* 1. Delineators and Reflectors

DESCRIPTION

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 This work consists of the installation and furnishing of delineators and reflectors per these specifications and in conformity with the lines, grades, and details shown on the plans or established.

MATERIALS

* + 1.

 Materials for the various types of delineators and reflectors shall be as follows:

1. *Delineators.*
2. Steel Posts. Details for each type of delineator are on the plans. Posts shall conform to the requirements shown on the plans, and reflectors shall conform to the requirements in subsections 713.07 and 713.10.
3. Flexible Posts. Use flexible posts listed on CDOT’s Approved Products List (APL)and shall conform to the following requirements:
4. Physical Properties.
	1. Material. Manufacture the post from an impact resistant flexible material, which is resistant to U.V. exposure, cold-weather temperatures, temperature fluctuation, and de-icing materials. Permanently seal the post at the top and date-stamp it, showing the month and year of fabrication on the top of the post, on the side facing away from traffic. The numerals shall be at least 1/4 inch in height and shall be either die-stamped or legibly stamped with permanent ink.
	2. Color. The post shall be Interstate Green per Federal Standard No. 595B, Color Number 14109, unless otherwise specified. The post shall show no signs of delamination, distress, or discoloration.
	3. Dimensions.
		1. Length. The post shall be of such length to provide a height of 48 inches above the edge of the pavement and to provide the required anchoring depth for the Drivable Method of installation. The post length shall adhere to the requirements outlined in S-612-01 for all other installation methods.
		2. Width. The post shall have a minimum width of 2 3/8 inches and a maximum width of 4 1/8 inches facing traffic.
5. Base Anchoring. Design the post to facilitate a permanent installation that resists overturning, twisting, and displacement from wind and impact forces. Install a metal anchor base per CDOT Standard Plan S-612-01 or manufacturer’s recommendation. Use a concrete foundation for delineator support in soft soils per the plans or as directed by the Engineer.

The drive capacity of the base anchor shall drive into an earth shoulder with or without a pilot hole. Accomplish installation with typical maintenance equipment.

1. Reflective Elements. Shape posts to accommodate the installation of reflective elements. Each reflective element shall be a 3 x 3-inch, Type IV or Type V reflective sheeting material meeting the requirements of subsection 713.10.

A Type I delineator shall have one (3 x 3-inch) reflective element on one side, a Type II delineator shall have two (3 x 3-inch) reflective elements on one side, and a Type III delineator shall have three (3 x 3-inch) reflective elements on one side. Place reflective elements in a straight vertical column starting 1 inch from the top edge of the delineator. Type II and III delineators shall have reflective elements separated by 1 inch vertically in the column.

Place all reflective elements at the factory, by the manufacturer, prior to on-site delivery of the delineators. The texture of the projected surface shall be smooth and suitable for the adherence of reflective elements without preparation other than wiping with a clean cloth dampened with mineral spirits to remove oil-type contaminants.

Protect reflective elements from scratches, abrasions, and other physical damage during shipping and base anchor driving by an easily removable “masking” sheet.

1. Workmanship. The posts shall exhibit good workmanship and shall be free of burrs, discoloration, contamination, and other objectionable marks or defects that affect appearance or serviceability. Each post shall be visibly free of bends or twists, prior to and after installation.
2. Performance Requirements. Test posts following NTPEP’s Evaluation of Temporary Traffic Control Devices: Flexible Delineators. Design posts so an installed post is capable of self-erecting and remain serviceable after subjected to a series of direct impacts by a typical passenger sedan.

Posts installed in ground-mount, side-of-roadway configurations shall be capable of withstanding a series of ten impacts into the traffic face of the post at a speed of 55 mph.

Posts installed in surface-mount, head-on and/or channelizing configurations shall be capable of withstanding a series of 125 impacts into the traffic face of the post at a speed of 55 mph.

CDOT reserves the right to require additional testing to best meet the performance of Colorado’s environment.

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1. Sampling and Acceptance. Before shipment of the posts, the manufacturer shall submit test reports and test data, developed by an approved testing laboratory, which attests to the fact that their marker post complies in all respects with requirements covered in the specifications. Submit a MASH self-certification letter with the
2. Flexible Delineator posts.
3. Barrier Reflector Strip. Reflector strip shall be 3M “Scotchlite” Series 344/346.
4. *Barrier Reflector Tabs.* Show details for the median barrier reflector on the plans. Reflectivity shall conform to the requirements in subsection 713.10.

CONSTRUCTION REQUIREMENTS

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 Spacing, location, color of reflectors and placement of delineator posts shall be as shown on the plans.

The Contractor shall install reflector strips in conformance with manufacturer’s recommendations.

The length of each reflector strip shall be 34 inches, unless otherwise approved. The Contractor shall adjust the spacing between reflector strips as recommended by the manufacturer to fit the location called for in the Contract. Do not cut reflector strips.

METHOD OF MEASUREMENT

* + 1.

 Measure delineators and reflectors for median barrier by the actual number of the various types installed and accepted.

BASIS OF PAYMENT

* + 1.

 Pay the accepted quantities at the contract unit price for each of the pay items listed below, that show in the bid schedule.

Pay under:

 **Pay Item Pay Unit**

 Delineator (Type\_\_\_\_\_\_) Each

 Delineator (Flexible) (Post Mounted) Each

 Delineator (Flexible) (Clamp Mounted) Each

 Delineator (Flexible) (Cup Mounted) Each

 Delineator (Flexible) (Surface Mounted) Each

 Delineator (Flexible) (Type\_\_\_) Each

 Delineator (Drivable) (Type\_\_\_) Each

 Reflector (Median Barrier) Each

 Reflector Strip (\_\_ Inch) Each

Do not measure and pay separately for concrete for anchor embedment ; include it in the work cost.

Do not measure and pay separately for surface preparation, brackets, fasteners, and adhesive for reflector strips ; include it in the work cost.

Payment is for all work, materials, and equipment required to install delineators.