



## DETERMINING RETROREFLECTIVITY OF DURABLE PAVEMENT MARKINGS

### **SCOPE**

This Instructional Memorandum describes the procedure used to measure the retroreflectivity of durable pavement marking installations to assure conformance to Iowa Department of Transportation Standard Specification requirements.

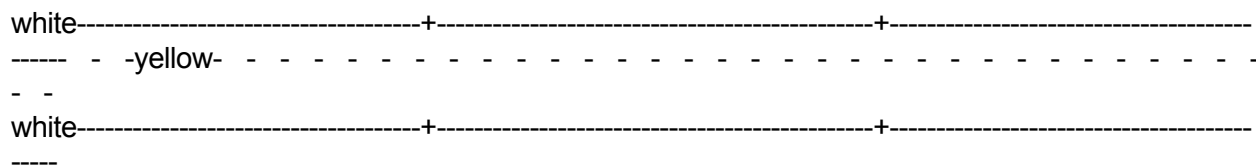
### **PROCEDURE**

The testing for final acceptance will be done between seven days and 35 days after installation.

#### A. Dividing the Project Into Test Sections

1. Add up the length of all the pavement markings in the project to be tested for acceptance to the nearest 0.25 mile. White and yellow pavement markings should be added separately. One-fourth of the mileage of dash line should be added to the length of solid lines to get the total length of pavement markings of either white or yellow.
2. If the total length of white or yellow pavement markings in the project is two miles or less, divide the total length into two approximately equal test sections. For any additional length of pavement markings a test section will be added for every two additional miles of pavement markings or part thereof. The total length of either white or yellow pavement markings in the project will be divided into the appropriate number of approximately equal test sections.
3. The average retroreflectivity value for each test section measured using either the mobile or the hand held retroreflectometer will be used to accept or reject that section of the project.

#### **EXAMPLE: Dividing Pavement Markings on a 3-mile Section of Two-lane Roadway Into Test Sections:**



1. Total length of two white edge lines = 3 + 3 = 6miles.  
Number of test sections needed = 2 for 1<sup>st</sup> two miles, one each for each of the additional 2-mile segments = 4 test sections.

2. Divide the total length of white edge lines into four approximately equal test sections.
3. Total length of yellow dash lines = 3 miles.  
Three miles of dash lines is equivalent to 3/4 mile of solid lines.  
For 3/4 mile yellow lines, take two approximately equal test sections.
4. Randomly select a test location in each test section to represent that test section.
5. The results of each test location will be used for accepting the section it represents.

B. Equipment.

1. Mobile retroreflectometer mounted on a van (Laser Lux Van) sold by Roadware Corp.
2. A hand held retroreflectometer with a 30-meter geometry (entrance angle of 88.76 degrees and observation angle of 1.05 degrees)
3. The instruments will be calibrated against a certified standard not more than two hours before use.

C. Procedure for Testing of Pavement Marking Using the Laser Lux Van

1. The Ames Central Office of Maintenance (515-239-1971), Laser Lux Van operation coordinator will be notified of the need for retroreflective measurement as soon as a reasonably predictable date for completion of the job is available.
2. The Laser Lux Van operation coordinator will inform the engineer of the feasibility of using the Laser Lux Van within the required timeframe and schedule the measurement and notify the project inspector who in turn will inform the contractor of the testing schedule.
3. The contractor may be present for the inspection if desired.
4. The measurement of pavement markings will be done in the same direction as the traffic for which the pavement marking is intended. The centerlines, which are meant for either direction of traffic, will be measured in both directions and averaged.
5. The Laser Lux Van retroreflectivity is averaged for the overall segment measured in a continuous run and also averaged for each tenth of a mile segment. The average retroreflectivity of each test section will be calculated from this Laser Lux report.
6. The average retroreflectivity for the test sections selected will be reported on the form attached and given to the engineer.

D. Procedure for Testing of Pavement Marking Using Hand Held Retroreflectometer

1. A random test location will be selected for each test section to represent that section of the project. The test location could be either in solid line or broken lines.
2. A 30-meter geometry hand held retroreflectometer will be used.
3. The instrument will be used as per the instructions in its operation manual.
4. The testing results will be given to the engineer on the attached form.
5. If the selected test location is in solid lines: ten retroreflectivity readings, each about 10 ft. apart, will be taken at the selected location in the same direction as the traffic for which the lines are intended. In case of centerlines the direction in which retroreflective readings are taken will be alternated. The average of the ten readings taken will be used to accept or reject that section represented by the test location.
6. The testing frequency will be same as for solid lines. The test location randomly selected will be five consecutive dashes and two readings will be taken on each of these dashes. The direction of the reading will be the same as the direction for which the line is intended. In case the line is meant for both directions of traffic, the direction of readings will be alternated. The average of the ten readings taken at the location will decide the acceptance of the part of the project represented by that location.

E. Procedure for Legends, Symbols, Pedestrian Crossings, Etc.

The engineer will decide if testing is required for acceptance of symbols, legends, etc. If the engineer decides to measure them, they will be counted to see how many legends, symbols, etc., there are in the project.

For every five legends, symbols, etc., one will be selected at random for measurement and five readings taken on the selected legend/symbol. The average of the five readings taken on the selected symbol will be used for determining acceptance of the group of five symbols.

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**Report of Retroreflective Measurement of Durable Pavement Markings  
Using the Hand Held Reflectometer**

Report No. \_\_\_\_\_ Route No. \_\_\_\_\_ Project No. \_\_\_\_\_

Page \_\_\_\_ of \_\_\_\_ Date Measured \_\_\_\_\_ Contractor \_\_\_\_\_

Reflectometer Operator \_\_\_\_\_

Type of Lines Measured:     White-Edge             White-Dash             Yellow-Solid/Dash  
    Yellow-Edge             Yellow-Dash             Yellow-Double Solid

Location of Line:    From: \_\_\_\_\_ To: \_\_\_\_\_

Test Section: No.	From (MM/Stn)	To (MM/Stn)	Testing Loc. (MM/Stn)	Avg. of 10 Retro. Rdgs. mcd/ft.cd/ft2	Line Type
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

Sketch of the Project Location:

Project Inspector: \_\_\_\_\_

cc: Central Materials  
Central Maintenance  
DME Office  
RCE Office  
Contractor

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**Report of Retroreflective Measurement of Durable Pavement Markings  
Using the Laser Lux Van**

Report No. \_\_\_\_\_ Route No. \_\_\_\_\_ Project No. \_\_\_\_\_

Page \_\_\_\_ of \_\_\_\_ Date Measured \_\_\_\_\_ Contractor \_\_\_\_\_

Reflectometer Operator \_\_\_\_\_

Type of Lines Measured:     White-Edge             White-Dash             Yellow-Solid/Dash  
                                   Yellow-Edge             Yellow-Dash             Yellow-Double Solid

Location of Line:    From: \_\_\_\_\_ To: \_\_\_\_\_

Test Section: No.	From (MM/Stn)	To (MM/Stn)	Testing Loc. (MM/Stn)	Avg. of 10 Retro. Rdgs. mcd/ft.cd/ft2	Line Type
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

Sketch of the Project Location:

Project Inspector: \_\_\_\_\_

cc: Central Materials  
Central Maintenance  
DME Office  
RCE Office  
Contractor