# Overhead Lighting of Signs JSP-04-09

**1.0 Description.** This work shall consist of installing sign lighting on overhead sign structures. Sign lighting shall include all work, material, equipment and electrical system components required for lighting signs on overhead structures in accordance with the contract documents.

**2.0 Equipment and Material List.** All electrical equipment and associated construction requirements shall be in accordance with applicable portions of Sec 901 and the following.

**2.1 Sign Lighting Fixtures.** Sign lighting fixtures shall be designed for use with lamps burning in a horizontal position and for the type of circuit specified. The luminaire shall have an aluminum housing with two 2-inch (50 mm) slipfitters or one 4-bolt slipfitter, and an internal ballast kit designed for that fixture. The housing shall have a natural aluminum finish or gray baked enamel finish. Reflectors shall have an alzak aluminum finish. The refractor shall consist of prismatic heat resistant glass in a cast aluminum holder. Plastic refractors shall not be used. The refractor shall be shielded on the end facing traffic. The holder shall be secured to the luminaire by means of a hinge and an automatic latch. A silicone rubber or other approved gasket shall be used to form a seal between the refractor and housing. The door and refractor assembly shall be completely sealed so that water cannot enter the housing. All metal parts, such as springs on the latches and hinges, U-bolts and screws, shall be made from non-ferrous metal or stainless steel. Wiring inside the luminaire housing shall be protected by suitable heat resistant insulating material. The reflector-refractor optical assembly and the ballast shall form a single unit. The optical unit shall be sealed at the socket entry. Transformer and capacitor compartments of the ballast shall be separated by either a heat barrier or an air gap for lower capacitor operating temperatures. A pipe stop and bracket for 4-bolt mounting shall be included in the assembly to properly locate the luminaire on the aluminum tracking to provide proper placement and illumination as shown on the plans.

**2.1.1** Lamps shall be mercury vapor or metal halide. Lamp size and type shall be as specified in the contract. The mercury vapor lamp shall have a rated lamp life of not less than 24,000 hours based on a minimum of 10 hours burning time per day. The metal halide lamp shall have a rated lamp life of not less than 10,000 hours based on a minimum of 10 hours burning time per day. The ballast shall be designed for the type of lamp used. The ballast shall be pre-wired to the lamp socket and to a terminal board so that only the connection of the supply leads to the ballast primary terminals is necessary. Ballasts shall be of the constant wattage type for mercury vapor lamps, and shall be peak lead auto transformer type for metal halide lamps. Ballasts shall operate satisfactorily over a voltage range of plus or minus 13 percent of its nominal primary voltage rating. The change in lamp wattage over this range shall not exceed 3 percent for mercury vapor and 8 percent for metal halide. The ballast shall start and operate the lamp satisfactorily over a temperature range of -20 to 105 F (-29 to 40 C). Ballast efficiency shall be no less than 86 percent. The ballast shall have a minimum power factor of 90 percent, and shall be able to withstand, for at least one minute, twice the rated primary voltage plus 1000 volts at 60 hertz from primary to core, from secondary to core and from primary to secondary.

* + 1. The luminaire unit shall provide an illumination level no less than 20 footcandles (215

lux) on any part of the sign when mounted as shown on the plans. The illumination uniformity ratio (maximum/minimum) shall be 6:1 or better. The illumination level shall be based on the type of lamp used at 70 percent of the output of a new luminaire. The contractor shall supply photometric data and other documentation to demonstrate these requirements are met. Documentation shall be submitted to the engineer and be approved in writing prior to installation of sign lighting.

**2.1.3** Three copies of the list of equipment and material to be installed will be furnished to the successful bidder, along with the contract for execution. The contractor shall complete the list by writing in the name of the equipment manufacturer and catalog number of each item listed. Two copies of the completed list shall be submitted to the engineer and shall be approved in writing before the items are installed. Approval of the items on the list will not relieve the contractor of responsibility for satisfactory performance of the installation.

**3.0 Construction Requirements.** Pole and bracket cable shall be installed between the sign luminaires and the power source at the base of the pole. A pre-molded fused connector assembly shall be installed on each conductor between the source cable and the pole and bracket cable. The connector assembly and splice shall be insulated with a protective rubber boot designed for the pre-molded connector. Splices shall only be made in junction boxes or luminaire housings as shown on the plans, or as approved by the engineer. Splices in junction boxes shall be accomplished with a splice block with a molded plastic insulating cover. The splice block shall be designed for the wire size used. The splice block shall have one port per wire and the wires shall be secured with set screws. The set screw holes shall be protected with removable plugs. Any required taping shall be accomplished with splice tape. Other wire and cable on overhead sign structures shall be as shown on the plans. All external wiring shall be enclosed in rigid aluminum conduit of the size shown on the plans. Handholes and wire outlets for sign lighting shall be provided as shown on the plans. If flexible conduit is specified, it shall be liquidtight flexible conduit and fittings conforming to Article 351 of the National Electrical Code. Junction boxes shall be stainless steel boxes in accordance with Sec 1062. All attachment hardware for conduit and junction boxes shall be stainless steel. No direct payment will be made for conduit and junction boxes on sign structures and any required hardware.

**4.0 Method of Measurement.**  Final measurement will not be made except for authorized changes during construction, or where appreciable errors are found in the contract quantity. The revision or correction will be computed and added to or deducted from the contract quantity.

**4.1** Measurement of conductor cable and wire will be made to the nearest 10 linear feet (5 m), as shown on the plans. If two-conductor pole and bracket cable is used in lieu of two single conductor cables, measurement will be made as for two single conductor cables. Contract quantities will be used in final payment.

**5.0 Basis of Payment.** Highway sign lighting will be paid for at the contract unit price for each of the pay items included in the contract.