

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. Includes Type I, Type II, and Type III Polymer-Concrete junction boxes.

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
- F. Section 13551: General ATMS Requirements

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 579: Standard Test Methods for Compressive Strength of Chemical-Resistant Mortars, Grouts, Monolithic Surfacing, and Polymer Concretes
- D. ASTM C 580: Standard Test Methods for Flexural Strength and Modulus of Elasticity of Chemical-Resistant Mortars, Grouts, Monolithic Surfacing, and Polymer Concretes

- E. 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
- F. ASTM D 543: Standard Practices for Evaluating the Resistance of Plastics to Chemical Reagents
- G. ASTM D 570: Standard Test Method for Water Absorption of Plastics
- H. ASTM D 635: Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastic in a Horizontal Position
- I. ASTM D 790: Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Insulating Materials
- J. ASTM G 154: Standard Practice for Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials
- K. 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 or grout around the conduit. Finish grout smooth and flush with the interior wall.
- B. Use free draining granular backfill borrow 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. Provide pre-cast polymer concrete 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 AT series Standard Drawings for all boxes that may experience incidental traffic.

D. “Load Rating 1” for Deliberate Vehicular Traffic:
1. 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.

E. Provide a poured-in-place 1-inch thick grout floor, with a 1-inch diameter drain, for all type I, II, and III-Polymer Concrete Junction Boxes or a box with a prefabricated floor with a 1-inch drain hole. Refer to ASTM C 579 and ASTM C 580 for test methods for grout.

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. Manufacture lids with the following markings in the logo area, in 1-inch recessed letters:
 - 1. “Traffic Signal” when the junction box contains cables or wires for traffic signal (Refer to Section 02892), CCTV, VMS, RWIS, WIM, ramp meter, traffic monitoring, or any other ATMS element (Refer to Section 13551).
 - 2. “Electric” when the junction box contains power conductors used for traffic signal, CCTV, VMS, RWIS, WIM, ramp meter, traffic monitoring, or any other ATMS element.
 - 3. “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.
 - 4. “Communication” when the junction box contains multi-duct conduit for future use.
 - 5. “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 CONDUIT PLUGS

- A. Use conduit plugs that have been specifically designed to seal the sized conduit used and that the Mule Tape can be securely fastened to.

2.6 GROUND ROD

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

2.7 GROUND WIRE

- A. Refer to Section 13551.

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 ¼-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.
 - 3. Seal vacant conduit with a manufactured plug designed for that purpose.
- 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 multi-duct 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 AT series Standard Drawings.
- I. Enter conduit through the sides of the junction box and not from the bottom. Place the conduit at least two inches above the floor.

- J. Place the recessed access point in a location that 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.
- N. Record GPS coordinates for all junction boxes according to Section 13551.

3.2 CONCRETE COLLAR

- A. See AT series Standard Drawings.
- B. Concrete: AA(AE) Refer to Section 03055.
- C. Do not install concrete collar for junction boxes in paved surface. Install concrete collars in all other areas.

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