

## SECTION 02840

### ROADWAY MARKING ACCESSORIES

#### PART 1 - GENERAL

##### 1.01 WORK INCLUDED

- A. Cleaning and sweeping of streets before application of markings.
- B. Application of temporary and permanent stripes and pavement markings.
- C. Application of raised pavement markers.
- D. Application of roadway markers and delineators.
- E. Installation of traffic control signs.
- F. Restoration of existing improvements.
- G. Cleanup and removal of debris.
- H. Supplying all labor, materials, equipment and apparatus not specifically mentioned herein or noted on the plans, but which are incidental and necessary to complete the work specified.

##### 1.02 QUALITY ASSURANCE

- A. Manufacturer's certificates showing conformance with this specification shall be delivered with each shipment of materials and equipment delivered to the job site.
- B. Only City inspected and approved material may be used for roadway delineation.
- C. Codes and Standards
  - 1. The standards, recommended methods and tests contained in the publications cited below shall determine the standards for the work to be done hereunder unless otherwise specifically designated on the plans:
    - a. The *California Manual on Uniform Traffic Control Devices (California MUTCD)*, latest edition.
    - b. The regulations, standards, and tests of the State of California Department of Transportation Materials and Research Division.
    - c. The *State of California Standard Plans and Standard Specifications*, and applicable related *Standard Special Provisions*.

2. Traffic signs, roadway markers and delineators, traffic stripes, , pavement markings, and pavement markers shall be placed in the locations shown on the plans and shall conform to the applicable sections of the California MUTCD and the State of California Highway Design Manual..
3. Reference by manufacturers, brands or models is to establish type and quality of materials desired. Substitutions of materials of equal quality will be permitted upon the prior written approval.

### **1.03 JOB CONDITIONS**

- A. No striping, markings, or markers shall be applied until pavement surfaces have been approved.
- B. Concrete shall be thoroughly cured before application of striping, markings, or markers thereon.

## **PART 2 - PRODUCTS**

### **2.01 TEMPORARY PAVEMENT MARKERS**

- A. Short term, temporary pavement markers shall be day/night retroreflective raised pavement markers conforming to the requirements of Section 12 of the State Standard Specifications and Part 6 of the California MUTCD.

### **2.02 THERMOPLASTIC STRIPES AND MARKING**

- A. Traffic stripes and pavement markings shall be thermoplastic material, unless otherwise noted on plans. Thermoplastic stripes and markings shall be extruded thermoplastic conforming to Section 84-1 and 84-2 of the *State Standard Specifications*.
- B. Thermoplastic stripes and markings shall have a minimum skid friction value of BPN = 35.
- C. Glass beads applied to molten thermoplastic material, or paint must comply with State Specification 8010-004.
- D. Submit certificates of compliance showing conformance with this specification for each load of material delivered to the job site.

### **2.03 PERMANENT PAVEMENT MARKERS AND ADHESIVES**

- A. Pavement markers shall be the type and description shown, noted or called for on the plans and detail drawings, and shall conform to the requirements of Section 85 of the State Standard Specifications and the State Standard Plans.
- B. Adhesive for pavement markers shall be either epoxy or hot melt bituminous adhesive conforming to the requirements of Section 85 of the State Standard Specifications.

- C. Submit certificates of compliance showing conformance with these specifications for each load of pavement markers delivered to the job site. Pavement markers must be on Caltrans' Authorized Material List of signing and delineation materials.

#### **2.04 REFLECTORIZED MARKERS AND POSTS**

- A. Retroreflective markers and delineators shall be of the size, type and description shown, noted, or called for on the plans and detail drawings and shall conform to the requirements of Section 82 of the State Standard Specifications, and the *California MUTCD*.
- B. Posts for retroreflective markers shall be of the type shown, noted, or called for on the plans and detail drawings and shall conform to the requirements of Section 82-1.02 of the *State Standard Specifications*.
- C. Target plates for markers shall be of the type shown, noted, or called for on the plans and detail drawings and shall conform to the requirements of Section 82-1.02E of the *State Standard Specifications*.
- D. Reflectors for markers and delineators must consist of Type III or higher grade retroreflective sheeting on the State Authorized Material List for signing and delineation materials, and shall comply with requirements in the *California MUTCD*.
- E. Mounting hardware shall conform to the requirements of Section 82-1.02H of the *State Standard Specifications*.

#### **2.05 TRAFFIC CONTROL SIGNS**

- A. Traffic control sign panels shall be of the type, size, shape, and pattern designated or called for on the plans and detail drawings. Where sign sizes are not specified in the plans, the designated Standard size sign in accordance with the *California MUTCD* shall be used.
- B. Signs shall conform to the requirements of Section 56-4 of the *State Standard Specifications*.
- C. Signs must comply with the *California Sign Specifications* and the federal *Standard Highway Signs and Markings Book*.
- D. Submit a certificate of compliance for:
  - 1. Aluminum sheeting
  - 2. Retroreflective sheeting
  - 3. Screened-process colors
  - 4. Nonreflective, opaque, black film
- E. Sign panels shall be constructed of aluminum, unless otherwise specified on plans. Aluminum panels shall conform to the requirements in Section 56-2.01B(5), 56-2.02, and 56-2.05B of the *State Standard Specifications*, and the *State Standard Plans*.

