660 High Mast Lighting Lowering Assemblies

660.1 Description
(1) This section describes providing high mast lighting tower lowering assemblies.

660.2 Materials
660.2.1 General
(1) Furnish luminaires conforming to 659.
(2) If not furnished as part of an assembly, use stainless steel threaded fasteners.

660.2.2 Lowering Device
(1) Equip the poles with a mechanical lowering system that allows servicing the luminaires and associated electrical and mechanical apparatus from the ground. Furnish lowering devices from a department-approved series and manufacturer and with a 10-year warranty against failure of its components.
(2) When fully raised, provide a method of securing the luminaire ring to the fixed head assembly. Show either a bottom latch or a top latch system for securing the luminaire ring on the drawings submitted for the engineer's review.
(3) Design top latch systems to provide the operator with a way to determine whether the raising operation is complete and the luminaire ring is secure. The operator observing clutch slippage does not meet this requirement.
(4) If securing the luminaire ring to the fixed head assembly, provide a means to relieve tension from the lowering cables onto the winch assembly. Provide strain relief devices that allow removing the winch assembly for servicing while the luminaire ring is fully lowered and blocked up.
(5) Ensure that the lowering device operates off one leg of the line feeding the tower and uses a portable drive motor that plugs into the line.
(6) Provide adjustable torque limiters in the winch system or drive motor to prevent excessive stress on the lowering cables, and to allow for proper tensioning against the fixed head assembly.
(7) For systems where the lifting cables meet on a transition plate, provide access to the top of the plate from the hand-hole, when the ring is fully raised, to allow cable tension adjustment. Furnish 7x9 stainless steel lifting cables. Do not use antirotational cables.

660.2.3 Fixed Head Assembly
(1) The fixed head assembly shall include no moving parts, except for the necessary pulleys, rollers, and sheaves that guide the lowering ring, lowering cables and electrical conductors during the lowering operation. For the fixed head assembly, use chromated or stainless steel. Use pulleys, rollers, sheaves, and associated bearings, bushings, and shafts made of corrosion-resistant materials. Use permanently lubricated and sealed bearings and bushings.
(2) For systems that use a roller assembly to support the power chord at the head frame, use an assembly made of rollers mounted between highly corrosion resistant steel plates. Ensure the power chord rides on at least 6 rollers made from acetate resin mounted on stainless steel pins. Furnish a roller assembly with a minimum bending radius of 7 inches. If using a pulley, use a minimum radius of 8 inches.
(3) Furnish stainless steel lifting cable sheaves with a minimum radius of 3 inches. Use sheaves with permanently lubricated bronze bearings and a stainless steel pin. For the depth of the vee on the pulley, use at least the diameter of the cable. Provide guards to prevent the cable from lifting off the pulley.
(4) Protect all of the head assembly with covers, screens, or shields, to prevent entrance of dirt, moisture, ice accumulation, nesting of insects or birds or other contaminants that may harm the head assembly and operation of the lowering device.

660.2.4 Luminaire Ring
(1) If the plans show unused luminaire tenons, install a counterweight equal in weight to a luminaire, and close the unused tenon off with a threaded cap.
(2) Furnish either a stainless steel, or a galvanized structural steel ring. Galvanize conforming to ASTM A123.
(3) Furnish a luminaire ring centering system designed to protect both the pole shaft and the luminaire ring assembly and with a 10-year warranty against failure of its components. Ensure that the system
operates successfully in winds up to 30 mph. Also ensure that the ring can travel smoothly and unimpeded over the entire length of the pole shaft.

660.2.5 Aviation Lights
(1) Furnish aviation lights, associated electrical circuits, and detailing the plans show.

660.2.6 Lightning Rod
(1) Furnish silver tipped lightning rod of engineer-approved design mechanically attached to the tower shaft or head assembly, and electrically connected to the pole shaft.

660.2.7 Miscellaneous Fittings
(1) Use stainless steel miscellaneous fittings, fasteners, and hardware.

660.2.8 Drive Motor Set
(1) Furnish a universal portable motor system compatible with the particular lowering system used and capable of powering that system for any combination of the pole height and luminaire load configuration. Ensure that the drive motor set consists of a 120 volt AC motor, a matching transformer, power connection cables, and a motor control switch.

660.3 Construction
660.3.1 Shop Drawings
(1) Submit shop drawings and component lists to the engineer for review. Include the following:
- Alloy identification.
- Plate thickness.
- Fixed head assembly.
- Lowering device.
- Luminaire ring.
- Other required apparatus.
- Tightening procedures for bolted connections.
(2) If any substantial changes from previously submitted drawings are made, submit the revisions to the engineer for review.

660.3.2 Lowering Device, Head Assembly, and Luminaire Ring
(1) Construct conforming to plan details and manufacturer’s instructions.
(2) Do not erect fixed head assemblies before the engineer inspects them on the ground.

660.3.3 Acceptance
(1) Before final acceptance of each completed high mast lighting tower installation, demonstrate to the engineer that electrical and mechanical systems function properly.

660.4 Measurement
(2) The department will measure High Mast Lowering Assembly as each individual assembly acceptably completed.

660.5 Delete existing bid items & add a bid item for the lowering assembly and electrical installations.

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

<table>
<thead>
<tr>
<th>ITEM NUMBER</th>
<th>DESCRIPTION</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>660.0500</td>
<td>High Mast Lowering Assembly (structure)</td>
<td>EACH</td>
</tr>
</tbody>
</table>
(1) Payment for High Mast Lowering Assembly is full compensation for providing the assembly including the drive motor set, fixed head assembly, luminaire ring, and lowering mechanism with associated mechanical and electrical components. Payment also includes the electrical grounding system, aviation lights, lightning rod; and for connecting to the electrical distribution system.
(2) The department will pay separately for high mast towers under 532.
(3) The department will pay separately for luminaires under the Luminaires bid items of 659.