# SECTION 02945
# WIRE ROPE BOUNDARY FENCE

## PART I: GENERAL

1.1 GENERAL REQUIREMENTS

A. Furnishing and installation of Wire Rope Boundary fence, and timber posts plus all accessories incidentals and specials necessary for the proper erection and installation of the fence and gates.

B. The Contractor shall construct Wire Rope Boundary fencing including posts, and gates as shown on the Drawings and in accordance with this Specification.

1.2 MEASUREMENT AND PAYMENT

A. Unit Prices:

1. Payment for Wire Rope Boundary Fence shall be on a per linear foot basis to include all necessary hardware, concrete, materials and labor.
2. Payment will be on a center of pull post to center of pull post.
3. Refer to Section 01270 – Measurement and Payment for unit price procedures.

B. Stipulated Price (Lump Sum):

1. If Contract is Stipulated Price Contract, payment for work in this Section is included in Total Stipulated Price.

1.3 REFERENCES

A. ANSI – American National Standards Institute.

1. ANSI 05.1 – Wood Poles – Specifications and Dimensions.

B. ASTM – American Society for Testing and Materials.

1. ASTM A153 – Standard Specification for Zinc Coating (Hot Dip) on Iron and Steel Hardware.
2. ASTM A475 – Standard Specification for Zinc-Coated Steel Wire Strand.
3. ASTM D245 – Standard Practice for Establishing Structural Grades and Related Allowable Properties for Visually Graded Lumber.
4. ASTM D1165 – Standard Nomenclature of Commercial Hardwoods and Softwoods.
5. ASTM D2555 – Standard Practice for Establishing Clear Wood Strength Values.

C. AWPA – American Wood Preserver's Association.

1. C5 – Fence Posts – Preservative Treatment by Pressure Processes.
2. M2 – Standard For Inspection Of Wood Products Treated With Preservatives.
3. P1/P13 – Standard For Creosote Preservative.

4. P2 – Standard for Creosote Solution.
5. P5 – Standards For Waterborne Preservatives.
6. P8 – Standard For Oil-Borne Preservatives.
7. P9 – Standards For Solvents and Formulations For Organic Preservative Systems.

D. CTFS – City of Friendswood Specifications.

1.4 SUBMITTALS

A. Conform to requirements of Section 01330 – Submittal Procedures.
B. Submit proposed design mix and test data for each type and strength of concrete.
C. Submit manufacturer's data and details of following items for approval:
   1. Treated Wood Post.
   2. Wire Cable.

## PART II: PRODUCTS

2.1 TREATED WOOD POSTS

A. Wood Posts shall be made of Southern Pine, including minor species as specified in ASTM D1165.
B. Do not use any post where a straight line drawn from the center of the butt to the center of the top varies more than one-half inch (1/2 In) at any point.
C. Do not use posts with splits or ring shakes in the top. Do not use posts with splits in the butt. If a single is in the butt, then the post shall be permitted to be used provided the shake is not wider than one-half (1/2) the butts diameter for round posts or one-half (1/2) the narrowest width for a rectangular post.
D. Round Posts shall adhere to the following:
   1. Round posts shall conform to ANSI Standard 05.1, except as modified herein.
   2. Round posts shall have a seven inch (7 In) minimum diameter at any point, as determined by a circumference-diameter tape.
   3. Round posts shall not exceed eight inches (8 In) in diameter below the dome.
   4. Do not use posts that vary more than one inch (1 In) from the specified length as listed in TABLE 4.1 – Post Lengths.
   5. Round posts shall have a dome that is one-half inch (1/2 In) diameter of the post at the base of the domed portion. Dome shall have a smooth finish with the distance from the top of the dome to the base of the dome having a variance no greater than one inch (1 In).
   6. Smooth shave round posts by machine. No ringing shall be permitted. The definition of the ground line, for applying the restrictions of ANSI 05.1 shall be one-half (1/2) the length.
   7. No knot shall be longer than three inches (3 In) in any direction.
   8. Do not use any post that has more than eight inches (8 In) for the

total sum of all knots greater than one-half inch (1/2 In) in any one foot (1 Ft) section of post.

9. Do not allow scars, as defined in ANSI 05.1, if the depth of the trimmed scar is deeper than one-quarter inch (1/4 In).

E. Rectangular Posts shall adhere to the following:
   1. Use Grade Number 1 rectangular posts, as designated by the Southern Pine Inspection Bureau, with a minimum $F_b$ of 3.0 ksi (Load and Resistance Factor Design) or better. The strength value and grading shall be in accordance with ASTM D245 and ASTM D2555.
   2. Rectangular post shall be six inches by eight inches (6 In x 8 In), less any routing, notching, or finishing.
   3. Rectangular posts shall not vary dimensions of E.2 above by more than one-quarter inch (1/4 In) maximum.
   4. Do not use posts that vary more than one inch (1 In) from the specified length as listed in TABLE 4.1 – Post Lengths.
   5. Do not exceed two and three-quarter inches (2¾ In) in any direction for a single knot or equivalent displacement on the centerline of the eight inch (8 In) face.
   6. Do not exceed two inches (2 In) in any direction for a single knot or equivalent displacement on the edge of the eight inch (8 In) face.
   7. Do not exceed two and one-quarter inches (2¼ In) in any direction for a single knot or equivalent displacement on the centerline of the six inch (6 In) face.
   8. Do not exceed one and one-half inches (1½ In) in any direction for a single knot or equivalent displacement on the edge of the six inch (6 In) face.

