

## ITEM 731 SIGN LIGHTING AND ELECTRICAL SIGNS MATERIAL

### 731.03 Changeable Message Sign, Electrical Type.

**A. General.** Electrical changeable message signs consist of units or groups of units containing arrangements of pixels using electrical circuitry to display different messages.

Place signs in weatherproof cabinets. Integrate control logic units, load switches, monitor feedback circuits, power supply, etc., within the sign cabinet or mount within a separate weatherproof enclosure as required.

**B. Message Type.** Provide electrical changeable message signs of the limited message or unlimited message type.

Provide limited message signs containing pixels in an arrangement that when energized, selected pixels display two or more messages.

Provide unlimited message signs containing pixels arranged in full matrix or alphanumeric type modules positioned side-by-side to provide line units of the specified length. Use line units capable of displaying messages containing letters and numerals, limited only by the number of characters accommodated by the sign. Use line units capable of continually displaying alternating messages.

Provide materials in accordance with the City's QPL.

**C. Display Type.** Provide electrical changeable message signs consisting of lamp, light emitting diode, fiber optic, light reflecting, or hybrid types.

Lamp type changeable message signs consist of individual incandescent bulbs.

Light emitting diode changeable message signs consist of groups of individual light emitting diodes that, acting together, form individual character pixels.

Fiber optic changeable message signs consist of fiber optic bundles that transmit light from a remote source to form individual pixels.

Light reflecting changeable message signs consist of individual light reflecting panels.

Hybrid changeable message signs consist of individual light reflecting panels, each augmented by a light emitting pixel of the specified type. Display light emitting pixels for reflecting panels in the exposed position, and conceal or de-energize light emitting pixels for reflecting panels in the unexposed position.

Provide materials in accordance with the City's QPL.

**731.05 Internally Illuminated Fixed Message Sign.** Provide internally illuminated fixed message signs of the required legend and consisting of an opaque housing with a face of translucent plastic. If specified, provide double faced signs. Illuminate signs using interior lamps located to uniformly light the sign face.

Provide signs either with the legend on the exterior surface to maintain legibility when unlighted due to power failure, or with the legend on the interior surface to make invisible when unlighted. Apply the legend using black silk screening or by direct applied characters to white sign faces, unless otherwise specified. Design the sign faces

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for quick removal for maintenance, and provide faces with a safety chain or like device. If specified, shield the sign faces with sunscreens, louvering, or visors.

Provide cast, extruded, or formed housings made of corrosion-resistant material. Provide mounting hubs similar to traffic signal design. Provide weatherproof signs with drainage weepholes.

Provide the sign with the appropriate hardware for mounting by span wire, mast arm, pedestal top, or pole type bracket arms. Include fluorescent type lamps with ballast.

Provide materials in accordance with the City's QPL.

**731.06 Sign Flasher Assembly.** Provide beacons consisting of single traffic signal sections with 8 or 12-inch (200 or 300 mm) yellow lenses. Provide flasher control units flashing the beacons at a rate for each beacon of between 50 to 60 times per minute with the light period from one-half to two-thirds of the total cycle. Provide flasher control units having all solid state components meeting NEMA TS-1, part 6. House control units within a weatherproof corrosion-resistant enclosure with a lockable door. Include the incandescent lamps.

Provide LED beacons from a manufacturer listed on the City's QPL for LED signal lamps.

Provide materials in accordance with the City's QPL.

**731.07 School Speed Limit Sign Assembly.** Provide yellow beacons sized at 8 inches (200 mm) or 12 inches (300 mm). Provide flashers flashing the beacons alternately at a rate for each beacon of 50 to 60 times per minute with the light period from one-half to two-thirds of the total cycle. Equip the assembly with a solar cell power array having cellular data communication with remote programming capabilities. Provide flashers having all solid state components and meeting NEMA TS-1, part 6. Provide the backing members with hardware compatible with the method of support.

Provide LED beacons from a manufacturer listed on the City's QPL for LED signal lamps.

Provide materials in accordance with the City's QPL.

**731.08 Flexible Conduit.** Provide galvanized steel flextube conduit with a waterproof PVC jacket in accordance with UL 360 for wiring of lighted signs.

Provide materials in accordance with the City's QPL.

**731.10 Timer with Enclosure.** Provide a timer that allows automatic sign operation for a minimum of 8 times per day and for selected days of the week. Provide a solid state timer with a back-up battery to maintain timekeeping and program memory for at least 48 hours. Provide a battery with a design life of 10 years under field conditions when power failures over the 10-year period would accumulate to 100 days. If installed outdoors, house the timer within a lockable, weatherproof, corrosion-resistant enclosure. Provide each enclosure with at least one padlock complying with 631.06.

Provide materials in accordance with the City's QPL.