

CONSTRUCTION STANDARDS

SECTION CS 15

STREET LIGHTING

CS 15-01 SCOPE: Street Lighting improvements shall be constructed in conformance with Section 86, Signals, Lighting and Electrical Systems, of the CALTRANS Standard Specifications and the requirements of the National Electric Code (NEC) except as modified by the City Standard Specifications and Standard Drawings. The stricter requirement shall apply in the case of conflicting information between the CALTRANS Standard Specifications, the NEC, and the City Standard Specifications and Standard Drawings. The work shall consist of furnishing and installing luminaires containing an integral ballast system, with high pressure sodium lamps, photoelectric cells; electrolier standards, electrolier arms and foundations, conduit and conductor wiring and all other materials and appurtenances in accordance with the Project Plans and these specifications.

CS 15-02 MATERIALS AND CONSTRUCTION: All materials and construction shall be in compliance with this section of these specifications.

- A. All materials delivered to the job shall be new, best quality of their respective grades, in accordance with the following specifications and packed in their original sealed containers. All materials to be installed shall bear the Underwriters Laboratories., Inc. (U.L.) label.
- B. The Contractor shall use materials mentioned in these specifications as standard, and in no case will a substitute be allowed without written approval of the City Engineer/Director of Public Works.
- C. All work and material shall be protected at all times. Conduit openings shall be closed with protective caps during installation and all materials shall be covered and protected against dirt, water and mechanical or other injury. All materials damaged during course of construction shall be replaced or repaired to original condition by the Contractor.
- D. The Contractor shall not allow or cause any of his work to be covered up or enclosed until it has been inspected, and approved by the Director of Public Works. Should any of the work be enclosed or covered up before such inspection, the Contractor shall, at his own expense, uncover the work and, after it has been inspected and approved, make all repairs with such material as may be necessary to restore all work to its original and proper condition.
- E. The Contractor shall furnish and install the street lighting equipment in accordance with the criteria shown in **Table CS 7-1 “Approved Street Light Equipment”** and all other requirements specified within these City

Standard Specifications. The Luminaire and Mounting type shall conform to the Project Plans and these specifications.

**TABLE CS 15-1
APPROVED STREET LIGHT EQUIPMENT**

Luminaire and Mounting Type	Where allowed by street classification	Approved fixture¹	Pole Height	Mounting Height
Cobra Head on single electrolier arm	Cul-de-sac, Residential and Collector	GE M-250R2 or equal ²	31'	32'6"
Cobra Head on single electrolier arm	Arterial	GE M-250R2 or equal ²	31'	32'6"
Decorative Post Top Type Mount	Cul-de-sac and Residential	Lumec AT 30-70HPS-SHA3M-ACDR-QTA/120-PH8-HS-GN8TX/RAL6012	15'	17'
Decorative Post Top Type Mount	Collector	Lumec AT 30-100HPS-SHA3M-ACDR-QTA/120-PH8-HS-GN8TX/RAL6012	15'	17'
Decorative Tear Drop Mount on single electrolier arm	Arterial	Lumec RN20-200HPS-THA3-ACDR-QTA/120-SMA-PH8-HS-GN8TX/RAL6012	27'6"	30'

¹ The luminaire fixture shall be classified as Type III Distribution unless otherwise noted on the Project Plans. The Luminaire fixture and mounting height for Industrial Streets are designed on a case by case basis and shall conform to the requirements shown on the Project Plans.

² Each fixture shall include a regulator ballast, a photo-electric receptacle for a twist lock photo cell, and not include a power door option. The 70 and 100 watt fixtures shall include a glass or acrylic drop lens and 200 watt fixtures shall include a glass drop lens except that lighting installed on traffic signal installations shall include a flat glass lens.

CS 15-03 FOUNDATIONS: Foundations shall be cast-in-place and in conformance with Section 86-2.01 "Excavating and Backfilling," and Section 86-2.03,

“Foundations,” of the CALTRANS Standard Specifications except as amended herein and the Standard Drawings.

CS 15-04 ELECTROLIER STANDARDS: Electrolier standards shall be defined for the purpose of these Standard Specifications to include the pole, base, and base cover. Electrolier Standards shall conform to the Standard Drawings and the following requirements:

- A. Each standard shall have an identification Street Light number sticker in black, installed in accordance with the Standard Drawings. The Street Light numbers will be shown on the plans.
- B. The hand hole shall be oriented on the pole so that a technician while facing the hand hole is also facing oncoming traffic.
- C. All electrolier standards shall be furnished with a grounding lug or nut installed opposite the hand hole/removable access door and inside the standard.
- D. **Cobra Head Electrolier Standards:** Electrolier standards for Cobra head fixtures shall conform to the Standard Drawings and the following criteria:
 - 1. The poles shall consist of galvanized steel material with a minimum thickness of 11 gauge.
 - 2. The poles shall be single-arm poles unless the Project Plans specify otherwise.
- D. **Decorative Post Top Type Mount Electrolier Standards:** Electrolier standards for Decorative Post Type fixture shall conform to the Standard Drawings and the following:
 - 1. The electrolier standard shall consist of an aluminum one piece unit which includes the pole with an aluminum structural base and a removable base cover and shall conform to the Standard Drawings.
 - 2. The electrolier standard pole shall be tapered and fluted.
 - 3. The electrolier standard shall be powder coated color Lumec GN8TX/RAL#6012 (dark green).
- E. **Decorative Tear Drop Type Mount Electrolier Standards:** Electrolier standards for Decorative Tear Drop Type fixtures shall conform to Standard Drawings and the following:
 - 1. The electrolier standard shall consist of a steel pole and a cast iron split decorative base.
 - 2. The electrolier standard (pole and base) shall be tapered and fluted.
 - 3. The electrolier standard shall be powder coated color Lumec GN8TX/RAL# 6012 (dark green).

