

**AUSTIN ENERGY**  
**PURCHASE SPECIFICATION**  
**FOR**  
**POLES, DIST, PRE-STRESSED SPUN CONCRETE**

<u>Date</u>	<u>Prepared by</u>	<u>Issuance/Revision</u>	Department Approval <u>Division Manager/Standards Manager</u>
06/06/97	Tony Shiekhi	Revision	

This specification, until revised or rescinded, shall apply to each future purchase and contract for the commodity described herein. Retain for future reference.

**AUSTIN ENERGY**  
**PURCHASE SPECIFICATION**  
**FOR**  
**POLES, DIST, PRE-STRESSED SPUN CONCRETE**

1.0 SCOPE

1.1 These specifications set forth the minimum requirements for design, material, fabrication, finishing and shipping of prestressed spun concrete electric distribution poles.

2.0 APPLICABLE SPECIFICATIONS

2.1 Reference to standard specifications shall be the latest revision of such specifications with abbreviations listed below:

Society of Testing and Material	ASTM - American
ANSI - American National Standards Institute	
ASME - American Society of Mechanical Engineers	ASCE - American
Society of Civil Engineers	

NESC - National Electric Safety Code	NEMA - National Electrical
Manufacturers Association	PCI - Prestressed Concrete Poles

3.0 PHYSICAL REQUIREMENTS

3.1 Material

3.1.1 All material used in the structure shall have a minimum yield strength equal to or greater than the value used in the design calculations.

- 3.1.2 Cement - Portland Cement shall conform to the latest requirements of Type I or Type III in accordance with Specification ASTM-C150 or shall be Portland-Pozzolan Cement conforming to the requirement of Specification ASTM-C595.
- 3.1.3 Aggregate - Aggregate shall conform to ASTM-C33 or C330 except that the requirements for grading shall not apply. Maximum size aggregate shall be  $\frac{3}{4}$  of the clear spacing between reinforcing steel and the surface of the pole or between individuals bars or wires.
- 3.1.4 Water - Water for mixing concrete shall be free of oils, organic matters, and other substances in amounts that may be deleterious to concrete and it shall not contain concentration of chloride ions in excess of 500 PPM or sulfate ions in excess of 1000 PPM.
- 3.1.5 Admixtures - Chemical admixtures shall conform to Specification ASTM-C494. Air entraining admixtures shall conform to Specification ASTM-C260. Fly ash or other pozzolanic admixture shall conform to requirements of Specification ASTM-C618
- 3.1.6 Steel - Prestressing steel reinforcement shall conform to Specification ASTM-A416. Uncoated stress relieved, low relaxation 7-wire strand. Non-tensioned reinforcement steel shall conform to the requirement of Specification ASTM-A615 for grade 60 rebar. All insert steel including spiral and longitudinal cage reinforcement shall be corrosion resistant, conform to Specification ASTM-A82 and shall not be less than  $\frac{3}{32}$  inches in diameter. No aluminum inserts shall be allowed. All baseplates, anchor bolts and top mount couplings shall conform to the ASTM specifications designated on contract drawings.
- 3.1.7 Concrete - The concrete shall achieve a minimum 28 day compressive strength of 9500 PSI. The cylinders for compression test shall be made in accordance with Specification ASTM-C172 and C31.
- 3.1.8 The bidder shall indicate the material used in each part of the structure and the specification covering the material.

#### 4.0 GENERAL REQUIREMENTS AND INFORMATION

##### 4.1 General Requirements

- 4.1.1 Concrete Cover - The minimum concrete cover over all steel shall be  $\frac{3}{4}$  inch (19 MM).
- 4.1.2 Circumferential Wire - The number of spirals of cold-drawn circumferential wire along any three feet of length shall not be less than required by design except that the spacing location shall be within an inch of its specified location.
- 4.1.3 Grounding - The purchaser shall specify any grounding requirements needed.
- 4.1.4 Exterior Surface Treatment - Exterior concrete surface finish shall be as specified by the purchaser.
- 4.1.5 The minimum 28-day compressive strength for concrete used in poles shall be 5000 psi (35 MPa) as determined using Specification C 39 or C 42. The cylinders for compression tests shall be made in accordance with Specification C 172 and C 31.

##### 4.2 Load Requirements

- 4.2.1 Poles shall be designed for ultimate strengths. Distribution line poles shall be designed in accordance with the PCI Guide given in 2.1. Poles shall be proportioned so that stresses produced by the manufacturing process, transportation, installation as well as dead and live loads will not be detrimental to the strength, serviceability requirements, and aesthetics of the structure.
- 4.2.2 Unless local codes or agency standards require otherwise, the following loading criteria shall apply: ANSI National Electric Safety Code loading criteria (See 2.1) shall apply for transmission and distribution.
- 4.2.3 Distribution Pole Loading - The COA-EUD will specify the load trees required for design. If deflection is critical, the COA-EUD shall specify maximum allowable deflection.

4.3 Shipping and Handling

4.3.1 Shipping instructions will be included in the bid information.

4.3.2 All bolt holes shall be covered/capped during shipment.

4.3.3 Price to be bid F.O.B. Austin, Texas; 4412 "B" Meinardus, Austin, Texas 78744.

4.3.4 Twenty-four (24) hours prior notice of delivery is required.

Telephone Wallace Gootman at (512) 440-4111.

