guidance in those conditions.
62	Deleted heading	The guidance heading is deleted due to the addition of a new guidance paragraph and heading preceding the table.
71, 75, 78, 79, 86, 90	Clarification	The phrase “or re-marked” is added to the description of each method to clearly indicate that markings do not need to be removed prior to being replaced. Without this change, the language could be interpreted to imply that the removal of the old marking is recommended.

1 **NCUTCD Recommended Changes to the MUTCD NPA (Docket No. FHWA-2009-0139)**
2 **Maintaining Minimum Retroreflectivity of Longitudinal Pavement Markings**
3

4 Note: Additions to the FHWA NPA language are shown as underlined blue font and deletions
5 are shown as ~~double strikethrough red font~~.
6

7 Add to Table I-2 Target Compliance Dates Established by the FHWA:

8 **Section 3A.03 Maintaining Minimum Retroreflectivity of Longitudinal Pavement Markings—new**
9 **section—from the effective date of the Final Rule for Revision 1 of the 2009 MUTCD:**

- 10 • **4 years from date of Final Rule for implementation and continued use of a maintenance**
11 **method that is designed to maintain pavement marking retroreflectivity at or above the**
12 **established minimum levels; and**
- 13 • **6 years from date of Final Rule for replacement of pavement markings that are identified**
14 **using the maintenance method as failing to meet the established minimum levels.**

15
16 Add new reference document to Section 1A.11 Relation to Other Publications:

17 **Section 1A.11**

18 **“Summary of the MUTCD Pavement Marking Retroreflectivity Standard,” Report No. FHWA-SA-**
19 **10-015.**

20
21 Revise Section 3A.03 as follows:

22 **Section 3A.03 Maintaining Minimum Retroreflectivity of Longitudinal Pavement**
23 **Markings**

24 **Standard:**

25 **Public agencies or officials having jurisdiction shall use a method designed to maintain**
26 **retroreflectivity of the following white and yellow longitudinal pavement markings, ~~at or above the~~**
27 **~~minimum levels in Table 3A-1:~~**
28

- 29 1. **Center line markings on roads where they are required or recommended ~~by~~ as described**
30 **in Section 3B.01. This shall include any no-passing zone markings, longitudinal two-way**
31 **left-turn lane markings, and yellow markings used to form flush medians on such roads.**
- 32 2. **Lane line markings on roads where they are required or recommended ~~by~~ as described in**
33 **Section 3B.04. This shall include any dotted lane lines, lane drop markings, and**
34 **longitudinal preferential lane markings on such roads.**
- 35 3. **Edge line markings on roads where they are required or recommended ~~by~~ as described in**
36 **Section 3B.07. This shall include any channelizing lines delineating gores, divergences, or**
37 **obstructions on such roads.**
- 38 4. **Any optional edge line markings that are used to qualify for the lower minimum**
39 **retroreflectivity values in the “All other roads” row of Table 3A-1.**
40

41 Except for the optional edge line markings described in item #4, optional white and yellow
 42 longitudinal pavement markings are not subject to this Standard, but shall comply with the
 43 requirements of Section 3A.02.

44 ~~Support:~~ [Relocated Paragraph and Changed to Standard]

45 Compliance ~~with the above Standard is~~ shall be achieved by having a method in place and using
 46 the method to maintain the recommended minimum levels established in Table 3A-1. Provided that
 47 a method is being used, an agency or official having jurisdiction ~~would~~ shall be in compliance with
 48 ~~the above Standard~~ even if there are occurrences when pavement markings ~~that~~ do not meet the
 49 minimum retroreflectivity levels at a particular location or at a particular point in time.

50 Support: [Relocated Paragraph]

51 These occurrences include, ~~There are many factors for agencies to consider in developing a method of~~
 52 ~~maintaining minimum pavement marking retroreflectivity including,~~ but are not limited to, winter
 53 weather, environmental conditions, reconstruction, ~~and~~ pavement resurfacing, and localized or abnormal
 54 wear. These are additional factors for agencies to consider in developing a method to maintain minimum
 55 pavement marking retroreflectivity.

