ROAD COMMISSION FOR OAKLAND COUNTY

SPECIAL PROVISION
FOR
RAISED PAVEMENT MARKER (RPM)

ORG:05-11-21
REV:05-11-21

a. Description

This work consists of furnishing and installing new Raised Pavement Markers (RPM) complete with prismatic retroreflective lenses.

The markers shall consist of an iron casting with replaceable prismatic retroreflectors for reflecting light from single or opposite directions.

b. Materials

All RPM shall be an approved model from the table below. The RPM shall be installed per manufacturer's specifications, and as described under Construction Methods contained in this provision.

Casting shall be nodular iron, conforming to specification ASTM-A536-S4, grade 72-45-05, hardened to 52-54RC.

Overall, approximate dimensions shall be 10 inches long by 5.5 inches wide by 1.75 inches high.

The casting approximate weight shall be 5.5 pounds and marked with the manufacturer's name and model number of marker.

Reflectors shall consist of a base molded from an acrylic plastic shell filled with a tightly adherent compound. The base shall contain one or two prismatic retroreflective lens to reflect incident light from a single or opposite directions. The reflector shall be attached to the casting by use of adhesive.

Table 1: APPROVED LIST OF SNOWPLOWABLE RAISED PAVEMENT MARKERS

MANUFACTURER	RAISED REFLECTIVE PAVEMENT MARKER CASTING	RAISED REFLECTIVE PAVEMENT MARKER CASTING (BRIDGE)	REPLACEMENT REFLECTOR
Ennis Traffic 6565 West Howard Niles, IL 60714 Contact: Pete McCafferty Phone: 630-841-4711 Email: petem@ennistraffic.com	Model 96LP Model 101LP	Model 96LPS Model 101LPS	Model 944 Model C40
Ray-O-Lite 1010 Brice Street Newark, OH 43055 Contact: Robert McCullohs Phone: 706-628-9550 Email: rmccullohs@rayolite.com	Hallen Ironstar Model 664H Hallen Model H960 Hallen Model H1010	Hallen Model H960B SnowLite Model 200	Model 2004
Three M Three M Center Building 225-5S-08 St. Paul, MN 55144-1380 Phone: 1-800-553-1380 x1 Email: tnortheast@mmm.com			Model RPM-190
Domestic Steel Act Applies: All iron and steel products, which are to be incorporated into state projects shall be domestically manufactured or produced and fabricated. The contractor shall obtain from the iron or steel producer and/or fabricator, in addition to the mill analysis, a certification that all iron or steel materials meet these domestic sourced requirements. the application of all coatings, epoxy, galvanizing, painting, etc., to metal products shall be domestically applied.			

c. Construction

Markers are to be located so that the reflective face is perpendicular to the roadway longitudinal joints on multi-lane roadways, offset the marker 4 to 6 inches left of the longitudinal joint. If the longitudinal joints do not approximate 11 foot lane widths, the offset location must be reviewed and approved by the Engineer prior to installation.

Markers shall not be located on longitudinal or transverse pavement joints or in cracks in the pavement surface. Markers shall be omitted from bridge decks. However, the

spacing of the marker cycle shall be maintained across the bridge to accommodate marker placement on bridge decks at a later time. The spacing and location of the markers shall conform to the drawings and dimensions contained in the Pavement Marking Typical Plans.

A slot shall be cut out of the pavement of the dimensions and depth specified by the manufacturer. The entire cut shall be made in a single plunge of the cutting apparatus. The cut should have approximately 0.125 inch clearance (side-to-side movement) and should match the bottom contour of the marker casting. The saw cut area must be dry and free of dust, dirt or any material which will adversely affect the bond of the epoxy adhesive. The casting shall extend above the finished pavement surface approximately 0.25 inch.

The casting keels and web shall be free of scale, dirt, rust, oil, grease or any other contaminate which may reduce its bond to the epoxy adhesive.

The reflector may be attached to the casting prior to or after placement of the casting in the road. If the latter option is selected, the epoxy adhesive shall be cured before installing the reflector on the castings.

An epoxy adhesive shall be used to affix the marker to the pavement. The epoxy adhesive shall be that specified by the marker manufacturer and applied within the temperature range recommended by the manufacturer. However, the pavement surface temperature and ambient air temperature at the time of marker placement shall not be less than 50°F. No marker shall be installed if the pavement surface is wet.

Table 2: Minimum Protection Time based on Ambient Air Temperature

Ambient Air Temperature (Fahrenheit)	Minimum Allowable Period Protected from Traffic (Minutes)
100°	15
90°	20
80°	25
70°	30
60°	35
50° (no application below 50°F)	45

In no case shall traffic be permitted on the marker until the adhesive has properly cured. The minimum allowable period protected from traffic may be extended by the Engineer to allow proper adhesive curing.

The casting epoxy adhesive shall be mixed in accordance with the manufacturer's recommendations. The mixing operation and placing of the markers shall be done rapidly. Any mixed batch that becomes so viscous that it cannot be readily extruded from under the marker with light pressure shall not be used.

The clean slots shall be filled with epoxy adhesive. Sufficient epoxy shall be placed in and between the slots (generally to within 0.375 inch of the road surface) to assure that all voids beneath and around the casting are filled.

Place the marker by hand into the epoxy-filled saw cut. The keels of the casting shall be placed into the slots in such a manner as to assure that the deflecting tips of the markers are below the surface and that all four lugs on the keels are in direct contact with the pavement. Make sure that the epoxy does not flow onto the reflective face or the surface in front of it.

d. Measurement and Payment

The completed work as measured for Raised Pavement Marker will be paid for at the contract unit price for the following pay items.

Pay Item	Pay Unit
Raised Pavt Marker, Retrflec, Amber, Monodirectional	Each
Raised Pavt Marker, Retrflec, Amber, Bidirectional	Each
Raised Pavt Marker, Retrflec, Crystal, Monodirectional	Each

Payment for RPMs shall include all materials and labor to furnish and properly install each RPM complete with retroreflectant lenses and all traffic control devices necessary to maintain traffic. Installation shall include all work and equipment necessary to cut the proper slot for the casting and clean-up of all debris from this operation. All debris shall be removed and properly disposed off of the road right-of-way.

Castings installed on bridge decks by error shall not be removed or paid for. Castings installed in longitudinal or transverse joints or cracks shall be removed and replaced at the contractor's expense. Castings with epoxy on the web or lens; or castings that do not have all four lugs in contact with the pavement surface shall be removed and replaced at the contractor's expense. Markers installed in violation of specifications are not considered a part of the delayed acceptance and shall be corrected immediately at the contractor's expense.

1. Delayed Acceptance of Raised Pavement Markers (RPM)

   Delayed acceptance is that period of time when the contractor must replace markers that have failed prior to the acceptance date established. Final acceptance of the completed work on RPMs will be delayed until May 1st of the following year. During this period, inspections of the markers placed will be conducted at the Road Commission's discretion. During inspection if ½ percent or more of the original markers installed are missing, the missing markers shall be replaced immediately at the contractor's expense.