Oregon

DEPARTMENT OF TRANSPORTATION

Construction Section
800 Airport Road SE
Salem, OR 97301-4798
503/986-3059

Standard Guidelines for Product Review

PAVEMENT MARKERS, TYPE 1, Recessed; Section 02840.60

October 22, 2002

02840.60 – Pavement Markers, Type I, Recessed

Description - Type I pavement markers are reflectorized. This category is for reflectorized markers to be placed in a slot to protect them from snowplows. The markers shall be:

1. Abrasive Resistant.
2. Not more than 0.5 inches (13 mm) tall.
3. Not more than 4.7 inches (120 mm) wide.
4. Be able to adhere to asphalt or concrete surfaces with bituminous or epoxy adhesives.
5. In a test installation 12 m apart, at least 6 markers shall be visible at night.

Process - Submit the following:

- Preliminary Information for Product Evaluation Form.
- Independent Test Results showing compliance with Specs listed below.
- Product Data Sheet.
- Detailed installation instructions.
- List of Limitations and Precautions.
- Submit 15 markers for our evaluation (each color).

Specifications - Strength, Optical Performance, Pull-Off, Abrasive Resistance:

Strength Requirements:

(1) Method Of Test - Select 3 specimens of any type of marker for load testing. Place each 100 mm x 100 mm marker on an "Alert 15175" pad, 7 mm thick, 17 ply, or equivalent and centered over the open end of a vertically positioned hollow cylinder that is 25 mm high with an internal diameter of 75 mm and a wall thickness of 6 mm. Place each 50 mm x 100 mm marker directly on a 12 mm thick flat steel plate. Apply a load necessary to break the marker at a speed of 5 mm/min to the top of the marker through a 25 mm diameter solid metal cylinder centered on the top of the marker.

(2) Requirements - Failure of the marker shall be determined as either breakage, deformation, or delamination of the shell and filler material at a load less than 680 kg for the 100 mm x 100 mm markers and 1800 kg for the 50 mm x 100 mm markers.

(3) Retest - Should any one of the 3 markers selected for strength testing fail to comply with the strength requirements of this specification, 6 additional specimens will

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be tested. The failure of any one of these 6 specimens shall be cause for the rejection of the entire lot or shipment represented by this sample.

Optical Performance – Test three specimens of each color according to Federal Test Method Standard 370. The luminous intensity of each reflective surface, when tested at 0.2° observation angle shall not be less than the following specified value:

	Coefficient of Luminous Intensity (R_I), cd/lx	
Entrance Angle	**White**	**Yellow**
0°	3.0	1.5
20°	1.2	0.6

Pull-Off Bond Test – Markers shall have bottom surfaces capable of good bond to adhesive. Five specimens shall be tested and shall provide a minimum average tensile bond strength of 3.4 MPa. The test consists of bonding a 38 mm diameter steel test plug with sandblasted surface to the center of the marker bottom using an epoxy meeting the requirements of AASHTO M237. After 48 hours curing time at 23 °C ± 2 °C the test plugs shall be tensile loaded at a rate of 2200 kg/min to failure.

Abrasive Resistance Test – On three different marker faces, with very flat faces, zero and 20 degree angle retro-reflectivity readings are taken at 0.2° observation angle in accordance with ASTM D4061 prior to abrasion. The markers are then put through an abrasion process as follows. (This abrasive resistance test is also described in ASTM D 4280 Section 9.2.2).

Obtain a 25 mm diameter flat pad of #3 coarse steel wool. Place the steel wool pad on the reflector lens. Apply a load of 22 +/- 0.2 kg and rub the entire lens surface 100 times at a rate not faster than 1 pass per second. Replace the steel wool after every other test.

Zero and 20 degree angle readings at 0.2° observation angle are again measured and compared to the original readings as a coefficient of luminous intensity.

The luminous intensity of each reading shall not drop below the luminous intensity of each reflective surface, when tested at 0.2° observation angle shall not be less than the following specified values, on any of the markers tested:

	Coefficient of Luminous Intensity (R_I), cd/lx	
Entrance Angle	**White**	**Yellow**

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0°	3.0	1.5
20°	1.2	0.6

The results of each face, both before and after abrasion should be reported.

Submit documentation to:
Oregon DOT
Mike Dunning
800 Airport Road SE
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