

ITEM 631 SIGN LIGHTING AND ELECTRICAL SIGNS

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631.01 Description. This work consists of furnishing and installing sign lighting or electrical sign equipment, complete, tested, and ready for service.

631.02 General. Perform installations according to the National Electrical Safety Code, the National Electrical Code and local codes for the area of installation. Furnish overhead sign lighting and integrate electric power with roadway lighting circuits.

Furnish certified drawings according to 625.06.

Conform to the requirements of City Supplement 1063 for the installation or testing of electrical items installed under 631.08 and 631.09.

Protect wire and cable by installing entirely within support structure interiors, enclosures, junction boxes, and rigid or flexible conduit. Ensure that the methods, materials, and locations of splicing and the methods of connecting and identifying wire and cable conform to Item 625, Item 725, and the plans. Furnish grounding systems according to 625.16.

Furnish power service under Item 625.

631.03 Materials and Equipment. Furnish materials and equipment that are new, of first quality, of current design, and free from defects.

Use electrical parts, wire, switches, and other elements of the installations that are of ample capacity to carry the required current without excessive heating or drop of potential.

Ensure that each item of equipment bears a nameplate, indelible marking, or brand that identifies the type, model, catalog number, and manufacturer.

Furnish materials conforming to the following:

Ground rod	625.16
Sealing, conduit.....	625.12
Cable and wire, 600-volt	725.02
Conduit, rigid	725.04
Mercury vapor ballast.....	725.11
Power service	725.19
Disconnect Switch.....	725.19

Switch Enclosure.....	725.19
Changeable message sign, electric type	731.03
Internally illuminated fixed message sign	731.05
Sign flasher assembly.....	731.06
School speed limit sign assembly.....	731.07
Conduit, flexible.....	731.08
Timer with enclosure.....	731.10

631.04 Sign Service. Sign service consists of all cable and other equipment to provide a complete electrical service from either an underground or overhead source to the disconnect switch.

Route sign service cable from a pull box to the switch enclosure for overhead supported signs by means of underground conduit, foundation conduit ell, and the interior of the structural member supporting the enclosure.

Route sign service for overpass structure mounted signs through underground and structure attached conduit terminating at a switch enclosure. Attach the conduit by 0.02-inch (0.5 mm) thick by 3/4-inch (19 mm) wide passivated stainless steel straps spaced at intervals of not more than 5 feet (1.5 m).

Route sign service cable from a distribution system direct drop to the switch enclosure by means of a conduit riser with weatherhead. Form a drip loop into the cable. Use either a cast aluminum or galvanized ferrous metal weatherhead of a threaded design. Attach the conduit by straps as described in the previous paragraph.

For sign service, use single conductor stranded copper. When the connection is to highway lighting distribution and circuit cable, use the same cable for sign service. In other applications, use sign service cable rated at 600 volts minimum and not smaller than 4 AWG.

631.05 Signs Wired. Ensure that signs wired complete the electrical system from the disconnect switch to the luminaires.

Furnish continuous wiring from the disconnect switch to a junction box mounted on the sign support or overpass structure. Install junction box in a manner that allows sign removal as a unit by the disconnection of the wires and the removal of sign attachment hardware. Install a junction box for each sign.

Furnish continuous wiring from the junction box to the first luminaire and between additional luminaires.

Use wire rated at 600 volts, single conductor and not smaller than 10 AWG.

Route wire on overhead sign supports from the disconnect switch enclosure through structural member interiors. Support wire hanging within the interior of steel vertical members by looping over the J-hook provided. After wiring in the disconnect switch enclosure, seal the nipple in the enclosure back with self-fusing high-dielectric insulating compound.

Assemble flexible or rigid conduit on the sign structure or lighting support arms with condulets, and attach them to the structure by clamps located within 6 inches (150 mm) of each conduit end and separated by not more than 24 inches (0.6 m).

631.06

631.06 Disconnect Switch. Install lighted signs with a disconnect switch within a lockable, weatherproof enclosure. For the switch, use a two-pole (minimum), single-throw, fused safety disconnect type, rated at 600 volts, 30 amperes with the fuse size as specified. Furnish a solid neutral bar.

For the enclosure, use stainless steel NEMA 250, Type 4. Furnish space for a chase nipple in the enclosure back. Field drill a hole through the enclosure and install the nipple. Ensure that enclosures also have a 1/4-inch (6 mm) diameter weep hole located in the bottom surface.

Furnish each enclosure with at least one padlock. Use padlocks with a bronze or brass lock body and a corrosion protected steel shackle. Key all padlocks for a project alike to use a master 2396 key.

When specified, furnish and install bracket assemblies on existing overhead sign supports or on concrete structures. Use bracket assemblies made of steel, galvanized according to 711.02, or aluminum.