56
 57 Guidance:

58 The method should be designed to maintain retroreflectivity of the white and yellow longitudinal
 59 markings described in items 1-4 of the preceding Standard at or above the minimum levels in Table 3A-1.

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

	Posted Speed (mph)		
	≤ 30	35 – 50	≥ 55
Two-lane roads with centerline markings only ^②	n/a	100	250 150
All other roads ^②	n/a	50	100

① Measured at standard 30-m geometry in units of mcd/m²/lux for clean and dry pavement markings.
 ② Exceptions:
 A. When RRPMS supplement or substitute for a longitudinal line (see Section 3B.13 and 3B.14), minimum pavement marking retroreflectivity levels are not applicable as long as the RRPMS are maintained so that at least 3 are visible from any position along that line during nighttime conditions.
 B. When continuous roadway lighting assures that the markings are visible, minimum pavement marking retroreflectivity levels are not applicable.
 C. When delineators are placed along the roadway according to Section 3F.04, minimum pavement marking retroreflectivity levels are not applicable.

62 ~~Guidance:~~

63 *Except for those pavement markings specifically identified in the Option below, one or more of the*
 64 *following methods, as described in the 2010 Edition of FHWA’s “Summary of the MUTCD Pavement*
 65 *Marking Retroreflectivity Standard (see Section 1A.11),” should be used to maintain retroreflectivity of*
 66 *longitudinal pavement markings at or above the levels identified in Table 3A-1:*

67

- 68 A. *Calibrated Visual Nighttime Inspection* – Prior to conducting a nighttime inspection from a
69 moving vehicle and in conditions similar to nighttime field conditions, a trained inspector
70 calibrates his eyes to pavement markings with known retroreflectivity levels at or above those in
71 Table 3A-1. Pavement markings identified by the inspector to have retroreflectivity below the
72 minimum levels are replaced or re-marked.
- 73 B. *Consistent Parameters Visual Nighttime Inspection* –A trained inspector at least 60 years old
74 conducts a nighttime inspection from a moving vehicle under parameters consistent with the
75 supporting research. Pavement markings identified by the inspector to have retroreflectivity
76 below the minimum levels are replaced or re-marked.
- 77 C. *Measured Retroreflectivity* – Pavement marking retroreflectivity is measured using a
78 retroreflectometer. Pavement markings with retroreflectivity levels below the minimums are
79 replaced or re-marked.
- 80 D. *Service Life Based on Monitored Markings* – Markings are replaced or re-marked based on the
81 monitored performance of similar in-service markings with similar placement characteristics.
82 All pavement markings in a group/area/corridor are replaced when those in the representative
83 monitored control set are near or at minimum retroreflectivity levels. The control set markings
84 are monitored on a regular basis by the visual nighttime inspection method, the measured
85 retroreflectivity method, or both.
- 86 E. *Blanket Replacement* – All pavement markings in a group/area/corridor or of a given type are
87 replaced or re-marked at specific intervals. The replacement interval is based on when the
88 shortest-life material in that group/area/corridor approaches the minimum retroreflectivity level.
89 The interval is also based on historical retroreflectivity data for that group/area/corridor.
- 90 F. *Other Methods* – Other methods developed based on engineering studies that determine when
91 markings are to be replaced or re-marked based on the minimum levels in Table 3A-1.

92 Option:

93 Public agencies or officials having jurisdiction may exclude the following markings from their
94 minimum pavement marking retroreflectivity maintenance method(s) and the minimum maintained
95 pavement marking retroreflectivity levels, but not from any requirements in Section 3A.02 to be
96 retroreflective.

- 97 A. Words, symbols, and arrows,
98 B. Crosswalks and other transverse markings,
99 C. Black markings used to enhance the contrast of pavement markings on a light colored pavement,
100 D. Diagonal or chevron markings within a neutral area of a flush median, shoulder, gore, divergence,
101 or approach to an obstruction,
102 E. Dotted extension lines that extend a longitudinal line through an intersection or interchange area,
103 F. Curb markings,
104 G. Parking space markings, and
105 H. Shared use path markings