DS-23071
(New)

DEVELOPMENTAL SPECIFICATIONS FOR MOBILE REFLECTOMETER MEASUREMENTS

Effective Date
February 18, 2025

THE STANDARD SPECIFICATIONS, SERIES 2023, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE DEVELOPMENTAL SPECIFICATIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

23071.01 DESCRIPTION.

Provide dry retro-reflectivity measurements of longitudinal markings using a vehicle-mounted mobile retro-reflectometer utilizing 30-meter CEN geometry. Retroreflectivity readings shall comply with the requirements of this specification and shall meet the applicable minimum standards established by the FHWA, in addition to the following standards:

- U.S. DOT Retroreflectivity Standards
- MUTCD
- ASTM E 1710 Standard Test Method for Measurement of Retroreflective Pavement Marking Materials with CEN-Prescribed Geometry Using a Portable Retroreflectometer
- ASTM E 3320 Standard Test Method for Measurement of Retroreflective Pavement Marking Materials Using a Mobile Retroreflectometer Unit (MRU)

23071.02 CONSTRUCTION.

A. Equipment.

1. The retro-reflectometer shall be calibrated in accordance with the operating manual and calibration guide for each specific machine and vehicle configuration. Measurement shall consist of the average retroreflective readings and standard deviations, as well as contrast ratios, over 0.1 mile intervals (or over the length of the line if shorter than 0.1 mile) for each type of pavement marking placed.

2. Verify the accuracy of traveled distance prior to performing measurements by traveling a known distance and comparing to the systems recorded distance. Provide proof of calibration and distance confirmation to the Engineer, including values and information.

B. Testing.

1. Conduct the evaluation of retro-reflectivity between 14 calendar days and 45 calendar days after pavement marking installation, prior to snow and ice maintenance operations if possible.

2. Excess beads or reflective elements must not be visible before the retro-reflectivity testing is conducted.

3. Collect the data when pavement and markings are dry, clean and no visible moisture is on the road surface.

4. Measure centerline markings in both directions, except in areas of painted medians or bidirectional turn lanes. Measure centerlines in painted medians and bidirectional turn lanes; and other longitudinal markings in the direction of intended vehicular travel for the adjacent mainline lane.

5. Notify the Engineer at least 1 business day prior to collecting data.

6. Evaluate any replaced or repaired markings per this specification at no additional cost to the Contracting Authority.

C. Reporting.

1. Provide a measurement report that includes:
   - **a.** Iowa DOT project number.
   - **b.** Data collection software name and version.
   - **c.** Date and time of data collection.
   - **d.** The Highway class (Interstate, US, or IA) and number with the beginning and ending reference points of data collection rounded to the nearest 0.01 mile and the beginning and ending coordinates determined by a GPS receiver with nominal 3 meter accuracy, including the direction of travel in terms of increasing or decreasing reference points.
   - **e.** The code for the line being read:
     - **1)** LEL – Left edge line
     - **2)** REL – Right edge line
     - **3)** CL – Centerline (yellow line separating traffic flowing in different directions)
     - **4)** XCL – Centerline for a roadway that has two centerlines due to a bidirectional center turn lane or painted median; LCL shall be used for the left centerline and RCL shall be used for the right centerline when facing in the direction of increasing reference points.
     - **5)** LL – Lane line skip
     - **6)** XLL – Lane line skip where X is the lane number for the lane on the left side of the measured line on a section with three or more mainline lanes in the same direction. Lane 1 shall be the left-most lane; the right-most mainline lane will not be used (auxiliary lanes, if present, will be identified as noted below).
     - **7)** AL – Auxiliary lane markings where there is only one auxiliary lane and the line on the left side of the auxiliary lane is the line being measured.
     - **8)** XAL - Auxiliary lane markings where X is the auxiliary lane number for the lane on the right side of the measured line on a section with two or more auxiliary lanes. Lane 1 shall be the left-most auxiliary lane; the right-most auxiliary lane number will not be used as the right line will be read as the right edge line for that segment of roadway.
   - **f.** The 0.1 mile interval retroreflective reading averages and standard deviations.
   - **g.** The 0.1 mile interval contrast ratio average.
   - **h.** An explanation for any intervals that are marked invalid.
   - **i.** A summary of the average retroreflective readings for each individual run file.
   - **j.** A summary of the average retroreflective readings in 1 mile intervals.
   - **k.** A summary of average retroreflective readings based on 0.1 mile intervals.
   - **l.** A summary of the total distance traveled by the vehicle in feet while taking retroreflective readings.

2. Provide the measurement report in the form of an electronic database file, or delimited text file, containing all raw data collected. Submit the data to the Maintenance Bureau: Benjamin.hucker@iowadot.us and copy the Engineer. Submit a summary of the report to the Engineer.

3. Note in the report any areas where the pavement markings are obscured and why they are obscured.

23071.02 METHOD OF MEASUREMENT.

Mobile Reflectometer Measurements will be measured by the length in feet. The linear foot will be measured for the distance travelled by the mobile reflectometer while measuring the retro-reflectivity of the pavement markings. One pass per measured line will be paid except for centerlines which are allotted one pass in each direction for a given line. Deadhead travel or additional distance required to prepare for measurement shall be incidental to the measured line length.

23071.03 BASIS OF PAYMENT.

The contract unit price per foot for the Mobile Reflectometer Measurements includes all costs incurred in materials, equipment, labor, traffic control, and time as required by the Contractor doing the MRM work. Submission of all summaries and measurement reports is included in the contract unit price.