CS 15-05 ELECTROLIER ARMS: Electrolier Arms shall conform to the Standard Drawings and the following requirements:

- A. Cobra Head Electrolier Arms:** The electrolier arms for Cobra Head Luminaires shall be six (6) long unless otherwise specified and shall consist of 11 gauge galvanized steel.
- B. Decorative Tear Drop Mount on single electrolier arms:** The electrolier arms for Decorative Tear Drop Mount on single electrolier arms shall be six (6) feet long unless otherwise specified and shall consist of aluminum material powder coated color RAL6012 (dark green).

CS 15-06 CONDUIT: Conduit shall be furnished and installed, conforming to the Standard Drawings, the requirements of Underwriters Laboratories Publication UL 543, and the following:

- A.** Conduit shall be 1½” PVC, Schedule 40 conduit.
- B.** Cutting and machining of conduit shall be in accordance with manufacturer’s recommendations. Pre-assembly of sections of conduit shall not be permitted except where jacking is required.
- C.** Pulling bells shall be installed on the ends of conduit terminating in pull boxes and electrolier standards.
- D.** The installation of conduit shall conform to the following:
 - 1.** Excavation and Backfill for conduit installation shall conform to Sections CS 2, “Trench Excavation,” and CS 3, “Trench Foundation,” Bedding and Backfill,” of the City Standard Specifications except as amended by this Section CS 15, “Street Lighting,” of the City Standard Specifications and the Standard Drawings.
 - a.** The conduit shall be laid over two inches of uniformly spread sand, and shall be covered by a minimum of 6 inches of sand.
 - b.** See section CS 3-07, “Rockwheel Trench,” for requirements when conduit is installed within existing street pavement (asphalt concrete paved) areas. However, the conduit may be installed with 18 inches of cover provided that the trench is excavated and backfilled in accordance with Section CS 3-07, “Rockwheel Trench,” of these City Standard Specifications.

CS 15-07 PULL BOXES: Pull boxes shall conform to the provisions of Section 2.06, “Pull Boxes,” of the CALTRANS Standard Specifications as amended herein by this Section CS 15, “Street Lighting,” of the City Standard Specifications and Standard Drawings.

- A.** Pull boxes shall be precast reinforced concrete, CALTRANS #3 1/2 Box with brass hold down bolts.

- B. The cover shall be marked "Street Lighting".
- C. Grout shall not be placed in the bottom of the pull box.

CS 15-08 CONDUCTORS AND WIRING: Conductors and wiring shall conform to the provisions of Section 86-2.08, "Conductors," and Section 86-2.09, "Wiring," of the CALTRANS Standard Specifications as amended herein by this Section CS 15, "Street Lighting," of the City Standard Specifications and Standard Drawings.

- A. Conductors shall be AWG and THWN copper stranded conductor Underwriters Laboratory Approved.
- B. The size of the conductors shall be as designated on the Project Plans.
- C. Any NEC approved splice excluding wire nuts connections may be used for splice connections.
- C. Splices shall be insulated in accordance with Section 86-2.09E, "Splice Insulation," type "B" method of the CALTRANS Standard Specifications.
- D. A fused disconnect splice connector shall be installed in each conductor between the line and ballast and shall be located and readily accessible within the hand hole of the electrolier standard. The fused disconnect splice shall consist of a Class CC (NEC) midget fuse holder with a 5 amp 250 volt non time delay midget fuse.

CS 15-09 LUMINAIRES: Luminaires shall conform to the Standard Drawings and the following requirements:

- A. Luminaires shall consist of the "approved fixture" type included in table CS 15-1 shaped aluminum housing, photoelectric control, reflector, and integral regulator type ballast. Luminaires, complete with lamps, shall be installed in the proper orientation to produce the desired light pattern and shall be completely assembled and connected to the conductor. The operating voltage shall be 120 volts unless otherwise specified.
- B. Ingress Protection (IP) rating for the Luminaire fixture shall conform to the following:
 - 1. Cobra head lighting fixture shall have a minimum IP rating of 55.
 - 2. Decorative Lighting (Post Top and Tear Drop) fixture shall have a minimum IP rating of 66.

CS 15-10 LAMPS: Unless otherwise specified, high pressure sodium lamps shall be installed in the luminaires. The wattage of the lamps shall be specified on the plans.

CS 15-11 PHOTOELECTRIC CONTROL: Photoelectric control shall be multi voltage photoelectric relay on a twist lock receptacle. A photoelectric cell shall be installed with each street light and shall be located as follows:

- A. Cobra Head luminaire on traffic signal standards:** Locate photo cell on the top of the traffic signal standard closest to the electrical service pedestal.
- B. Cobra Head luminaire on electrolier standards:** Locate photo cell on the top of the luminaire fixture.
- C. Decorative Post Top luminaire:** Locate photo cell inside the top of fixture.
- D. Decorative Tear Drop luminaire:** Locate photo cell on the top of the luminaire fixture.

CS 15-12 SERVICE CONNECTION: Service connections for street lights served by underground electrical systems will be made at the Service Point Location designated on the Project Plans which is normally a PG&E secondary box. Service Connections shall conform to the following requirements:

- A.** The Contractor shall provide conduit and wire from the PG&E secondary box to and throughout the new street light system.
- B.** Wires shall be tagged at secondary box in accordance with the latest applicable PG& E detail.
- C.** Service connections for electroliers served by overhead electrical systems will be made at a junction box located at the base of the service riser pole. The Contractor shall provide the junction box, conduit and wire from the junction box to the pull box adjacent to the nearest street light.
- D.** All service connections will be made by PG& E. The Contractor shall bear all costs by PG&E for service connection(s).