

**Section 02762****TEMPORARY AND REMOVABLE REFLECTORIZED PAVEMENT MARKINGS****1.0 GENERAL****1.01 SECTION INCLUDES**

- A Temporary retroreflective preformed pavement markings.
- B Wet retroreflective markers.
- C References to Technical Specifications:
  - 1. Section 01200 – Measurement and Payment Procedures
  - 2. Section 01350 – Submittals
  - 3. Section 02981 – Blast Cleaning of Pavement
- D Referenced Standards:
  - 1. American Society for Testing and Materials (ASTM)
    - a. ASTM D 4061, “Standard Test Methods for Retroreflectance of Horizontal Coatings”
    - b. ASTM E 1347, “Standard Test Methods for Color and Color-Difference Measurement by Tristimulus (Filter) Colorimetry”
    - c. ASTM E 303, “Standard Test Methods for Measuring Surface Frictional Properties Using British Pendulum Tester”
    - d. ASTM D 1056, “Standard Specification for Flexible Cellular Materials-Sponge or Expanded Rubber”
    - e. ASTM E 809, “Standard Practice for Measuring Photometric Characteristics of Retroreflectors”
    - f. ASTM E 808, “Standard Practice for Describing Retroreflection”ASTM D 1056, “Standard Specification for Flexible Cellular Materials-Sponge or Expanded Rubber”

**1.02 MEASUREMENT AND PAYMENT**

- A Measurement for temporary pavement markings is on a linear foot basis, for each class, measured and complete in place.
- B Payment includes all labor and materials required to complete installation as indicated on Plans.
- C Refer to Section 01200 – Measurement and Payment Procedures.

**1.03 SUBMITTALS**

- A Make Submittals required by this Section under the provisions of Section 01350 – Submittals.

- 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.

**1.04 TEMPORARY PAVEMENT MARKING CLASSIFICATIONS**

- 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.

**1.05 DELIVERY AND STORAGE**

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

**2.0 PRODUCTS**

**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:

		CLASS I		CLASS II		TEST METHOD
		WHITE	YELLOW	WHITE	YELLOW	
1.	Init. Retroreflectance (mcd•ft <sup>-2</sup> •fc <sup>-1</sup> ), min. * @ 86.0°, 0.2° * @ 86.5°, 1.0°	1770 750	1310 450	1360 500	820 350	ASTM D 4061
2.	Daytime Reflectance Factor "Y" %, min.	65	36	65	36	ASTM E 97
3.	Init. Skid Resistance, Avg. BPN	50		35		ASTM E 303
4.	Refractive Index of Beads, min.	1.9		1.9		Liquid Immersion
5.	Thickness, without adhesive, mils, min.	40		9		Caliper Gauge

\* (Entrance Angle, Observation Angle).

2.02 RAISED WET REFLECTIVE MARKERS

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 D 1056:

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 E 809:

COLOR	WHITE	YELLOW	WHITE	YELLOW	WHITE	YELLOW	WHITE	YELLOW
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. Test at an entrance angle (Beta 2 horizontal entrance component described in ASTM E 808) 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

**3.0 EXECUTION**

**3.01 INSTALLATION**

- A Apply markings to clean dry surfaces in accordance with manufacturer's recommendations at locations indicated on Plans, or as directed by the Engineer.
- 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 02981 – Blast Cleaning of Pavement.

END OF SECTION