

Section 658 Traffic Signals

658.1 Description

- (1) This section describes providing traffic signal faces and pedestrian signal faces at the locations the plans show.

658.2 Materials

658.2.1 Signal Mounting Hardware

- (1) Protect brackets/clamps used for assembling and mounting traffic signal or pedestrian signal faces against atmospheric conditions. Use weather tight brackets/clamps. For threaded signal face support hardware use 1 1/2 inch IPS.
- (2) Use an engineer-approved type of pole or standard vertical mounting brackets/clamps for signal faces from a department-approved manufacturer.
- (3) Use 1 1/2 inch ID nipples, zinc-coated rigid metal conduit to complete the raceway from a pole or standard mounting bracket/clamp to the traffic or pedestrian signal face. Use nipples long enough to accommodate full depth threading into the head mounting lock nut in order to tighten the face, but that do not interfere with reflector closure. Thread the nipple into the mounting bracket/elbow until tight. Use approved pinnacle type hardware from a department-approved manufacturer to close the unused 1 1/2 inch openings in signal faces and bracket ends.
- (4) Use a 1 1/2 inch IPS approved type of neoprene/rubber washers from a department-approved manufacturer to seal the top of a face, or the top of the top face in an array of face, to the upper mounting bracket to keep moisture out of the face.
- (5) For traffic signal face mounting lock nuts, use hex, zinc coated, malleable iron. ASME B16.14-1991 current for lock nut threading. Use 1/2 inch thick lock nuts that measure 2 1/2 inches outside flat to flat.
- (6) For rigid metallic zinc coated conduit nipples, use steel, 1 1/2 inch, IPS NPT, length as required.
- (7) When required, use corrosion resistant poly bracket shims.

658.2.2 Traffic Signal Faces

658.2.2.1 General

- (1) Furnish traffic signal faces, associated backplates, and LED modules from the department's approved products list. Conform to ITE standards for adjustable face, vehicle traffic control signal heads modified to reference polycarbonate resin where ITE standards reference plastic.
- (2) Furnish stainless steel screws, retaining clips, eyebolts, and other hardware. Use brass threaded inserts embedded into polycarbonate resin components where machine screws are used.
- (3) Submit a materials list and accompanying manufacturer's certificate of compliance certifying that the listed materials conform to the contract.

658.2.2.2 Signal Housings and Backplates

- (1) Furnish polycarbonate resin housings, doors, visors, and backplates. Use yellow, Federal Standard 595 - FS13538, housings and dull black door faces, visors, and backplates. Ensure that the door is sized for 12-inch nominal diameter lenses and is held shut with eyebolts secured with wing nuts. Use cut away or tunnel type visors as the plans show. Use flat backplates that project 5 inches beyond all sides of the signal housing.
- (2) Ensure that the manufacturer pre-drills matching holes in the housing and backplate and provides stainless steel self-tapping screws appropriately sized to securely attach the housing to the backplate.
- (3) Anchor terminal blocks in the signal face to the housing with machine screws. Use 18 AWG wire terminal screws in the terminal blocks.

658.2.2.3 LED Modules

- (1) Furnish circular and arrow LED modules from the department's approved products list and conforming to ITE VTCSH-LED.

658.2.3 Pedestrian Signal Faces

658.2.3.1 General

- (1) Furnish pedestrian signal faces and LED modules from the department's approved products list. Conform to ITE standards for adjustable face, pedestrian signal heads modified to reference polycarbonate resin where ITE standards reference plastic.
- (2) Furnish stainless steel screws, tabs, and other hardware. Use brass threaded inserts embedded into polycarbonate resin components where machine screws are used.

- (3) Submit a materials list and accompanying manufacturer's certificate of compliance certifying that the listed materials conform to the contract.

658.2.3.2 Signal Housings

- (1) Furnish polycarbonate resin housings, doors, and visors. Use yellow, Federal Standard 595 - FS13538, housings and dull black door faces and visors. For 16-inch heads, mount a z-crate visor and gasket to the door with stainless steel tabs. Drill the housing for top and bottom pipe mounting.
- (2) Anchor terminal blocks in the signal face to the housing with machine screws. Use 18 AWG wire terminal screws in the terminal blocks. Allow for side-fire connection without conflict between the mounting bracket and the door hinge.

658.2.3.3 LED Modules

- (1) Furnish pedestrian LED modules from the department's approved products list and conforming to ITE PTCSH-LED and the following:
 - Furnish 16-inch person walking/hand overlays with fully MUTCD compliant countdown timers.
 - Ensure uniform appearance symbols are ITE-PCSI-2 compliant.

658.2.4 Programmable Traffic Signal Faces

- (1) Furnish electronically programmable traffic signal faces with LED illumination sources conforming to the following:
 - Fully programmable with a portable electronic device.
 - Programmable for both horizontal and vertical viewing angles.
 - Programmable light intensity.

