ITEM 670.01901010 - WOODEN POLE STANDARD WITH SINGLE ARM 36 FT TO 38 FT HIGH
ITEM 670.01900210 - WOODEN POLE STANDARD WITH SINGLE ARM 38 FT TO 40 FT HIGH
ITEM 670.01900310 - WOODEN POLE STANDARD WITH SINGLE ARM 40 FT TO 42 FT HIGH
ITEM 670.01900410 - WOODEN POLE STANDARD WITH SINGLE ARM 42 FT TO 44 FT HIGH
ITEM 670.01900510 - WOODEN POLE STANDARD WITH SINGLE ARM OVER 44 FT HIGH
ITEM 670.01910110 - WOODEN POLE STANDARD WITH DOUBLE ARM 36 FT TO 38 FT HIGH
ITEM 670.01910210 - WOODEN POLE STANDARD WITH DOUBLE ARM 38 FT TO 40 FT HIGH
ITEM 670.01910310 - WOODEN POLE STANDARD WITH DOUBLE ARM OVER 40 FT HIGH

DESCRIPTION

Under these items the Contractor shall furnish and install wooden pole standards of the type and at locations in accordance with the plans, specifications or as ordered by the Engineer.

MATERIALS

Pole, Mast Arm and Brace Assembly. Breakaway Box Pole shall be manufactured from billets of grade 2.0E Laminated Veneer Lumber (LVL). The LVL shall be made of 98.4 mils or 118.1 mils veneer with the grain oriented parallel to the length of the finished billet. Each veneer shall be dried as required, visually graded, and mechanically graded by an ultrasonic or other approved non-destructive method. The veneers shall be glued together in a continuous process with lap or scarf joints connecting successive veneers in each layer. Veneer joints shall be staggered through the thickness of the billet. The adhesive used to manufacture the billet shall be a phenol-formaldehyde which conforms to the ASTM D 2559 “Standard Specification for Adhesives for Structural Laminated Wood Products for Use Under Exterior (Wet Use) Exposure Conditions”.

Mast Arm and Brace shall be of the same LVL material as the Pole, except for the wooden strip that will be inserted in the trough on the bottom of the Mast Arm, which shall be manufactured from Coastal Douglas Fir.

CONSTRUCTION DETAILS

Fabrication and Assembly. Laminated veneer lumber must be manufactured in a plant and by a process approved by the International Code Council Evaluation Service (ICC-ES).

Breakaway Box Pole shall have a hollow box cross section. The nominal outside dimensions of the pole shall be 9” x 9”. The walls of the box pole shall be minimum 1.5” thick. A 45 degree
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Miter shall be used for the corner joint. The adhesive used at the corner joint shall be a gapfilling phenol-resorcinol which conforms to the ASTM D 2559 specification. A commercial quality, 20 gauge, galvanized steel cap shall be attached to one end of the pole with hot-dipped galvanized nails. The opposite end of the pole shall have a partial plywood or oriented strand board (OSB) cap attached with hot-dipped galvanized nails.

Mast Arm and Brace shall be of a full cross section, conforming to the details shown on plans or as approved by the Engineer. A trough of 2” width, as shown on the contract plans, shall be carved along the bottom of the mast arm for placement of the wiring to the luminaire, and thereafter it will be filled with the Douglas Fir strip. The strip shall be glued in place using the same adhesive as above.

The assembly order of mast arm, brace and pole cap to the pole will be done as described in the contract documents or as approved by the Engineer.

**Testing.** All LVL sections shall be tested for strength by performing bending tests in accordance with the ASTM D143 and D 198 specifications. The test specimens shall be 1.75” wide and tested on edge over a 36” span under third-point loading. The mean modulus of rupture (MOR) shall be 8000 psi or greater for a sample of ten or more specimens. The moving average MOR of thirty or more specimens shall be 9000 psi minimum.

One section of a Breakaway Box Pole out of each production lot of one hundred poles or less shall be tested for shear strength. The ultimate shear stress developed by each specimen shall be at least 700 psi.

The poles shall be tested for breakaway performance in accordance with the recommendations of National Cooperative Highway Research Program Report 350, Recommended Procedures for the Safety Performance Evaluation of Highway Features, accepted by the FHWA and meeting the requirements of the AASHTO, Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals.
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Preservative Treatment. The poles shall be treated with copper naphthenate and meet all the requirements of Standard Specifications for Section 708-32 – Wood Preservative – Oil-Borne. Poles shall comply with category UC5 of the U1 User Specification for Treated Wood Standard of the American Wood Protection Association.

Storage and Handling. Bundles of poles shall be stacked horizontally. Stickers shall be placed between layers in a bundle at intervals not to exceed ten feet. Stickers shall be aligned vertically in the bundle. Bundles shall be supported by level stickers, aligned with those in the bundle.

The stickers shall be thick enough to provide easy access for forklifts and to keep poles clear of mud and standing water. Bundles of poles may be stacked if properly stickered and normal safety precautions are followed.

The poles shall be stored under some form of cover approved by the Engineer. If a tarpaulin is used, it should be loosely draped over the bundle with the ends of the bundle left open to allow free air circulation and prevent moisture condensation.

Identification. All poles shall bear a corrosion-resistant metal plate that identifies the manufacturer, the date of manufacture, and the lot number of the pole.

Installation. Breakaway Box Pole shall be installed as shown on plans and in accordance with specifications.

Each pole will be equipped with a breakaway feature consisting of two pairs of 1” diameter holes, drilled through the wall on each side of the pole, on the side facing the parkway and the opposite side. Each pair of holes shall be drilled 3” apart. The first pair of holes shall be drilled 3” above ground and the second pair shall be drilled 18” above the first. The breakaway feature shall be cut after the pole has been set as indicated on plans or as approved by the Department.
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**METHOD OF MEASUREMENT**

The work will be measured by the number of wooden poles furnished and installed in accordance with plans and specifications.

**BASIS OF PAYMENT**

The unit price bid for each wooden pole shall include the cost of furnishing and installing of the wooden pole, complete with arm and brace, according to the plans and specifications. The unit price bid shall include the cost of all labor, equipment, materials, fabrication, assembly, testing, preservative treatment, installation, pole wiring, and all other work necessary to complete the work.