

SECTION 13554

**POLYMER CONCRETE
JUNCTION BOX**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Furnish and install polymer concrete junction box, ground rod, and maintenance marker.

1.2 RELATED SECTIONS

- A. Section 02056: Common Fill
- B. Section 02061: Select Aggregate
- C. Section 02842: Delineators
- D. Section 02892: Traffic Signal
- E. Section 03055: Portland Cement Concrete

1.3 REFERENCES

- A. ASTM C 109: Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2 inch or 50 mm cubes).
- B. ASTM C 496: Standard Test Method for Splitting Tensile Strength of Cylindrical Concrete Specimens.
- C. ASTM C 1028: Standard Test Method for Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull Meter Method.
- D. ASTM D 543: Standard Practices for Evaluating the Resistance of Plastics to Chemical Reagents.

- E. ASTM D 570: Standard Test Method for Water Absorption of Plastics.
- F. ASTM D 635: Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastic in a Horizontal Position.
- G. ASTM D 790: Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Insulating Materials.
- H. ASTM G 154: Standard Practice for Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials.
- I. ANSI/UL 467: Grounding and Bonding Equipment.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Provide special termination kits from the conduit manufacturer for terminating the conduit in junction boxes. Provide kits that form a watertight seal of conduit to structure wall.
- B. Use free draining granular backfill borrow as per Section 02061.
- C. Use granular backfill borrow per Section 02056.
- D. Provide maintenance markers for junction boxes along freeways and expressways.
- E. Provide concrete AA(AE) for concrete collar. Refer to Section 03055.
- F. Fabricate junction boxes per the size and type specified in the plans. Boxes are made from polymer concrete.

- G. Use body, ring, and lid meeting the physical and chemical requirements listed in Table 1:

Table 1

Property	ASTM Test	Value
Compressive Strength	C 109	11,000 psi
Flexural Strength	D 790	7500 psi
Tensile Strength	C 496	1700 psi
Effects of Acids	D 543	Very Resistant
Effects of Alkalies	D 543	Very Resistant

- H. Provide all components with ultraviolet inhibitors per ASTM G 154.
- I. Provide all components flame-resistant per ASTM D 635.

2.2 JUNCTION BOXES AND LIDS

- A. Provide junction boxes and vaults that resist water absorption in accordance with ASTM D 570.
- B. “Load Rating 3” for Non Wheel Loading Accessible, Behind Sidewalk
1. In area behind sidewalk, provide boxes, rings, and lids that sustain a minimum vertical test load of 12,000 lbs over a 10 inch x 10 inch square.
- C. “Load Rating 2” for Incidental Vehicular Traffic:
1. In area not in traveled way, provide boxes, rings, and lids that sustain a minimum vertical test load of 22,500 lbs over a 10 inch x 20 inch square.
 2. Provide concrete collar per Standard Drawing AT-7 for all boxes that may experience incidental traffic.
- D. “Load Rating 1” for Deliberate Vehicular Traffic:
1. In traveled way, or in any paved area immediately adjacent to the mainline, such as shoulders, snow storage areas, or vehicle pullout areas, provide boxes, rings, and lids that sustain a minimum vertical test load of 45,000 lbs over a 10 inch x 20 inch square.
 2. Provide steel ring and steel lid.

- E. Provide a poured-in-place 1 inch thick grout floor, with a 1 inch diameter drain, for all type I-PC, II-PC, and III-PC boxes.
- F. Provide lid for all junction boxes as specified by application.
- G. Provide lids with a non-skid surface with minimum coefficient of friction of 0.50, per ASTM C 1028. Coatings will not be approved.
- H. Mark the junction box lid in the logo area with 1 inch letters:
 - 1. "Traffic Signal" when the junction box contains cables or wires for traffic signal, CCTV, VMS, RWIS, WIM, ramp meter, traffic monitoring, or any other ATMS element.
 - 2. "Traffic Signal" when the junction box contains power conductors under 480 V used for traffic signal, CCTV, VMS, RWIS, WIM, ramp meter, traffic monitoring, or any other ATMS element.
 - 3. "Electric - 480 V" contains power conductors at 480 V used for traffic signal, CCTV, VMS, RWIS, WIM, ramp meter, traffic monitoring, or any other ATMS element.
 - 4. "Street Lighting" when the junction box contains street lighting conductors only. Inscribe "High Voltage" below the words "Street Lighting" when the junction box contains voltage above 600 V.
 - 5. "Communication" when the junction box contains multiduct conduit for future use.
 - 6. "Sprinkler Control" when sprinkler control conduit enters the junction box.
- I. Provide lids with recessed access point to allow removal of cover with a hook or lever. Damage to the pulling point in the lid must be repaired.
- J. Provide lids with vandal-resistant stainless steel recessed bolts.

2.3 MAINTENANCE MARKERS

- A. Steel posts: Refer to Section 02842.

2.4 BACKFILL

- A. Compact free draining granular backfill borrow under junction boxes. Refer to Section 02061.

- B. Compact granular backfill borrow around boxes. Refer to Section 02056.

2.5 DUCT SEAL

- A. Waterproof, rodent proof, non-corrosive, non-oxidizing, and non-hardening when subject to temperatures ranging from -13 degrees F to 150 degrees F. Do not use foam sealant.

2.6 GROUND ROD

- A. Copper-coated steel as specified.
- B. ANSI/UL 467.

2.7 GROUND WIRE

- A. Ground Wire: Refer to Section 02892.

PART 3 EXECUTION

3.1 JUNCTION BOX AND EXTENSION

- A. Install per manufacturer's recommendations.
- B. Cast conduit holes in junction box at the time of precasting or drill at the time of placement with no structural damage to the box.
 - 1. Holes drilled in junction box must not be more than 1/4 inch larger than conduit diameter.
 - 2. Seal conduit ends inside all junction boxes with at least 2 inch thick duct caulking after wires are installed.
- C. Place the top of the junction box flush with the surrounding grade or set at the planned finished grade.
- D. Hand tamp the granular backfill borrow material around the junction box. Match the top 4 inches to the composition, density, and elevation of the surrounding surface.

- E. Do not install junction boxes inside of railroad right of way.
- F. Field locate junction boxes to avoid steep slopes and low lying locations with poor drainage.
- G. Do not install junction boxes within the traveled way, shoulders, or on approaches to signal poles.
- H. Do not install conduit in corner of junction box, or within 2 inches of corner of junction box. Extend multiduct conduit 6 inches (nominal) beyond the inside wall of the junction box. Extend all other non-multiduct conduit 2 inches minimum to 3 inches maximum beyond the inside wall of the junction box. Refer to Standard Drawing AT-7.
- I. Extend conduit entering through bottom of junction box 4 inches above the top of floor.
- J. Orient the recessed access point in a location which provides both leverage and safety.
- K. Saw cut concrete or other improved surfaces that require removal in the sidewalk area. Remove entire section of sidewalk. Replace with in-kind materials to match the existing grade.
- L. Provide 12 inches deep free draining granular backfill borrow directly under junction box.
- M. Install expansion joint material around entire periphery of ring for junction boxes installed in paved surface.

3.2 CONCRETE COLLAR

- A. See Standard Drawing AT-7.
- B. Concrete: AA(AE). Refer to Section 03055.
- C. Do not install concrete collar for junction boxes in paved surface. Install concrete collars in areas of incidental traffic.

3.3 GROUND ROD

- A. Install ground rod to extend maximum 2 inches above box floor.
- B. Attach ground wire or locator wire with clamps.

3.4 RESTORATION

- A. Restore all areas damaged during the installation of the junction boxes.

END OF SECTION