

# CONSTRUCTION SPECIFICATION

## NATURAL RESOURCES CONSERVATION SERVICE

### FENCE - PERMANENT NON-ELECTRIC HIGH TENSILE

(Ft.)

#### CODE 382

#### 1. Scope

The work shall consist of furnishing and installing smooth, permanent non-electric high tensile wire fences, including gates, posts, braces and fittings in accordance with the Conservation Practice Standard, Fence, 382, this construction specification and as shown on related drawings.

#### 2. Wire Spacing

Spacing of line posts and stays depends on terrain and number of wires. Farm border fences and roadside fences must be constructed of at least seven wires, with the total height to the top wire not less than 42 inches.

Cross fences can be constructed of six or more wires, with the fence height being at least 42 inches.

#### 3. Type of Wire

Wire shall be smooth, high tensile 12.5 gauge wire with a minimum of 170,000 psi breaking strength, with Type III galvanizing or aluminum. Typically, triple galvanized 12.5 gauge wire with 170,000 psi minimum breaking strength is installed. The 170,000 psi wire is much easier to work with than the 210,000 psi wire.

#### 4. Pull Assemblies

For high tensile fence, two posts with brace and brace wire shall be spaced at intervals less than ½ mile on straight sections and flat terrain of the fence. Where turns are encountered, additional wire strainers will be installed for proper tension on fence. Wire must be kept tight.

#### 5. Post Spacing, Length and Depth

Install line posts in dips and rises first. Line posts shall be spaced 16 ft. or less apart with no stays required. Line posts may be spaced up to 30 ft. apart with stays or light posts between the posts.

For suspension fences, place posts up to 100 ft. apart. Evenly place stays 33 ft. to 50 ft. apart and do not allow them to touch the ground.

In undulating terrain, space posts and stays so that fence height is maintained. Posts in dips shall be anchored so that they will not pull out of the soil. Posts shall be at least 24 in. in the ground. All wood posts will be at least 2 in. higher than the top wire of the fence to prevent splitting when attaching insulators. All posts of other materials shall be at least 1 in. higher than the top wire of the fence.

Steel posts and other line post shall be driven minimum of 18 in. deep, use standard "T" or "U" shaped steel posts minimum of 5.5 ft. long. In very loose or very sandy soils, posts will be driven deeper and should be longer.

Post spacing in areas shallow to rock may vary based on availability of post sites. Probe to determine desirable post sites. Steel pipe and steel posts are recommended to use in cracks between rocks. Use concrete where possible to secure posts. Rock bits are available in some areas for drilling rock. Use stays to maintain wire spacing. Post set in a 5 gallon bucket of concrete, may be used as a line posts when proper placement of posts in soil is not possible. Bury buckets as deep as possible. Use live trees as posts where needed. See section F.

## **6. Line Posts and Stays**

The following posts and stays may be used:

- Australian ironwood (eucalyptus), 1 x 1.5 inches minimum length and width dimension.
- Fiberglass and polyvinylchloride solid round sucker rod of at least 5/8" in diameter.
- Fiberglass T-posts and stays of at least 1" in width.

For the above posts, attach wire to posts by loose clips or by running through holes in posts. Attach to stays with tight clips to hold in place.

Wood posts will have a minimum diameter of at least 3 inches. Wood posts of black or honey locust, red cedar, Osage Orange, catalpa, mulberry, pressure treated pine, or other wood of equal life and strength. At least one-half of the diameter of the red cedar shall be heartwood. Pressure treatment shall conform to American Wood-Preservers' Association standard, U1-06, UC4A. Below are some common preservative treatments with minimum retention rates:

<u>Treatment</u>	<u>Retention lb/ft<sup>3</sup></u>
Creosote coal tar	10
Pentachlorophenol	.5
Amoniacal copper arsenate	.4
Chromated copper sulfate	.4
Alkaline copper quat (ACQ)*	.4

\*Do not use aluminum fasteners or metals when using wood treated with ACQ. Use hot dipped galvanized treated fasteners or metals.

