ITEM 0107301

CONSTRUCTION BARRICADE

DESCRIPTION

Under this item, the contractor shall furnish, erect, maintain, move, adjust, relocate and store all construction barricades of the specified type required as shown on the plans and/or as directed by the Engineer.

REFERENCED ITEMS

Item 0107501

REQUIRED SUBMITTALS

Material Certificate of Compliance:

Submit 5 copies of material certificate of compliance for barricades in accordance with the contract general requirements.

Certified Test Report:

Submit 5 copies of certified test reports for reflector sheeting in accordance with the contract general requirements.

MATERIALS

Construction barricades shall consist of plastic, aluminum or other material which is of sufficient strength for the intended purpose and will not create a hazard to the public. Barricades made from any material other than polyvinyl chloride pipe conforming to the following requirements shall be approved by the Engineer:

> Polyvinyl chloride pipe shall conform to ASTM D-2241-04 for PVC 1120 or 1220, SDR 21, pressure rating 200psi. Barricade made of wood shall not be used. Aluminum face panels used as horizontal members shall be constructed of .025-anodized aluminum or comparable material.

All hardware shall be in accordance with standard commercial specifications and shall be approved by the Engineer.

The barricade's horizontal face panels shall have alternate stripes of white and orange encapsulated lens reflective applied as shown on the Standard Details. This reflective sheeting shall conform to the following requirements:

1. **REFLECTIVE SHEETING**

Type I - enclosed lens

a. Description

The reflective sheeting shall be of Type I Enclosed Lens, consisting of spherical lens elements embedded within a transparent, weatherproof film having a smooth, flat, outer surface. The sheeting shall have a re-coated adhesive backing protected by a removable liner. The reflective sheeting shall meet the requirements of AASHTO M268-03.

b. Color Requirements

Through instrumental color testing the diffuse day color of the reflective material shall conform to the requirements of Table I and shall be determined in accordance with AASHTO T-257-96, for 45-Degree, 0-Degree Directional Reflectance of Opaque Specimens by Filter Photometry. Geometric characteristics must be combined to illumination incident within 10 degrees of, and centered about, a direction of 45 degrees from the perpendicular to the test surface, viewing is within 15 degrees of, and centered about, the perpendicular to the test surface. Conditions of illumination and observation must not be interchanged. The standards to be used for reference shall be the MUNSEL PAPERS designated in Table I.

The papers must be recently calibrated on a spectrophotometer. The test instrument shall be one of the following or approved equal:

Gardner Multipurpose Reflectometer or Model XL20 Color Difference Meter

Gardner Model AC-2a Color Difference Meter or Model XL30 Color Difference Meter

MEECO Model V Colormaster

Hunterlab D25 Color Difference Meter

c. Reflective Intensity

The reflective sheeting shall have a minimum specific intensity per unit area (SIA) as shown in Table III expressed as candelas per foot-candle per square foot. Measurement of SIA shall be conducted in accordance with the method detailed in AASHTO T257-96, except specific intensity per unit area of the

reflective sheeting when totally wet shall be not less than 90 percent of the day measured value of the weathered sample.

d. Specular Gloss

The reflective sheeting shall have an 85-degree specular gloss of not less than 40 for Type I when tested in accordance with ASTM D-523-89.

e. Processing

The sheeting shall permit cutting and color processing with compatible transparent and opaque process inks at temperatures of 60 degrees F to 100 degrees F (15 to 38 C) and relative humidity at 20 to 80 percent. The sheeting shall be heat resistance and permit force curing without staining of applied or unapplied sheeting at temperatures as recommended by the manufacturer.

f. Shrinkage

A 9" by (" (229 mm by 229mm) reflective sheeting specimen with liner shall be conditioned a minimum of one hour at 75 degrees F (22C) and 50 percent relative humidity. The liner shall be removed and the specimen placed on a flat surface with the adhesive side up. Ten minutes after liner is removed and again after 24 hours, the specimen shall be measured to determine the amount of dimensional change. The reflective sheeting shall not shrink in any dimension more than 1/32 inch (0.79 mm) in 10 minutes nor more than 1/8 inch (3.18 mm) in 24 hours.

g. Flexibility

(Type I - Enclosed Lens Material) - The sheeting, applied according to the manufacturer's recommendations to a clean, etched 0.020 inch by 2 inch by 8 inch (0.51 mm x 50.8 mm x 203 mm) aluminum panel of alloy 6061-T6 conditioned a minimum of 48 hours and tested at 75 degrees F (22C) and 50 percent relative humidity, shall be sufficiently flexible to show not cracking when bent around a 3/4 inch (19.1 mm) mandrel.

h. Adhesive

The reflective sheeting shall include a pre-coated pressure sensitive adhesive backing (Class I) or a tack-free, heat-activated adhesive backing (Class 2), either of which may be applied without necessity of additional adhesive coats on either the reflective sheeting or application surface.

The Class I adhesive backing shall be a pressure-sensitive adhesive of the aggressive tack type requiring no heat, solvent, or other preparation for adhesion to smooth, clean surfaces. The Class 2 adhesive backing shall be a tack-free adhesive activated by applying heat in excess of 175 F (79 C) to the material as in the heat-vacuum process of sign fabrication.

