

SECTION 02590

TEMPORARY AND REMOVABLE REFLECTORIZED PAVEMENT MARKINGS

PART 1      G E N E R A L

1.01    SECTION INCLUDES

- A.    Temporary retroreflective preformed pavement markings.
- B.    Wet retroreflective markers.

1.02    UNIT PRICES

- A.    Measurement for temporary pavement markings is on a linear foot basis, for each class, measured in place.

1.03    TEMPORARY PAVEMENT MARKING DEFINITIONS

- A.    Class I -      Temporary preformed pavement markings suitable for longitudinal and word and symbol markings where removability will be required.
- B.    Class II -     Temporary non-removable preformed pavement markings suitable for overlay lane lines, edge lines, and channelizing lines where pavement will be resurfaced.
- C.    Class III -    Class I markers with wet reflective markers added every 8 feet.
- D.    Class IV -    Class II markers with wet reflective markers added every 8 feet.

1.04    SUBMITTALS

- A.    Submittals shall conform to requirements of all sections and provisions of these specifications.
- B.    Submit manufacturer's product data for each proposed class of marking material and installation instructions for approval. Include certificate by manufacturer that each class of marking conforms to the requirements of this specification.
- C.    Submit details of manufacturer's replacement policy for each class of marker.

1.05    DELIVERY AND STORAGE

- A.    Deliver preformed plastic marking material in rolls or strips.
- B.    Store material in cool dry conditions until application.

PART 2      P R O D U C T S

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PAVEMENT MARKINGS**

2.01 PREFORMED MARKINGS

- A. Retroreflective preformed markings: White or yellow retroreflective tape on conformable backing with pigments conforming to standard highway colors. Glass beads shall be incorporated in film and a reflective layer of beads shall be bonded to the top surface of the film. Bead adhesion shall be such that beads cannot be easily removed by scratching with a thumbnail.
- B. Preformed marking shall be precoated with pressure sensitive adhesive and shall have a demonstrated ability to adhere to roadways under climatic and traffic conditions normally encountered in a construction work zone when properly applied.
- C. Class I markings shall be removable from portland cement and asphaltic concrete pavements intact, or in large pieces, at temperatures above 40 degrees F without use of heat, solvents, grinding, or blast cleaning. Marking film shall be removable after exposure to following minimum traffic exposure when tested on transverse test decks with rolling traffic:

|    |   |            |
|----|---|------------|
| 1. | Time in Place (days)                      | 632        |
| 2. | ADT per lane (23% trucks, 3.5 axles/unit) | 9,000      |
| 3. | Minimum Axle Hits                         | 13,000,000 |

D. Quality performance characteristics:

|   | <u>CLASS I</u> |               | <u>CLASS II</u> |               | <u>TEST METHOD</u>  |
|---|----------------|---------------|-----------------|---------------|---------------------|
|   | <u>White</u>   | <u>Yellow</u> | <u>White</u>    | <u>Yellow</u> |                     |
| Init. Retroreflective<br>(mcd ft <sup>-2</sup> fc <sup>-1</sup> ), min.<br>**@86.0°, 0.2° | 1770           | 1310          | 1360            | 820           | ASTM D4061          |
| **@86.5°, 1.0°  | 750            | 450           | 500             | 350           |                     |
| Daytime Reflectance<br>Factor "Y" %, min.   | 65             | 36            | 65              | 36            | ASTM E97            |
| Init. Skid Resistance,<br>Avg. BPN  | 50             |               | 35              |               | ASTM E303           |
| Refractive Index of<br>Beads, min.  | 1.9            |               | 1.9             |               | LIQUID<br>IMMERSION |
| Thickness, without<br>adhesive, mils, min.  | 40             |               | 9               |               | Caliper Gauge       |

\* (Entrance Angle, Observation Angle).

2.02 RAISED WET REFLECTIVE MARKERS

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- A. Raised Markers: Expanded rubber extrusions capable of being elastically compressed and deflected when impacted by rotating vehicle tires. Marker body shall have the following properties when tested in accordance with ASTM D1056:
  - 1. Compression deflection - < 16 psi @ 25<sup>0</sup> deflection.
  - 2. Oven aged compression deflection - % change, +18.
  - 3. Compress set low - 10%.
  - 4. Water absorption - < 9%.
  - 5. Density (lbs/ft) -24.
- B. Markers shall be precoated with pressure sensitive adhesive capable of holding markers to top of preformed marking film.
- C. Markers shall have enclosed retroreflective lens sheeting elements attached to marker bodies with pressure sensitive adhesive.

- 1. Retroreflective lenses elements shall have the following initial minimum reflectance when measured in accordance with ASTM E809:

| Color:  | <u>White</u> | <u>Yellow</u> | <u>White</u> | <u>Yellow</u> | <u>White</u> | <u>Yellow</u> | <u>White</u> | <u>Yellow</u> |
|---|--------------|---------------|--------------|---------------|--------------|---------------|--------------|---------------|
| Observation angle                                       | 0.2°         |               | 0.5°         |               | 1.0°         |               | 1.5°         |               |
| Coeff. Of Luminous Intensity , R (cd fc <sup>-1</sup> ) | 1.00         | 0.60          | 0.40         | 0.24          | 0.19         | 0.11          | 0.14         | 0.08          |

- Notes:
- 1. Tests at an entrance angle (Beta 2 horizontal entrance component described In ASTM E808) of -4° measured from an axis perpendicular to top edge of Marker when viewed from above.
  - 2. Angle formed by reflective surface and base of marker shall be between 75° and 90° prior to measurement.

- 2. Marker reflective elements shall be visible at night, to motorists with low beam headlights, under the following conditions:
  - a. Dry conditions - 1500 feet
  - b. Rainfall at a rate of 1" per hour - 1000 feet
  - c. Rainfall at a rate of 8" per hour - 250 feet

PART 3 EXECUTION

3.01 INSTALLATION

- A. Apply markings to clean dry surfaces in accordance with manufacturer's recommendations at locations indicated on Drawings, or as directed by the Owner Representative.
- B. Place markings on each paving lift that is to be opened to traffic prior to the end of each day's work.
- C. Maintain markings, and replace as needed, until they are covered with subsequent paving courses or replaced by permanent markings on final lifts.

3.02 REMOVAL

- A. Remove and obliterate markings on existing and final lifts used for redirecting traffic during construction. If blast cleaning is required, comply with requirements of Section 02581 – Blast Cleaning of Pavement.

END OF SECTION