EXPECTED IMPLEMENTATION JANUARY 2015

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653 PEDESTRIAN SIGNAL ASSEMBLIES.
(REV 9-4-14) (FA 9-16-14) (1-15)

SECTION 653 is deleted and the following substituted:

SECTION 653
PEDESTRIAN SIGNAL ASSEMBLIES

653-1 Description.

Install pedestrian signal assemblies as shown in the Plans and Design Standards, Index No. 17764. Meet the requirements of Section 603.

653-2 Materials.

653-2.1 General: Use pedestrian signals listed on the Department's Approved Product List (APL). Pedestrian signal assemblies must meet the requirements of the latest edition of the Federal Highway Administration's (FHWA) Manual on Uniform Traffic Control Devices (MUTCD) and the Institute of Transportation Engineers (ITE) standard for Pedestrian Traffic Control Signal Indications.

653-2.2 Housing and Visor: The housing must be weatherproof, sectional and may consist of as many sections as optical units. The housing must prevent light from escaping from one unit to another. The top and bottom opening of the housing must include a circular 72-tooth serrated connection (2 inch nominal I.D.) capable of providing positive positioning and alignment in 5 degree increments. When assembled and tightened, these connections must prevent rotation or misalignment. The serrated area must start at the outside of the 2 inch hole and be at least 1/8 inch wide. The teeth must have a minimum depth of 3/64 inch between peaks and valleys, free from burrs or other imperfections, and provide positive locking with the grooves of mating sections, framework, and brackets. The serration on the top circular connection of a signal section must have a valley at the 0 degree position and the serration on the bottom circular connection must have a peak at the 0 degree position, both aligned perpendicular to the front of the section. Housings must include latch pads and manual stainless steel latching devices that are captive, or non-removable. Housings must have at least two latching points.

Reinforce all mounting points and adjacent housing material. The door enclosing the lens must be hinged and held securely to the housing. Provide a gasket meeting the requirements of ASTM D1056, Grade 2B2 between the housing and door and between the lens and door. If the fitting between the housing and door is weather-tight, the gasket may be omitted.

Provide a visor for each signal face. Light must not escape between the door and visor. The visor must be three-sided and extend a minimum of 7 inches at the top from the face of the lens. The visor must be constructed of noncorrosive sheet metal, not less than 0.05 inch thick, (No. 18 gauge in thickness) or polycarbonate.

All metal housings and visors must be powder-coat painted black in accordance with Military Standard MIL-PRF-24712A or AAMA-2603-02 with a reflectance value not exceeding 25 percent as measured by ASTM E97. For polycarbonate heads, the black color must be incorporated into the material before the molding process.

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The housing must be constructed of a non-corrosive material. Cast metal parts must have a minimum tensile strength of 1 ksi (117 MPa) and sheet metal parts a minimum tensile strength of 27 ksi (186 MPa).

653-2.2.1 Die castings: Meet the requirements in ASTM B85 for the physical characteristics and chemical content for alloys S12A, S12B, SC84A, SC84B, SG100A and SG100B.

653-2.2.2 Sand Castings: Meet the requirements in ASTM B26 for the physical characteristics and chemical content for alloys S5A and CS72A.

653-2.2.3 Permanent mold castings: Meet the requirements in ASTM B108 for the physical characteristics and chemical content for alloys S5A and CS72A.

653-2.2.4 Polycarbonate: Polycarbonate housing assemblies, doors and visors must be molded from ultraviolet stabilized polycarbonate plastic with a minimum thickness of 0.1 inches, plus or minus 0.01 inch, and provide the following physical properties:

Table 1

Test	Minimum Requirement	Method
Specific Gravity	1.17	ASTM D 792
Vicat Softening Temp.	305-325°F (152 – 163°C)	ASTM D 1525
Brittleness Temp.	Below -200°F (-129°C)	ASTM D 746
Flammability	Self-extinguishing	ASTM D 635
Tensile Strength	Yield, 8500 psi (58 MPa)	ASTM D 638
Elongation at yield	5.5 - 8.5%	ASTM D 638
Shear Strength	Yield, 5500 psi (38 MPa)	ASTM D 732
Izod impact strength	15ft-lb/in (800 J/m)	ASTM D 256
Fatigue strength	950 psi (6.5MPa) at 2.5 mm cycles	ASTM D 671

653-2.3 Light Emitting Diode (LED) Pedestrian Signal Optical Unit (State Standard): Provide a countdown pedestrian signal module meeting the requirements of the latest ITE LED Pedestrian Signal Specifications.

653-2.4 Electrical: Wiring must be color-coded No. 18 AWG or larger, stranded wires with an approved 600 V outdoor insulation rating or equivalent. Wires must be a minimum of 3 feet long with self-insulating slide-on terminals with no bare wiring exposed where wires are secured.

The pedestrian signal must include a terminal block containing a minimum of five circuits, each with two noncorrosive screw-type terminals. Each terminal must accommodate three No. 18 AWG conductors and be labeled for ease of identification. The terminal block must not be obstructed and be visible when the housing is open.

653-2.5 Hardware: All brackets used to mount pedestrian signals must be an aluminum alloy cast fitting, pipe or equivalent material approved by the Department. Aluminum and aluminum alloy bars, rods, wires, profiles, and tubes must meet ASTM B221. Aluminum-alloy sand casting must meet ASTM B26. All mounting hardware must be painted black with a reflectance value not exceeding 25 percent as measured by ASTM E97.

Ensure that all assembly hardware, including nuts, bolts, external screws and locking washers less than 5/8 inch in diameter, are Type 304 or 316 passivated stainless steel. Stainless Steel bolts, screws and studs must meet ASTM F593. Nuts must meet ASTM F594. All

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assembly hardware greater than or equal to 5/8 inch in diameter must be galvanized. Bolts, studs, and threaded rod must meet ASTM A307. Structural bolts must meet ASTM A325.

653-3 Installation.

653-3.1 General: Use pedestrian signal assemblies capable of being maintained, adjusted, and disassembled with ordinary hand tools. Pre-assemble the pedestrian signal, with the exception of mounting hardware, prior to installation at the site. Construct the pedestrian signal assembly (including the mounting hardware) to be a weather-tight unit. Conceal all conductors.

653-3.2 Placement: Position pedestrian signals and all mounting assembly members as either plumb or level, and symmetrically arranged. Align signals in the line of the pedestrian's vision for the crosswalk being used.

653-3.3 Installation Sequence: Install all pedestrian signal assemblies at any intersection as a single operation unless a staged operation is approved by the Engineer. Do not install signals at any intersection until all other signal equipment, including the controller, and pedestrian detectors are in place and ready for operation, unless completely covered in accordance with 650-3.10.

653-4 Method of Measurement.

The Contract unit price per assembly for pedestrian signal assembly, furnished and installed, (including mounting hardware but not including poles or pedestals) will include all materials and equipment as specified in the Contract Documents, and all labor and materials necessary for a complete and accepted installation.

Payment for removal of pedestrian signal will be made only when the pole/pedestal is to remain. Removal of all other pedestrian signals will be incidental to the removal of the pole or pedestal.

653-5 Basis of Payment.

Price and payment will be full compensation for all work specified in this Section.

Payment will be made under:

Item No. 653- Pedestrian Signal - per assembly.