SECTION 02740

SIGNAL HEADS

02740.01 GENERAL

A. Description

Signal heads shall include, but not necessarily be limited to, furnishing and installing signal heads and the necessary mounting hardware of the type and size shown on the Plans and in accordance with the Contract Documents or as directed by the Engineer.

B. Related Work Included Elsewhere

1. General electrical work; Section 02730.

2. Electrical cable; Section 02735.

3. Miscellaneous metals; Section 05500.

4. Painting; Section 09900.

C. Quality Assurance

The Engineer will inspect all materials and work to ensure compliance with the Contract Documents.

D. Submittals

1. Shop Drawings

   Shop drawings shall be submitted as specified in the "General Provisions" for all signal heads. The shop drawings shall include general product information, dimensional data, mounting procedures, wiring diagrams, parts list, and such other information as is specified in Section 02730.01 or as may be required to verify compliance with these Specifications.

2. Certificates of Compliance

   Certificates of compliance shall be submitted as specified in the "General Provisions" for all signal heads stating that the materials furnished meets the requirements of the latest Institute of Traffic Engineer's (ITE) specifications and standards.

02740.02 MATERIALS

A. Materials Furnished by the County

The County will not furnish any material for signal heads.

B. Contractor's Options

Not applicable.

C. Detailed Material Requirements

All hardware shall be corrosion resistant and compatible with the item being installed. Signal heads and all necessary mounting hardware shall be produced by the same manufacturer.

1. Electrical Cable

   Electrical cable shall meet the requirements of Section 02735.02.

2. Head and Lamps

   All traffic signal heads and lamps shall meet the requirements of the ITE specifications and standards.

3. Pedestrian Signal Heads and Lamps

   All pedestrian signal heads and lamps shall meet the requirements of the latest ITE specifications and standards.

4. Polycarbonate Signals

   Polycarbonate signals shall be used only when specified.

5. Optically Programmed Signals

   Optically programmed signals shall have the optical system comprised of the lamp, lamp collar, optical limiter-diffuser, objective lens, and color filter.

   a. The lamp shall meet the requirements of the latest ITE specifications and standards. The lamp shall be coupled to the diffusing element with exception of a collar including a specular inner surface. The diffusing element may be discrete or integral with the convex surface of the optical limiter.

   b. The optical limiter shall provide an accessible imaging surface at focus on the optical axis for objects 900 to 1200 feet distant and permit an effective veiling mask to be variously applied as determined by the desired visibility zone. The optical limiter shall be composed of heat resistant glass.

   c. The objective lens shall be a high-resolution planar incremental lens hermetically sealed within a flat laminant of weather resistant acrylic or approved equal. The lens shall be symmetrical in outline and may be rotated to any 90 degree orientation about its axis without displacing the primary image.

d. The optical system shall accommodate projection from a single section of diverse, selected indicators to separate portions of the roadway such that only one indication will be simultaneously apparent to any viewer. The projected indications shall meet the requirements of ITE chromaticity standards.

e. Die cast aluminum parts shall meet the requirements of ITE alloy and tensile requirements and have a chromate preparatory treatment. The exterior of the signal case, lamp housing, and mounting flanges shall be finished with prime baked enamel finish paint. The lens holder and interior of the case shall be optical flat black.

f. Signal cases and lens holders shall be predrilled for backplates and visors. Hinge and latch pins shall be stainless steel. All access openings shall be sealed with weather resistant rubber gaskets.

g. Sheet metal parts, including visors and backplates, shall meet the ITE material requirements and include a chromate preparatory treatment and optical black on all surfaces.

h. Lamp fixtures shall comprise a separately accessible housing and integral lamp support, indexed ceramic socket, and self-aligning, quick release lamp retainer. Electrical connection between case and lamp housing shall be accomplished with an interlock assembly that disconnects the lamp holder when opened. Each signal section shall include a covered terminal lock for clip or screw attachment of lead wires. Concealed No. 18 AWG stranded and coded wires shall interconnect all sections to permit field connection within any section.

i. Each signal section shall include integral means for regulating its intensity between limits as a function of individual background illumination. Lamp intensity shall not be less than 97% of uncontrolled intensity at 1000 fc and shall reduce to 15 ± 2% of maximum at less than 1 fc. Response shall be proportional and essentially instantaneous to any detectable increase of illumination from darkness to 1000 fc and damped for any decrease from 1000 fc.

j. The intensity controller shall comprise an integrated, directional light sensing and regulating device interposed between lamps and line wires. It shall be compatible with 60 hertz input and responsive with the range 105 to 135 volts. Output may be phase controlled, but the device shall provide a nominal terminal impedance of 1200 ohms open circuit and a corresponding holding current.

02740.03 EXECUTION

A. General

Traffic signal heads shall be installed as shown on the Plans or as directed by the Engineer.

B. Pedestrian Signal Heads

Pedestrian signal heads mounted on poles or pedestals shall be mounted so that no portion of the mounted signal assembly shall be closer than 2 feet to the face of the curb. All signal heads on the same pole or pedestal shall be within 6 inches of being at the same height unless otherwise specified on the Plans.

C. Painting

All trunnions, brackets, and suspensions shall be painted yellow or as directed by the Engineer.

D. Mountings

The signal shall mount to standard 1 1/2 inch fittings as a single section, as a multiple section face, or in combination with other signals. The signal section shall be provided with an adjustable connection that permits incremental tilting from 0 to 10 degrees below the horizontal while maintaining common vertical axis through couplers and mounting.

Mounting attachments shall permit external adjustment about the mounting axis in 5 degree increments.

Signal heads which are to be rigid mounted shall be done so by the use of an adjustable signal bracket.

Signal heads shall be aimed to provide maximum safety to the traveling public by exposing maximum lens face.

02740.04 METHOD OF MEASUREMENT

Measurement for traffic signal heads will be made of the number of each type satisfactorily installed where shown on the Plans.

02740.05 BASIS OF PAYMENT

Payment for traffic signal heads will be made at the price bid per each for the number of the type installed, complete in place. The price bid shall include furnishing and installing signal heads, including all mounting hardware, and all labor, materials, and equipment necessary to complete this item of work and specified in strict accordance with the Contract Documents.