

SECTION D – SPECIFICATIONS/SCOPE OF WORK

**GENERAL**

The primary purpose of the contract is to supply Traffic Control Devices (TCD) & Hardware listed on the Quotation Sheets. All deliveries must meet the timeline requirement specified on page E-3, and be delivered to County Sign Shop, located at 1283 Seven Locks Road, Building E, Rockville, MD 20854. All TCDs to be supplied under the resulting Contract must comply with the specifications and requirements of the latest edition of Maryland Manual on Uniform Traffic Control Devices (MdMUTCD).

**MATERIAL SPECIFICATIONS**

**Group 1**

R1-6a pedestrian crossing stop sign must have reflective sheeting on aluminum with corner radius and 3/8" pre-punched holes. High intensity and diamond grade sign material must meet MdMUTCD and federal specifications. Sign color must be reflective fluorescent yellow green and white with red and black print. The sign assembly must include permanent fixed base bolts for anchorage to road surface. The sign must meet NCHRP-350 crash test standards.

HARDWARE Bolts, nuts, post clips, lock and flat washers must be either aluminum alloy or commercial quality stainless steel, hot-dip galvanized or cadmium plated after fabrication. The material must conform to ASTM A 307, bolts, nuts and washers shall be galvanized or plated to prevent rust in accordance with ASTM A 153. Pole caps must be made of aluminum, galvanized ferrous metal, or zinc die casting. The sign brackets must be made of 6061-T6 extruded aluminum alloy or approved equal.

Roll-up signs and sign stand must be MdMUTCD and NCHRP-350 compliant.

**Group 2**

All the materials in this Group must be MdMUTCD compliant. Tubular Markers should be manufacturer-certified as NCHRP Report 350 and/or MASH 2016 compliant.

**1. FLEX POSTS**

**a. FLEXIBLE DELINEATOR SURFACE MOUNT PIN LOCK SYSTEM:**

- i. The two-piece delineator must consist of a flexible, surface mounted delineator made from durable, non-discoloring, polyethylene plastic to which reflective sheeting is applied, and a thermoplastic base which is secured to the pavement with epoxy adhesive, butyl pad adhesive or mechanical fasteners. The delineator must be capable of self-righting after repeated vehicle impacts. The delineator must insert and be secured into the plastic base with two horizontal locking pins. It is required that when the delineator is no longer serviceable, it can be removed, and a new delineator can be manually inserted and locked into the existing base. The delineators are to be of a size and have a locking mechanism compatible with the bases in service. Delineators that are not compatible will be rejected for use.
- ii. **GENERAL REQUIREMENTS** The delineator must be tubular in shape and two and one-quarter inches [ $2\frac{1}{4} \pm 1/32$ ] in diameter. A one-and three-quarter inches [ $1\frac{3}{4} \pm 1/32$ ] diameter interior reinforcement tube must be located and secured in the lower portion of the delineator. The total above ground height of the delineator must be delivered as required. The delineator must be white in color and resistant to ultraviolet and infrared radiation. Reflective sheeting per

Federal Highway Specification FP-96, Type III (minimum), Class 1 must be applied to the uppermost portion of the delineator. The delineator must be capable of providing 360-degree visibility by applying reflective sheeting completely around the delineator. The reflective sheeting must be white (silver) or yellow (amber) in color and applied to the front or back of the delineator or around the circumference as required.

iii. PERFORMANCE REQUIREMENTS

1. HEAT RESISTANCE: Three (3) delineators must be conditioned in a test chamber for 4 hours at  $150 \pm 3$  degrees F. The delineators must be bent 180 degrees at their midpoint around a 1-1/2-inch diameter mandrel. The delineators must be bent 10 times within one-and one-half minutes after removal from the chamber and return to within 10 degrees of their original position with 10 seconds after the last bend. Any delineator cracking, splitting or not returning to within 10 degrees in the allotted time constitutes a failure.
2. COLD RESISTANCE: Delineators must be conditioned in a test chamber for 24 hours at  $-20 \pm 3$  degrees F. The delineators must be bent 90 degrees at their midpoint around a 1-1/2-inch diameter mandrel. The delineators must be bent 4 times within one and one-half minutes after removal from the chamber and return to within 10 degrees of their original position within 60 seconds after the last bend. Any delineator cracking, splitting or not returning to within 10 degrees in the allotted time constitutes a failure.
3. VEHICLE IMPACT PERFORMANCE: Delineators must be impacted at 55 mph by a typical passenger sedan weighing approximately 3500 lbs. and having no unusual sharp hood ornaments or other projections. Delineators be impacted 5 times with bumper hits and four delineators impacted 5 times with combined bumper/direct wheel hits at both  $85 \pm 5$  degrees F and  $32 \pm 5$  degrees F for a total of 10 impacts per delineator. At the conclusion of both high and low temperature testing, at least 4 of the 4 bumper hit and 3 of the 4 bumper/direct wheel hit tested delineators shall remain intact, securely anchored, return to their original vertical orientation within an angle of  $\pm 10$  degrees and retain a minimum of 50% of the total initial reflective sheeting.