- F. Retroreflective sign sheeting shall conform to the requirements in Section 56-2.01B(6) of the *State Standard Specifications* and Part 2 of the *California MUTCD*.
- G. Sign information must be imprinted in 1/4-inch upper case letters and numerals. Locate this information on the back, lower right of each sign panel. Sign information must include:
  - 1. Month and year of fabrication
  - 2. Type of retroreflective sheeting
  - 3. Sheeting manufacturer's identification and lot number for the retroreflective sheeting
- H. Posts for traffic control signs, unless designated to be mounted on traffic signal or electrolier standards, shall be as designated and detailed on the plans.
- I. Mounting hardware for traffic control signs shall conform to the details shown or called for on the plans. Mounting hardware for signal or electrolier standards or metal posts shall conform to the applicable requirements and specifications shown and noted on *Plan RS4* of *State Standard Plans* and Section 56-4.02E of the *State Standard Specifications*.
- J. Concrete bases for traffic control sign posts shall be Portland cement concrete of the shape and dimensions shown or called for on the plans and detail drawings, and shall conform to the requirements of Section 02550 of these specifications and Section 90-2 of the *State Standard Specifications*.

## **2.06 PROTECTION**

- A. The Contractor shall protect the newly installed pavement markers and stripes from damage until the material has cured.
- B. Replace any markers broken, misaligned or otherwise disturbed prior to opening roadway to traffic.

## **PART 3 - EXECUTION**

### **3.01 TEMPORARY PAVEMENT MARKERS**

- A. Temporary pavement markers shall be installed and replaced as directed.
- B. If permanent pavement markers cannot be installed immediately, short term, temporary pavement markers shall be installed on new roadways before the street will be opened for traffic.
- C. Temporary pavement markers, at a minimum, shall be placed at 24 feet on centers in the appropriate colors to delineate centerlines and travel lanes on multi-lane roadways except that edge lines shall not be simulated with raised pavement markers.

### **3.02 THERMOPLASTIC STRIPES AND MARKINGS**

- A.** Thermoplastic stripes and markings shall be applied hot in conformance with the manufacturer's recommended instructions and the applicable requirements of Section 84-2.03 of the *State Standard Specifications*.
- B.** Use mechanical wire brushing to remove dirt, contaminants, and loose material from the pavement surface that is to receive the traffic stripe or pavement marking. Use abrasive blast cleaning to remove laitance and curing compound from the surface of new concrete pavement that is to receive the traffic stripe or pavement marking.
- C.** Apply a traffic stripe or a pavement marking to a dry surface during a period of favorable weather when the pavement surface is above 50 degrees F.
- D.** Apply extruded thermoplastic at a temperature from 400 to 425 degrees F, unless a different temperature is instructed by the manufacturer.
- E.** Apply glass beads to the surface of the molten thermoplastic at a rate of at least 8 lb/100 sq ft. Glass beads must be embedded in the coat or thermoplastic to a depth of 1/2 their diameters.
- F.** Apply extruded thermoplastic for a traffic stripe at a rate of at least 0.20 lb/ft of 4-inch wide solid stripe. The applied thermoplastic traffic stripe must be at least 0.06 inch thick. An applied thermoplastic pavement marking must be 0.10 to 0.15 inch thick.

### **3.03 PAVEMENT MARKERS**

- A.** Pavement markers shall be installed in conformance with the requirements of Section 85-1.03 of the *State Standard Specifications*.
- B.** Remove undesirable material from the pavement surface. Clean the pavement surface by abrasive blast cleaning when directed by the Engineer.
- C.** Markers shall be installed accurately to the line established by the Engineer. No markers shall be installed until the surface and layout have been approved by the Engineer.

### **3.04 REFLECTORIZED MARKERS**

- A.** ReflectORIZED markers shall be installed in conformance with the requirements of Section 82-1.03 of the *State Standard Specifications*, except that the metal marker posts shall not be driven in place without prior approval of the Engineer.
- B.** ReflectORIZED markers shall be installed accurately at the locations called for on the plans and in the positions specified on the detail drawings.

### **3.05 TRAFFIC CONTROL SIGNS**

- A. Traffic control signs shall be installed in conformance with the requirements of the *California MUTCD*, and Section 56 of the State Standard Specifications.
- B. After erection, damage to traffic sign faces shall be repaired as required.

### **3.06 RESTORATION OF EXISTING IMPROVEMENTS**

- A. Existing signs or other markings removed or damaged due to the installation of roadway markers or traffic control signs shall be replaced in kind.
- B. Existing landscaping or planting removed, damaged or disturbed due to the installation of roadway markers or traffic control signs shall be replaced in kind.

### **3.07 CLEANUP**

- A. Upon completion of the installation of Roadway Markings and Accessories, Contractor shall thoroughly clean the work site of all waste, rubbish and construction debris of any nature.
- B. Upon removal of temporary signs, patch holes in walkway or roadway with Portland Cement concrete conforming to Section 02550 of these Specifications.

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