SECTION 02583

RAISED REFLECTIVE PAVEMENT MARKERS

PART 1 G E N E R A L

1.01 SECTION INCLUDES

A. Raised reflective pavement markers.

1.02 UNIT PRICES

A. Measurement for Type I raised reflective pavement markers with one reflective face is on a lump sum basis for each marker installed.

B. Measurement for Type I raised reflective pavement markers with two reflective faces is on a lump sum basis for each marker installed.

C. Measurement for Type II raised reflective pavement markers with one reflective face is on a lump sum basis for each marker installed.

D. Measurement for Type II raised reflective pavement markers with two reflective faces is on a lump sum basis for each marker installed.

1.03 SUBMITTALS

A. Submittals shall conform to requirements of all section and provisions of these specifications.

B. Submit manufacturer's product data concerning following materials for approval:

1. Class I and II markers.

2. Primers, solvents, and adhesives.

3. Installation instructions.

C. Submit certificate by manufacturer that each class of marker and each type of adhesive conforms to the requirements of this specification.

D. Submit details of manufacturer’s replacement policy for each class of marker.

1.04 DELIVERY AND STORAGE

A. Deliver markers is cartons of 100 units, epoxy adhesive in one gallon pails. Ship like materials in like-sized containers to facilitate storage.

B. Store material in cool dry conditions until application.

PART 2 P R O D U C T S

2.01 MARKERS

A. Raised Reflective Pavement Markers: Shallow frustum of pyramid shaped markers with tempered glass prismatic reflective elements. Bodies shall be plastic shells with resin/sand fillings, or single-piece injection-molded bodies of impact resistant polymers. Plastic shells shall be Methyl Methacrylate conforming to Federal Specification L-P-380C, Type I, Class 3 and shall have a minimum wall thickness of 0.65 inches.

B. Marker configuration shall be as follows:

	Normal Dimensions	Reflecting Face Slope	Reflecting Face Surface Area
Type I	4"x4"x0.75" high	30˚	3.25 sq. in.
	3"x5"x0.70" high	30˚	4.00 sq. in.
Type II	2"x4"x0.40" high	30˚	1.87 sq. in.
Type III	3"x5"x0.70" high	30˚	4.00 sq. in.

C. Optical performance shall be as follows:

1. Type I and II:

	White	Yellow	Red
Specific Intensity, SI, min			
Entrance Angle = 0˚	15.0	9.0	3.5
Entrance Angle = 20˚	6.0	3.6	1.2

2. Type III:

	White	Yellow	Red
Specific Intensity, SI, min			
Entrance Angle = 0˚	15.0	9.0	3.5
Entrance Angle = 20˚	6.0	3.6	1.2

3. Testing Procedure: Locate a randomly selected test marker with center of reflecting face 5 feet from uniformly bright light source with effective diameter of 0.2 inches. Use a photocell width of 0.05 inches for Type I markers and a photocell with annular ring of 0.37 inches by 0.46 inches for type II markers; shield to eliminate stray light. Distance from light source to photocell center of 0.21 inches. Modify source receiver dimensions and distance between source and receiver proportionally to test distance change for test distances other than 5 feet. Lots containing more than 4% reflecting face failures shall be rejected according to ASTM E808 and ASTM E809.

D. Physical requirements shall be in accordance with the following test procedures:

1. Type I and Type III Markers: Select 3 random markers per lot. Center marker over open end of a vertically positioned 1-inch long hollow metal cylinder with a

3-inch inside diameter and a 0.25-inch wall thickness. Apply load slowly to top of marker through a 1-inch diameter by 1-inch high metal plug centered on the marker. Breakage or appreciable deformation of a test sample at a load less than 2000 pounds shall be cause for lot rejection.

2. Type II Markers: Select 20 random markers per lot. Condition markers in a convection oven at 130°F for one hour. At elevated temperature, impact reflective face by dropping a 90-gram dart, fitted with a 0.25-inch radius spherical head, 6 inches perpendicularly onto center of reflective surface. Cracks in impact surface area shall be generally concentric in appearance. Small radial cracks less than 0.25 inches in length will be allowed. Lot will be acceptable if 18 test samples meet testing requirements; failure of 4 test samples will cause lot rejection. Retest an additional 20 markers if 3 samples fail; failure of one lens of resample group will cause lot rejection.

E. Impact Resistance: Test in accordance with ASTM D2444 Type A.

2.02 EPOXY ADHESIVE

A. Obtain two-component epoxy adhesive from reflective pavement marker manufacturer conforming to manufacturer's requirements for marker installation.

PART 3 E X E C U T I O N

3.01 GENERAL

A. Prepare pavement surfaces and install markers in accordance with marker and adhesive manufacturer's recommendations.

B. Accurately locate and install approved markers to conform to classes and colors indicated on Drawings.

3.02 PREPARATION

A. Clean and repair surfaces to receive markings. Remove loose material, dust, contaminants such as oil and curing membrane, and polished aggregates.

B. Blast clean surfaces indicated on Drawings or where directed by the Owner Representative in accordance with requirements of Section 02581 – Blast Cleaning of Pavement. Do not clean Portland cement concrete pavements by grinding. Mechanical wire brushing may be used to remove curing membranes.

3.03 INSTALLATION

A. Test pavement surface for moisture content prior to application of markings. Place an approximate 2 square foot sheet of clear plastic or tar paper on road surface and hold in place for 20 minutes. Immediately inspect the sheet for build up of condensed moisture. If sufficient moisture has condensed to cause water to drip from sheet, do not apply

markings. Repeat test as necessary until adequate moisture has evaporated from pavement to allow placement.

B. Observe manufacturer's recommended pavement and ambient air temperature requirements for application. If manufacturer has no temperature recommendations, do not install markings if pavement temperature is below 60°F or above 120°F.

C. Prime pavement surface and apply markings as recommended by manufacturer.

3.04 CLEANING

A. Keep project site free of unnecessary traffic hazards at all times.

B. Clean area upon completion of work and remove rubbish from work site.

3.05 WARRANTY

A. Contractor shall warrant material and labor for a period of twelve months from date of installation of markings.

END OF SECTION