The protective liner attached to the adhesive shall be removed by peeling without soaking in water or solvents, without breaking, tearing, or removing any adhesive from the backing. The protective liner shall be easily removed following accelerated storage for 4 hours at 160 degrees F (71 C) under a weight of 2.5 pounds per square inch (17 kPa).

The adhesive backing of the reflective sheeting shall produce a bond to support a 1.75 pound (0.79 kg) weight for 5 minutes without the bond peeling for a distance of more than 2.0 inches (50.8 mm) when applied to a smooth, aluminum surface and tested as specified in Federal Highway Administration Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects FP-92 for reflective Sheeting, except that the applied sample shall be conditioned at 73 + 2 F and 50 + 4 percent relative humidity for 24 hours before testing.

i. Impact Resistance

The reflective sheeting material applied according to the manufacturer's recommendations to a cleaned, etched, aluminum panel of alloy 6061-T6, .04 inches x 3.0 inches x 5 inches (.10 mm x 76.2 mm x 127 mm) and conditioned for 24 hours at 72 F (22 C) and 50 percent relative humidity, shall show no cracking when the face of the panel is subject to an impact of a 2.0 pound (0.9 kg) weight with a 5/8 inch (15.9 mm) rounded tip dropped from a 10 inch-pund (1.13 Newton Meter) setting on a Gardener variable Impact Tester, IG-1120.

j. Durability

Processed and applied in accordance with recommended procedures, the reflective material shall be weather-resistant, and following cleaning, shall show no appreciable discoloration, cracking, blistering, or dimensional change. Following exposure, the panels shall be washed with a 5% HCL solution for 45 seconds, rinsed thoroughly with clean water, blotted with a soft clean cloth, brought to equilibrium at standard conditions and tested. The reflective mature shall have not less than the 50 percent of the specified minimum SIA values (Tables III) for Type I - Enclosed Lens Sheeting when

subject to accelerated weathering for 1,000 or 2,200 hours, respectively. In addition, the brightness shall not be less than 80 percent of the specified minimum SIA values (Tables III) when exposed to weathering for two years, south facing, unprotected at 45 degrees in south Florida. The reflective sheeting manufacturer shall certify that his product conforms with the requirements of these specifications for "Durability", and that he has tested and exposed similar material as the specification requires. The reflective sheeting manufacturer, additionally, shall submit certified test data for durability on similar materials.

Color-fastness, and fungus-resistance shall conform to the requirements outlined in Federal Highway Administration Standard Specifications for Construction for Roads and Bridges on Federal Highway Projects FP-92, for Reflective Sheeting, shall be substituted with subarticle 10 (Durability) and subarticle 3 (Reflective Intensity), respectively, of these specifications.

k. General Characteristics and Packaging

The reflective sheeting as supplied shall be of good appearance, free from ragged edges, cracks, and extraneous materials, and shall be furnished in both rolls and sheets. When the reflective sheeting is furnished in continuous rolls, the average number of splices shall not be more than those per 50 yards (45.7-m metric equivalent) of material with a maximum of four splices in any 50-yard length. Splices shall be butted or overlapped and shall be suitable for continuous application as supplied. Material to be used on squeeze roller applicators to have squeeze roller applicator splices.

2. **CERTIFICATION REQUIRED**

The Contractor shall submit a Materials Certificate and a Certificate of Compliance for the construction barricades used in this project.

CONSTRUCTION METHODS

The contractor shall furnish a sufficient number of construction barricades required for the traffic patterns for all operations which are being undertaken concurrently. Use of the barricades shall conform to Manual on Uniform Traffic Control Devices for Streets and Highways, Millennium Edition. The barricades shall be constructed in a neat and workmanlike manner to the satisfaction of the Director of Public Works (Traffic Engineer) or his designated representative.

The uniform design and use of traffic control devices shall be in accordance with the Manual on Traffic Control Devices for Streets and Highways by the U.S.

Department of Transportation. Alternate stripes of white and orange encapsulated lens reflective sheeting shall be applied to the horizontal face panels as shown on the plans.

Any barricade that becomes damaged or defaced so that it is not effective in the opinion of the Director of Public Works (Traffic Engineer) or his designated representative, shall be replaced by the Contractor at no cost to the City.

Warning lights to be mounted on barricades shall be supplied as required by Item 0107501, and shall be in operation from sunrise to sunset.

Suitable ingress and egress shall be provided at all times where required at all intersections and abutting properties.

When the barricades are no longer required on the Project, they shall be removed from the City property and shall remain the property of the Contractor.

METHOD OF MEASUREMENT

Measurement for construction barricades shall be by the number of each (EA) barricade furnished and accepted. Measurement will be made only once for each barricade furnished regardless of the length of time, adjustment, or relocation necessary to complete the work

BASIS OF PAYMENT

"CONSTRUCTION BARRICADES" shall be paid for each (EA) complete, furnished and accepted. All labor, tools, materials and equipment required for this item shall be included in the unit price. Erecting, maintaining, moving, adjusting and disposing of barricades shall also be included in price.

PAY ITEM	DESCRIPTION	PAY UNIT
0107301	Construction Barricade	EA