E-3 Concrete Pole Specifications

1.00 SCOPE

1.10 This specification is to establish design and quality standards for static cast concrete poles for power distribution or lighting. All pole design structural calculations shall be prepared by a licensed engineer experienced in prestressed concrete design.

2.00 GENERAL

- 2.10 The concrete poles furnished under these specifications shall be designed and manufactured in accordance with requirements and/or recommendations of the American Concrete Institute Standard "Building Code Requirements for Structural Concrete" (ACI 318 Latest Edition), unless otherwise specified.
- 2.20 Poles shall be designed in accordance with the Prestressed Concrete Institute "Guide for Design of Prestressed Concrete Poles."

3.00 PHYSICAL CHARACTERISTICS

- 3.10 All poles shall be prestressed concrete and suitable for direct embedment into the ground without special foundations.
- 3.20 Shape and Length: Poles shall be square in cross-section, with chamfered corners, and shall have a standard taper of 0.162 inch per foot. Cross-sectional dimensions shall not deviate by more than 3/8 inch. The allowable tolerance for overall length shall be +3 inches and -2 inches. The width of the bottom face of the pole (as it is cast) may be less than the top face.
- 3.30 Finish: The pole shall have a smooth uncolored finish with no cracks. The top surface of each pole shall be troweled until all projections, depressions, and irregularities have been removed and the entire surface has a smooth texture and neat lines. Square corners and sharp edges shall be tooled to form smooth, chamfered corners.

All small cavities shall be cleaned, saturated with water and then filled with mortar. A small cavity is defined as one larger than 1/4 inch but smaller than 3/4 inch in diameter, and less than 3/8 inch deep. Larger non-structural cavities and spalls shall be repaired by opening the side of the damaged area on a 1 to 1 slope using a mechanical grinder, cleaning thoroughly and filling with a high-strength non-shrink concrete repair material. Poles with other defects may be repaired only upon authorization of, and using the method prescribed by the Design Engineer.

- 3.40 Sealing Steel Strands: The end of each steel reinforcing strand (in the top and butt) shall be burned back to a minimum depth of 1/2 inch. The holes left by the removal of the strand shall be thoroughly cleaned of any loose residue. The holes shall then be completely filled with non-shrink grout and smoothed evenly with tip or butt surface.
- 3.50 Cover: The prestressing strands shall have a minimum concrete cover of 1 inch, except that Type I poles will have a minimum cover of 3/4 inch. The centerline axis along the faces of the poles shall be clear of embedded steel except for stirrups, spiral reinforcement and fabrication devices, so that 3/4 inch diameter holes may be drilled without interference from the strands.
- 3.60 Sweep: Sweep is the deviation of a pole from straightness. A straight line joining the edge of the pole at the butt and the edge of the pole at the top shall not be distant from the surface of the pole at any point by more than 3/8 inch for each 10 feet of length.
- 3.70 Hole Drilling: Poles shall be drilled in accordance with approved drawings. The location of holes shall not deviate by more than 3/8 inch. Holes drilled after removal from molds shall be drilled from both sides of the pole and shall be uniform in entrance and exit. Holes drilled from opposing sides of the pole must be in the same plane and be centered on both faces.
- 3.80 Cable Entrances: Two cable entrances with couplings shall be cast in all poles 90 degrees to the handhole unless otherwise specified by the customer.

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4.00 MATERIALS

- 4.10 Chloride Content: The chloride content of the concrete mix, including all ingredients, shall be 0.4 pounds per cubic yard, or less.
- 4.20 Corrosion Resistance: All inserts or attachments, if required, shall be of noncorrosive material or galvanized.
- 4.30 Concrete: Concrete used in poles shall have a compressive strength at transfer of not less than 4,000 PSI, and a 28-day compressive strength of not less than 7,000 PSI, unless otherwise specified.
- 4.40 Material shall comply with the most recent revision of the following

ASTM Standards:

a) Portland Cement ASTM C105 b) Admixtures ASTM C494

c) Aggregates ASTM C33 or C330

d) Reinforcing Bars ASTM A615 e) Cold Drawn Spiral Wire ASTM A82 f) Prestressing Strand, 270K ASTM A416

5.00 STRENGTH REQUIREMENTS

- 5.10 Poles of each standard type, unless otherwise specified, shall be designed to withstand the rated design (cracking) and ultimate strength shown in the following tables, with modifications to accommodate allowances for handling, transportation and erection. The rated strength is that load which, if applied, in a direction perpendicular to the axis 2 feet below the pole tip and with the bottom of the pole (ten percent of its length plus two feet from the butt) held firm, will produce the first sign of hairline cracks. The ultimate strength is the load at which point failure occurs.
- 5.20 All poles shall be capable of withstanding single point pickup from the horizontal position when lifting from a point 30% of the overall length down from the tip.

6.00 GROUNDING

6.10 A PVC conduit for customer to pull a ground wire through can be cast in poles if required by the customer and included with bid to customer.

7.00 QUALITY CONTROL

7.10 Tests shall be made and records shall be maintained in accordance with the requirements of Prestressed Concrete Institute MNL-116, "Manual for Quality Control for Plants and Production of Precast Prestressed Concrete Products."

8.00 DRAWING AND DESIGN INFORMATION

- 8.10 Upon request, Lonestar Prestress Mfg., Inc. will furnish detailed design drawings and computations for the poles bid or supplied, including but not limited to the following:
 - 1) Total weight and center of gravity of each pole.
 - 2) Calculations of cracking and ultimate moment capacities at not more than 5 foot intervals.
 - 3) Dunnage and pickup points, including both one-point and two-point pickup locations.
 - 4) Detail of cross section and all points where reinforcing changes.

9.00 INSTALLATION

9.10 Poles shall be supported and protected during site storage, lifting and setting to prevent damage to the pole. Spalls or other damage incurred during these operations shall be repaired to restore the pole to "as new" condition.