

Item 613

High Mast Illumination Poles



1. DESCRIPTION

Furnish and install high mast illumination poles.

2. MATERIALS

Provide new materials that comply with the details shown on the plans, the requirements of this Item, and the pertinent requirements of the following Items:

- Item 416, "Drilled Shaft Foundations"
- Item 421, "Hydraulic Cement Concrete"
- Item 432, "Riprap"
- Item 441, "Steel Structures"
- Item 442, "Metal for Structures"
- Item 445, "Galvanizing"
- Item 449, "Anchor Bolts"
- Item 618, "Conduit"

Use alloy steel or medium strength mild steel anchor bolts that comply with Section 449.2.1., "Bolts and Nuts."

3. CONSTRUCTION

Perform work in accordance with the details shown on the plans, and the requirements of this Item. Provide components that fit together properly.

Use established industry and utility safety practices when installing high mast poles located near overhead or underground utilities. Consult with the appropriate utility company before beginning work.

3.1. **Standard Design.** Fabricate poles in accordance with this Item and the plans. Alternate designs are not permitted.

3.2. **Shop Drawings.** Do not submit shop drawings for high mast illumination poles fabricated in accordance with this Item and the plans.

3.3. **Fabrication.** Fabricate and weld in accordance with Item 441, "Steel Structures," AWS D1.1, *Structural Welding Code—Steel*, and the requirements of this Item. Match-mark pole shaft sections as shown on the plans.

Fabrication plants that produce high mast illumination poles must be approved in accordance with [DMS-7380](#), "Steel Non-Bridge Member Fabrication Plant Qualification." The Construction Division maintains a list of approved high mast illumination pole fabrication plants.

Provide circumferential welds only at the top attachment and base plates. Grind or smooth the longitudinal seam welds to the same radius as contacted shaft corners for the length of the lap plus at least 6 in. at each slip joint splice. Ensure acceptable seam weld profiles for the remainder of the pole exterior. Provide full-penetration longitudinal seam welds for a length of 1.5 diameters plus at least 6 in. in outer sections at splices and base plates. Provide 85% minimum penetration in longitudinal seam welds at other pole sections.

Provide longitudinal seam weld and fit-up that will minimize acid entrapment during later galvanizing. Use at most 2 longitudinal seam welds in each section.

Permanently mark each pole base plate with the insignia or trademark of the fabrication plant. Place the mark on the pole base plate adjacent to the handhole access compartment.

Hot-dip galvanize fabricated pole sections and associated parts in accordance with Item 445, "Galvanizing." Punch or drill holes in steel parts or members, when allowed, before galvanizing. Fabrication tolerances are given in Table 1.

Provide ultrasonic testing (UT) of the shaft to base plate weld joint with a procedure approved by the Department. Perform UT at this joint after galvanizing.

Table 1
Fabrication Tolerances

Part	Dimension	Tolerance (in.)
Pole shaft	Length (unassembled sections)	±1
	Shaft Thickness ¹	+0.12, -0.02
	I.D. of outside slip fitting	+1/8, -1/16
	O.D. of inside slip fitting	+1/32, -1/8
	Difference between flats or diameter	±1/4
	Straightness	1/8 in 10 ft.
	Attachment locations	±1
Assembled pole shaft	Perpendicular to base plate	1/8 in 24 in.
	Shaft centered on base plate	±1/4
	Twist in shaft ²	4° in 100 ft.
	Position of winch channel	±1/4
Base plate	Overall	±1/4
	Thickness	+1/4, -1/16
	Deviations from flat	3/16 in 24 in.
	Spacing between holes	±3/16
	Bolt hole size	±1/16
Anchor bolt templates	Outside diameter	±1/8
	Inside diameter	+1/4
	Thickness	+1/4, -1/32
	Spacing between holes	±1/16
	Bolt hole size	±1/16
Anchor bolts	Length	±1/2
	Threaded Length	±1/2
	Galvanized Length	-1/4
Misc.	Bolt hole spacing	±1/16

- Adjust pole diameter if shaft thickness exceeds nominal thickness by 0.02 in. or more. Change the splice length for this adjustment.
- The Department may accept an excessive twist for individual pole sections, provided the top of pole is within twist tolerance for assembled sections.