- Steel posts may be "T" or "U" posts that are a minimum of high carbon steel weight of 1.25 lbs. per one foot of length. They will have an anchor plate and be studded, embossed, or punched for wire attachment. Metal posts will be galvanized, enameled and baked, or painted with weather resistant steel paint.

## **7. Live Trees as Line, Bracing and Corner Posts**

Live trees used for corner, bracing, and line posts shall have a diameter breast height (DBH) equal to or greater than those prescribed for normal wooden posts. Some alignment variation shall be allowed, but caution should be taken to minimize offsets and prevent excess fencing needs. Wires will not be fastened directly to trees.

When using live trees, protection will be provided between the tree and wire. Use fiberglass or rigid plastic strip or treated 2 in. x 4 in. board that meets the American Wood Preservers' Association UC3 standard. Avoid using potentially high-value timber trees. Do not use fast growing trees as end posts.

## 8. Corners and Braces

Braces and end assemblies are required at all corners, gates, and angles up to 150° in the fence line alignment. No brace assembly is required for angles between 150 and 180°; however, do use a 5-in. diameter post as a corner post. Lean the corner post 2 in. or more away from the direction of pull. Refer to Fence drawing AL-ECS-382-07.

Corner, gate, and end or pull assemblies for non-electric high tensile fences will be either H-brace, H+H brace, H+N, or floating angle brace assemblies. Posts will be at least 5-in. nominal wood or 2.5 in. nominal steel pipe (capped). Steel pipe shall be set in concrete 30 in. deep. Wood posts will be sufficient lengths to permit driving or setting the post at least 36 in. deep. Earth backfill shall be thoroughly tamped. If concrete is used, set the posts a minimum of 30 in. deep in a 12-in. diameter hole. Refer to Fence Drawing AL-ECS-382-20.

All wood posts will be at least 2 in. higher than the top wire of the fence to prevent splitting when attaching insulators.

All posts of other materials shall be at least 1 in. higher than the top wire of the fence.

## 9. Bracing

The brace member shall be the equivalent of a 4-in. top diameter post or standard weight galvanized steel pipe of 2-in. diameter installed at least 3 ft. above ground or between the top two wires, whichever is higher. Place brace at least 8 in. below top of post. The brace member shall be at least 6 ft. long or 2.5 times the height of the top wire (i.e., 42 in. x 2.5 = 105 in. or 8.75 ft.).

The brace wire shall be number 9 gauge smooth wire or 12½-gauge high tensile strength smooth wire. Twist sticks or inline strainers will be used to tighten brace wire.

Wooden brace members shall be attached to wooden posts with either 3/8 in. metal pins or nails that penetrate to the middle of the post. Nail holes will be pre-drilled if the nail size is such that splitting of the brace member will occur.

## 10. Staples and Fasteners

Wires will be attached to line posts by a method that allows wires to slip. If stays are used, wires will be attached to stays in a manner that prevents stay slippage along the fence.

Staples shall be of hot-dipped, galvanized 9-gauge steel or heavier with a minimum length of 1½ in. for softwoods and a minimum length of 1 in. for close-grained hardwoods. Barbed staples shall be used for softwood posts. Drive staples diagonally to the wood's grain and at a slight downward angle (upward if pull is up) to avoid splitting posts and loosening of staples. Space should be left between staple and post to permit free movement of wire.

Splicing of high tensile wire will be accomplished by three crimping sleeves, "figure eight knots," or "square knots."

Tying of high tensile wire to end posts will be accomplished using "thread through method" or two crimping sleeves. Tension of wires will be designed to maintain the proper average height of the fence wire and tightness to provide wire contact with animals.

The tension on each wire shall be maintained according to type of grazing animal. Use in-line strainers, staggered, on each wire to maintain the correct tension. Tension springs are optional, but are helpful in maintaining proper tension and absorbing sudden shocks to the wire.