F. Treat posts with preservative in accordance to industry standard and TABLE 4.2 – Minimum Retention of Preservative Treated round post shall have a minimum of one inch (1 In) sapwood depth as determined by examining the top and bottom of the posts. Before treatment, posts shall be inspected for moisture content in accordance with AWPA Standard M2. Conduct tests on representative pieces.

G. The lot shall be deemed acceptable when the average moisture content does not exceed twenty-five percent (25%). Any piece that exceeds twenty-nine percent (29%) moisture content shall be removed from the lot.

2.3 WIRE CABLE

A. Furnish wire cable meeting ASTM A475 and shall adhere to the following:
   1. Three-Eighths inch (3/8 In.) nominal diameter.
   2. Seven (7) wire strand, common grade.
   3. Minimum four thousand pound (4,000 LB) breaking strength.
   4. Minimum zinc coating of three-tenths ounce per square foot (0.30 OZ/SF).
   5. Do not exceed two and three-quarter inches (2¾ In) in any direction

for a single knot or equivalent displacement on the centerline of the eight inch (8 In) face.

2.4 MISCELLANEOUS HARDWARE AND FITTINGS

A. Miscellaneous steel hardware and fittings for use with zinc-coated steel fabric shall be of commercial grade steel or better quality, wrought or cast as appropriate to the article, and sufficient in strength to provide balanced design when used in conjunction with wood posts and wires of the quality specified herein. All steel hardware and fittings shall be protected with a zinc coating applied in conformance with ASTM A153.

2.5 CONCRETE

A. All concrete shall conform to Technical Specification 03300 – Structural Concrete and have a minimum twenty-eight day (28 Dy) strength of three thousand pounds per square inch (3,000 PSI).

## PART III: EXECUTION

3.1 INSTALLATION

A. The fence shall be installed by skilled and experienced fence erectors, and on lines and grades indicated on the Drawings. The finished fence shall be plumb, true to line and ground contour and complete in every detail.

3.2 CONSTRUCTION

A. The Contractor shall perform all clearing of brush and debris, which may be necessary for the installation of the fencing.
B. Thoroughly compact backfill in four inch (4 In) lifts.
C. Post Spacing:
   1. Shall have a maximum spacing of no more than twenty-five feet (25 Ft).
   2. End Brace Posts shall be set in concrete as specified in Paragraph 3.2.D of this Section.
D. Holes
   1. Concrete footings shall be Class A Concrete, NO EXCEPTIONS. Concrete shall be in accordance with Section 03300 – Structural Concrete. All concrete footings shall be cast up to finished grade and crowned one inch (1 In) to shed water. Excess concrete and other material shall be removed and disposed of in accordance with Section 01580 – Waste Material Disposal. Embedded posts shall have a minimum of three inches (3 In) of clearance from the sides and bottom of the post.
   2. No material shall be set on posts line and brace posts for a minimum of seven days (7 Dy) after individual concrete footing has been placed.

E. WIRE CABLE
   1. Drill holes in wood post a minimum of five-eighths inch (5/8 In) in diameter.

F. Splicing
   1. The splice shall be made with approved wire splice with a rated holding capacity higher that the breaking strength of the wire as recommended by the wire manufacturer and using an approved crimping tools as recommended by the wire manufacturer. The splice shall be made in accordance with industry standards and wire manufacturers recommendations. There shall be no more than two (2) splices per one hundred foot (100 Ft) of wire cable. Any splices that fail to meet these requirements shall not be accepted and shall be redone at the Contractor's expense.
   2. There shall be no more than three inches (3 In) of droop between wooden posts for all wire cables.
   3. Multiple cable wire fences shall have a maximum space of thirteen inches (13 in) and a minimum eleven inches (11 in) of droop between posts and each wire cable.

## PART IV: TABLES

TABLE 4.1 POST LENGTHS

| Number of Wires | Length | Bury | Hole Location |
|---|---|---|---|
| 1 | 6' | 3' | 7" from the top |
| 2 | 7' | 3' 6" | 7" and 13" from the top |
| 3 | 8' | 4' | 7", 13", and 19" from the top |

TABLE 4.2 MINIMUM RETENTION OF PRESERVATIVES

| Product | Creosote (LB/CF) | Creosote-Coal Tar Solution (LB/CF) | Penta-Chloro-Phenol (LB/CF) | ACA[1] OR CCA[2] (LB/CF) | AWPA Standard For Treatment |
|---|---|---|---|---|---|
| **AWPA Preservative Standard** | **P1/P13** | **P2** | **(P8/P9)** | **P5** | |
| Rectangular Fence Posts[3] | 12 | N/A | 0.6 | 0.5 | C14 |
| Round Fence Posts[3] | 8 | N/A | 0.4 | 0.4 | C5 |

1. Ammoniacal Copper Arsenate.
2. Chromated Copper Arsenate.
3. Retention determined by assay (0 to 1.0-inches zone).

END OF SECTION