4.3.5 The City of Austin will be responsible for the off loading of all materials.

4.4 Rejection of Material

Any material delivered under these specifications which, in the opinion of the City of Austin, does not meet the requirements set forth herein with regard to material, fabrication, coating, delivery, shipment or any other condition will be returned to the fabricator. All expense incurred, including handling, transportation, and any and all other charges connected with said incorrect compliance with these specifications shall be charged to or shall be at the expense of the fabricator. Any and all of these expenses which may have been paid by the City of Austin shall be reimbursed to the City of Austin in full by the fabricator.

5.0 SPECIMEN PREPARATION

5.1 Mixture - The aggregates shall be sized and graded and the mixture proportioned and mixed in a mixer using such proportions of cement and water as will produce a homogeneous concrete mixture of such quality that the pole will conform to the test and design requirements of this specification.

- 5.2 Placing and Compaction - Concrete may be placed in the forms by pumping or pouring. Sufficient concrete must be placed in the forms to provide the specified cover over reinforcing after the spinning operation. Compaction shall be by centrifugal force. Forms should be spun at sufficient speed long enough to adequately compact the concrete. Water and laitance shall be drained prior to curing.
- 5.3 Curing - Poles may be cured by either water curing or by accelerated curing, or by any other method or combination of methods, approved by the purchaser, that will give satisfactory results. If accelerated curing is used the poles may be cured with either steam or radiant heat in moist environment. If water curing is used the poles may be submerged or covered with water-saturated materials.
- 5.4 Prestressing - Initial prestress shall not be applied until the concrete strength has reached the greater of 3500 psi (24 MPa) or 1.67 times the maximum expected stress in the concrete due to the prestressing forces immediately after transfer and before losses occur.
- 5.5 Forms - Forms shall be rigid and strong enough to support the loads developed during the spinning operations and to produce poles as shown on the contract drawings and in accordance with the dimensional tolerances. Forms shall be tightened to prevent seepage of water during the spinning operation.

## 6.0 LOAD TEST PROCEDURES

- 6.1 The poles shall be tested in either a horizontal or vertical position.
- 6.2 The number, location, direction, holding time, sequence, and increments of the test loads, and the number, location, and direction of deflection readings shall be approved by the purchaser.
- 6.3 The method of attaching the test loads to produce bending and torsional stresses, applying the test loads, measuring and recording the test loads and deflections shall be approved by the purchaser before testing begins.
- 6.4 The producer shall furnish the purchaser copies of the test report. This report shall include all recorded test data as well as drawings describing the test.

## 7.0 TOLERANCES

- 7.1 Dimensional tolerances from nominal or specified dimensions shall be limited to the following:
- 7.1.1 Length - Length may vary by no more than or less than 2 in. (50 mm) or more than or less than 1 in. (25 mm) plus 1/8 in. (3 mm) per 10 ft. whichever is greater.
  - 7.1.2 Outside Cross-Sectional Dimension - Not more or less than 1/4 in. (6 mm).
  - 7.1.3 Bolt Hole or Insert Spacing, within the group not less than or more than 1/16 in. (1.5 mm). Between groups not less than or more than 1 in. (25 mm).
  - 7.1.4 Bolt Hole Diameter - Not more than 1/8 in. (3 mm).
  - 7.1.5 Bolt Hole Location - Not more or less than 1 in. (25 mm).
  - 7.1.6 Luminaire Mounting Location - Not more or less than 3 in. (75 mm) from the designated.
  - 7.1.7 Deviation from Longitudinal Axis - Not more or less than 1/4 in. (6 mm) per 10 ft. (3 m) of length.
  - 7.1.8 Apertures and Handhole Locations - Not more or less than 2 in. (50 mm) from the designated.

## 8.0 DETAIL DRAWINGS

- 8.1 The producer shall furnish the purchaser sets of fabrication and detail drawings that shall include the following information:
- 8.1.1 Dimension and length.
  - 8.1.2 Description and location of the steel reinforcement.
  - 8.1.3 Twenty-eight-day strength of the concrete and detensioning strength.

- 8.1.4 All the necessary stressing information.
- 8.1.5 Size, description, quantity and location of all hardware that is a part of the pole.
- 8.1.6 Cracking and ultimate moment at the ground line or the most critical section along with pole length.
- 8.1.7 Marking of the poles as specified, and
- 8.1.8 Any other special information required by the purchaser.

9.0 OTHER REQUIREMENTS

- 9.1 All correspondence shall be directed to:

City of Austin, Electric Utility Department  
Attn: Tony Shiedhi, Distribution Design Division  
721 Barton Springs Road  
Austin, TX 78704  
(512) 322-6443

10.0 INSPECTION

- 10.1 The quality of materials, the process of manufacture, and the finished poles shall be subject to inspection and approval by the purchaser. The producer shall afford the purchaser reasonable access for making the necessary checks of the production facilities and any required test. All tests and inspections are to be conducted so as not to interfere unnecessarily with the manufacture and delivery of the pole.