b. SAFE-HIT TWO-PIECE FLEXIBLE DELINEATOR SURFACE MOUNT PIN LOCK SYSTEM  
GENERAL PRODUCT SPECIFICATION:

- i. HIGH TEMPERATURE RESISTANCE: Delineators must be placed in a test chamber set to  $180 \pm 3$  degrees F. The delineators must be sufficiently rigid to withstand two hours without wilting. Any delineator observed to wilt must constitute a failure.
- ii. LOW TEMPERATURE RESISTANCE: Delineators must withstand at  $-20 \pm 3$  degrees F temperatures.
- iii. STATIC RIGIDITY: Delineators 48 inches in above ground length must be tested by suspending a five-pound weight at the free end. The delineators must be cantilevered horizontally with the weight within two inches from the unsupported end. The test must be conducted at  $77 \pm 5$  degrees F. Any delineator with a deflection greater than 60 degrees from horizontal must constitute a failure.
- iv. COLORFASTNESS: The delineator must be exposed to 1000 hours weather meter exposure per ASTM G53 or equivalent test. Significant yellowing, darkening, fading or changes in average tensile strength or elongation greater than 35% shall constitute a failure.

2. **TRAFFIC CONES AND DRUMS:** Cones and Drums must be manufacturer-certified as NCHRP Report 350 and/or MASH 2016 compliant.
  
3. **QUICK CURB**
  - a. The Traffic Curb Systems and lane separators should be tested to MASH 2016 under NCHRP 350. The replacement reflectors mounted on the PVC curb system must be MCHRP 350 certified.
  - b. Flexible posts that are part of the curb subsystem should be easily replaceable without making adjustment to the curb system. Each section of the curb must allow water to drain freely through internal openings. The base and curb section should be installed and removed using standard power tools and damage to the pavement must be minimum. Flexible posts must be made of urethane formula designed to take vehicle impacts. The curb section is desired to be two inches in height and eight inches wide.

**Group 3**

Reflective Pavement Markers: Acrylic Plastic Reflector filled with tightly adherent potting compound must come packs of 100 of 4"x4"x0.70" reflectors. The reflective area must be 3.25 square inch per reflective face. The specific intensity for white reflectors should be at 0.2 observation angle -3.0 at 0 degree angle. Entrance angle; 1.2 at 20 degrees horizontal angle. For yellow reflectors, the value should be 60 percent of that for white reflectors.

**Group 4**

Contact Adhesive shall be high performance, solvent based. It must offer high immediate handling strength and good heat resistance and be usable for bonding most metals and plastics. It must also be suitable for large surface panel or composite lamination. It shall have excellent moisture and heat resistance and must perform up to up to 300°F.

Traffic signs hardware should be Aluminum. Bolts and screws must conform to:

	<b>ASTM Designation</b>	<b>Alloy</b>	<b>Condition/ Temper</b>
Bolts and screws	B 211 (B 211M)	2024	T4
		6061	T6

**Samples**

The County reserves the right to require a Bidder to furnish samples of any item bid. Samples may be requested after the bid opening for verification of "Approved Equal" as stated for items listed, and for testing if they meet or exceed the County's requirements. Bidder(s) must make arrangements for the delivery of samples at no cost to the County to the specific campus location(s) within five (5) business days after the request by the County. Each sample submitted must bear the name of Bidder, item number and bid number. Failure to submit a sample that conforms with the specification or within the time specified may be cause for rejection of the item(s) and may not be further considered for award.

If a Bidder requests to pick up a sample, they must do so within 30 days. Samples will be returned to the Bidder at the Bidder's expense. The County does not bear any pecuniary liability for their loss or damages. If a Bidder fails to pick up the sample, the County will dispose of it at the convenience of the County.

**Catalogs**

Within seven (7) days after the contract award and after request by the County, Contractor must provide complete price lists, catalogs including name of the manufacturer of their product line both in hard copy and in electronic version at no cost to the County, and material specification to match the industry standard and in compliance with the specifications as specified in the contract documents. In addition, contractor must provide updated catalogs and price list to County no later than seven (7) days at the beginning of each Contract renewal period and upon request from County.

Within seven (7) days after award recommendation and upon request from the County, the Contractor must provide complete price lists and catalogs including name of the manufacturer of their product line(s) both in hard copy and in electronic version at no cost to the County, and material specification to match the industry standard and in compliance with the specifications as specified in the Contract documents. In addition, the Contractor must provide updated catalogs and price list(s) to County no less than seven (7) business at the beginning of each Contract renewal period.