3.4. **Installation.** Stake and install high mast illumination poles as shown on the plans. The Engineer may shift the assembly locations, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities.

Use established industry and utility safety practices when installing poles located near overhead or underground utilities. Consult with the appropriate utility before beginning work.

Prevent scarring or marring of the poles. Repair galvanized surfaces damaged in assembly, transit, or installation; or for steel parts or members welded after galvanizing in accordance with Section 445.3.5., "Repairs."

Provide riprap around pole foundations in accordance with Item 432, "Riprap," and the details shown on the plans.

- 3.4.1. **Foundations.** Construct foundations for high mast illumination poles in accordance with Item 416, "Drilled Shaft Foundations," and the details shown on the plans.

Before placing concrete for the drilled shaft foundation, inspect anchor bolts to verify proper projecting length of bolts, bolt pattern, orientation of pattern, bolt alignment, and bolt galvanizing are as shown on the plans. Orient anchor bolts to provide 2 bolts on the reference line as shown on the plans. Ensure the anchor bolts are electrically bonded to the reinforcing steel as shown on the plans.

Ensure anchor bolts and templates are rigidly held in position during concrete placement. Positioning devices may be tack welded to steel template, but not to any portion of the anchor bolts. Hold conduit in place with a bar attached to the upper template and cap conduit before placing concrete. Ream conduit to remove burrs and sharp edges after placing concrete. Install bell ends or bushings on the conduit.

- 3.4.2. **Pole Assembly.** Assemble poles on blocking using a minimum of 2 hydraulic rams at the splices. Support the free end of the section being assembled with hoist equipment. Apply assembly force using hydraulic rams with sufficient capacity to properly draw the sections together with little or no remaining gaps. Mark poles with permanent ink to indicate designed lap length. Ensure splices are a minimum of 90% or a maximum of 110% of the planned lap. Mark the 90% and 110% locations before assembling the pole. Obtain written approval from the Department for splices that do not meet lap tolerances before erecting the pole.

- 3.4.3. **Pole Installation.** Install structures after foundation concrete has attained its design strength as required on the plans and Item 421, "Hydraulic Cement Concrete." Coat anchor bolt threads and tighten anchor bolts in accordance with Item 449, "Anchor Bolts." Erect and align the poles within 12 in. of vertical. Use enough temporary slings, chains, or wire rope to prevent unintentional separation of the pole sections. Orient poles so a worker can see into the access hole while facing oncoming traffic.

After the high mast pole has been plumbed and all nuts are tight, tack-weld each anchor bolt nut to its washer in 2 places and tack-weld each washer to the base plate in 2 places. Tack weld in accordance with Item 441, "Steel Structures," the AWS D1.1, *Structural Welding Code—Steel*, and the requirements of this Item. Never weld components to the bolt. Repair galvanizing damage on bolts, nuts, and washers in accordance with Section 445.3.5., "Repairs," after tack welding. Do not grout between the base plate and foundation.

4. MEASUREMENT

This Item will be measured as each high mast illumination pole installed.

5. PAYMENT

The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "High Mast Illumination Poles" of the wind design and height specified. This price is full compensation for furnishing, fabricating, galvanizing, assembling and installing the pole on a foundation; anchor bolts, nuts, washers, and templates; conduit, ground rods, and wiring; and materials, equipment, labor, tools, and incidentals.

New drilled shaft foundations will be paid for under Item 416, "Drilled Shaft Foundations." New riprap will be paid for under Item 432, "Riprap." New high mast illumination assemblies will be paid for under Item 614, "High Mast Illumination Assemblies." New ground boxes will be paid for under Item 624, "Ground Boxes." New electrical services will be paid for under Item 628, "Electrical Services."