658.2.5 Pedestrian Push Buttons

- (1) Furnish freeze-proof ADA compliant pedestrian push buttons made by a department-approved manufacturer. Band a standard R 10-3b or R 10-3e series sign directly above each push button. Include a directional arrow or arrows on the sign as the plans show.

658.3 Construction

658.3.1 Signal Mounting Hardware

- (1) Install mounting hardware necessary to attach pedestrian and traffic signal faces to standards, poles, monotube arms, and trombone arms.
- (2) Seal voids between mounting brackets and poles by using silicon or rubberized caulking or similar material as the engineer approves.
- (3) Install engineer-approved sealing or closure pinnacles with neoprene/rubber washers in topside holes of upper signal face head mounting brackets. Plug bottom holes on bottom mounting brackets with engineer-approved sealing or closure pinnacles.
- (4) If using 2 brackets with 2 mounting holes in each bracket, only use the upper hole of the top bracket to bolt the bracket to a pole or standard. Band the lower end of the upper bracket and the lower bracket to the pole or standard using 3/4 inch wide, 0.025 inch thick, stainless steel bands. Use stainless steel clips.
- (5) Mount brackets banded to poles or standard so that the traffic signal assemblies are immovable. Mount other traffic signal and pedestrian assemblies so that they are immovable.
- (6) Furnish stainless steel hex-head cap screw 3/8 inch-24 NF mounting bolts. Drill and tap the pole or standard to match. Do not extend the bolt more than 1/4 inch through the wall, into the interior cavity of the pole or standard. Use a stainless steel flat washer sized to properly cover the bolt hole in the bracket and a stainless steel lock washer with each bolt.

658.3.2 Traffic Signal Faces

- (1) Install traffic signal faces with backplates as the plans show. Install LED modules conforming to the manufacturer's recommendations.
- (2) Cover with hood or turn away traffic signal faces from the view of the traveling public until the signal is accepted for use and activated.

658.3.3 Programmable Traffic Signal Faces

- (1) Install programmable signal faces according to the manufacturers recommendations.

658.3.4 Pedestrian Signal Faces

- (1) Install pedestrian signal faces as the plans show. Install LED modules conforming to the manufacturer's recommendations. Use cut away, tunnel, or z-crate type visors as the plans show.
- (2) Cover or turn away pedestrian signal faces from the view of the traveling public until the signal is accepted for use and activated.

658.3.5 Pedestrian Push Buttons

- (1) Install pedestrian push buttons. Provide a 3/4-inch diameter push button mounting hole for wiring purposes in standards or poles. De-burr the holes after sawing and before installing the wire.
- (2) Plug the opening in the bottom of the pedestrian push button with a threaded pipe plug. Drill a 1/4-inch diameter hole in the plug for drainage purposes. Use IMSA 50-2 loop lead-in cable to wire the push button to the conductors in the base.

658.4 Measurement

- (1) The department will measure the EACH bid items under this section as each individual unit acceptably completed.
- (2) The department will measure the Signal Mounting Hardware bid items as a single lump sum unit for each intersection acceptably completed.

658.5 Payment

- (1) The department will pay for measured quantities at the contract unit price under the following bid items:

<u>ITEM NUMBER</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
658.0100 - 0199	Traffic Signal Face (size) (vertical or horizontal)	EACH
658.0200 - 0290	Backplates Signal Face (# section) (size)	EACH
658.0300	Backplates Signal Face 12-8-8	EACH
658.0400 - 0499	Pedestrian Signal Face (inch)	EACH
658.0500	Pedestrian Push Buttons	EACH
658.0600 - 0629	LED Modules (size) (color) (type)	EACH
658.0630 - 0659	LED Modules Pedestrian Countdown Timer (size)	EACH
658.0660 - 0689	LED Modules Countdown Timer (size)	EACH
658.1100 - 1199	Programmable Traffic Signal Face (size) (vertical or horizontal)	EACH
658.5069	Signal Mounting Hardware (location)	LS

- (2) Payment for the Signal Mounting Hardware bid items is full compensation for providing mounting hardware, including spacers, necessary to attach pedestrian and traffic signal faces to standards, poles, trombone, or monotube arms.
- (3) Payment for the Traffic Signal Face bid items, the Pedestrian Signal Face bid items, and the Programmable Traffic Signal Face bid items is full compensation for providing signal faces.
- (4) Payment for the Backplates Signal Face bid items is full compensation for providing backplates and mounting screws.
- (5) Payment for Pedestrian Push Buttons is full compensation for providing pedestrian push buttons, pipe plugs, mounting hardware, signs, banding, and wiring.
- (6) Payment for the LED Modules bid items is full compensation for providing LED display modules.
- (7) The department will pay for wiring from the signal face terminal strip to the underground feeder cables at the top of the concrete base separately under the appropriate Cable Traffic Signal bid item as specified in [655.5](#).