631.07 Luminaire. Include a lamp of the wattage specified.

Locate ballasts integral with the luminaire. Furnish weatherproof ballast housings made from corrosion resistant materials.

631.08 Controls. When specified, furnish photoelectric controls when sign lighting is fed by uncontrolled circuits.

When specified, furnish and install the timer with enclosure to provide automatic school speed limit sign operation.

631.09 Electrical Signs. Furnish changeable message signs that conform to the Contract Documents. The pay item will specify if the display capabilities are limited message or unlimited message. The Contractor may use line units of these types as inserts in a panel sign, singly or grouped to provide a multiline sign. Hardware and software shall be complete to operate and maintain the sign.

Furnish internally illuminated signs consisting of the single or double face type. The sign support is furnished under another pay item. Furnish suspended signs that hang plumb, are properly oriented, and locked in place.

Furnish sign flasher assemblies consisting of a pair of flashing beacons. The sign, support, and foundation are furnished under other pay items.

Furnish school speed limit sign assemblies that conform to the Contract Documents. School speed limit sign assemblies consist of a retro-reflective SCHOOL SPEED LIMIT 20 WHEN FLASHING (R-10-S) sign fitted with a pair of flashing beacons arranged above and below the sign, and one flashing beacon on the back of the sign facing the opposing direction. The flashing beacons shall be yellow LED-type.

631.10 Removal and Storage or Reerection. Carefully remove sign lighting equipment (such as luminaires, disconnect switches, or ballasts) and electrical signs, and either store on the project for salvage by the City or re-erect elsewhere on the project. Clean and restore luminaires to be re-erected to an operating condition, fitted with new lamp boots, relamped with the proper type and size lamp, and provided with new hardware.

631.11 Inspection and Testing. Ensure that the sign lighting systems and electrical signs meet all requirements of the ground, cable insulation, and performance tests specified in 625.19. Correct lamps, ballasts, and transformers that failed during the performance test by replacing the faulty component; the entire test period will not require restarting.

During the performance test, make final adjustments to sign lateral position and aiming angles of luminaires to eliminate excessive brightness and glare, and to obtain optimum sign face reflected brightness, uniformity of illumination, visibility, and legibility, to the satisfaction of the Engineer.

631.12 Method of Measurement. All of the following methods of measurement include all hardware necessary to securely mount the associated item including angles, plates, tubes and channels.

The City will measure Sign Service by the number of complete units for each support, and will include conduit, conduit riser, weatherhead, fittings, cables, trenching, and backfilling.

The City will measure Sign Wired and Sign Wired, Overpass Structure by the number of complete units of wiring for each individual sign, and will include junction boxes, rigid or flexible conduit, condulets, clamps, wires, and connectors.

The City will measure Disconnect Switch with Enclosure by the number of each, and will include field drilling and padlocks.

The City will measure Switch Enclosure Mounting Bracket Assembly by the number of each, and will include two brackets and field drilling.

The City will measure Ballast and Photoelectric Control by the number of each separate item.

The City will measure luminaire by the number of each, and will include lamps and luminaire attachment hardware.

The City will measure Changeable Message Sign by the number of each, and will include cabinet, external enclosures, conduit, electrical, electronic and auxiliary components, and remote control units to provide a fully functional unit.

The City will measure Internally Illuminated Fixed Message Sign by the number of each, and will include lamps and ballasts.

The City will measure Sign Flasher Assembly by the number of each, and will include beacons, flasher control unit with enclosure, and lamps.

The City will measure School Speed Limit Sign Assembly by the number of each, and will include sign, beacons, flasher control unit with enclosure, and lamps.

The City will measure Timer with Enclosure by the number of each, and will include field drilling and padlocks.

The City will measure Removal and Storage or Removal and Reerection of sign lighting equipment or electrical signs by the number of each like items removed and stored or re-erected.

631.13 Basis of Payment. The City will pay for grounding systems under Item 625.

631.13

The City will pay for accepted quantities at the contract prices as follows:

Item	Unit	Description
631	Each	Sign Service
631	Each	Sign Wired
631	Each	Sign Wired, Overpass Structure
631	Each	Disconnect Switch with Enclosure, Type ____
631	Each	Switch Enclosure Mounting Bracket Assembly
631	Each	Ballast, Type ____
631	Each	Photoelectric Control
631	Each	Luminaire, Type ____, with ____-watt Lamp
631	Each	Changeable Message Sign, (Limited, Unlimited) Message
631	Each	Internally Illuminated Fixed Message Sign, Type ____
631	Each	Sign Flasher Assembly
631	Each	School Speed Limit Sign Assembly, ____ inches x ____ inches (____ mm x ____ mm)
631	Each	Timer with Enclosure
631	Each	Removal of (Luminaire, Disconnect Switch, Ballast, etc.) and (Storage or Reerection)