

NATURAL RESOURCES CONSERVATION SERVICE CONSTRUCTION SPECIFICATIONS

FENCE - PERMANENT NON-ELECTRIC HIGH TENSILE

(Ft.)

CODE 382

CONSTRUCTION SPECIFICATIONS

Permanent Non-electric High Tensile Fences

A. Wire Spacing

Spacing of line posts and stays depends on terrain and number of wires. Maximum spacing is as follows.

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 not less than 42 inches.

B. Type of Wire

Wire shall be high tensile, a minimum of 13 gauge, single strand, tensile strength of 110,000 psi minimum breaking strength, with Type III galvanizing or be aluminum or copper clad. 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.

C. Pull Assemblies

For high tensile fence, two posts with brace and brace wire shall be spaced at intervals not to exceed 2,000 feet in straight sections of the fence. Where turns are encountered, additional wire strainers will be installed for proper tension on fence. Wire must be kept tight.

D. Post Spacing, Length and Depth

Install line posts in dips and rises first. Line posts shall be spaced 12 feet or less apart with no stays required. Line posts may be spaced 15 feet apart with stays or light posts between the posts. In undulating terrain, space posts and stays so that fence height is maintained. Posts in dips shall be constructed so that they will not pull out of the soil. Two-inch or smaller posts will be anchored or wooden posts (4") set to sufficient depth to resist pull out. Posts shall be at least 24 inches in the ground. All wood posts will be at least 2 inches higher than the top wire of the fence to prevent splitting when attaching insulators. All posts of other materials shall be at least 1 inch higher than the top wire of the fence.

Steel posts and other line post shall be driven minimum of 12" deep or to the top of the flange, use standard "T" shaped steel posts minimum of 5.5 ft. long.

Post spacing in areas shallow to rock may vary based on availability of post sites. Probe with a rock probe to determine desirable post sites. Steel pipe and steel post are recommended to use in cracks between rock. Concrete in post where possible. Rock bits are available in some areas for drilling rock. Use stays to maintain post spacing. Post set in concrete 30" diameter and 8" deep, may be used as a line post, bury as deep as possible. Use live trees as post where needed, see section F.

- E. **Line Posts** – Wood post or steel post need to be used at a minimum for every other post

Wood posts of black locust, red cedar, Osage orange, redwood, pressure treated pine, or other wood of equal life and strength will be used. At least one-half of the diameter of the red cedar and redwood posts shall be heartwood. Pressure treatment shall conform to Materials Specification 585. Wire shall be attached by insulators. See L. Insulation for guidance. Line posts shall be at least 4 inches in diameter.

Steel posts may be “T” posts that are a minimum of 1.25 pounds per one foot of length.

Stays

1. High density wood, 1"x1.5".
2. Fiberglass, rigid plastic at least 5/8" in diameter.
3. Wood/Plastic composite post 1" minimum diameter.
4. Fiberglass T-posts and stays of at least 1" in cross-section.

For the above posts, attach wire to post by clips or by running cotter keys through holes in post. Cotter keys are preferred. Attach to stays with tight clips to hold in place.

Landscape timbers are not acceptable anywhere in the fence as post or braces.

- F. **Live Trees as Line, Bracing and Corner Posts**

No more than 50% of post shall be trees unless in a flood plain or area shallow to rock. 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.

When using live trees, protection will be provided between the tree and wire (CCA-treated 2" x 4", fiberglass, or rigid plastic strip). Avoid using trees with a short lifespan (i.e., elms and musclewood). When using live trees as end post attach wire to a 3/8" lag eye bolt in the tree.

Avoid using potentially high-value timber trees. Do not use fast growing trees as end posts.

- G. **Corners and Braces**

(See Standard Drawing No. FEN-382-BR1 and BR2.)

Braces and end assemblies are required at all corners, gates, and angles up to 150 degrees in the fence line. Tying off wires at the corner post will lessen stress on the corner post. No brace assembly is required for angles between 150 and 180 degrees however, do use a 6" diameter post as a corner post. Lean the corner post 2" or more away from the direction of pull. Five driven 6" post in the angle can be substituted for one brace assembly in the 150 degree angle.

H-brace, N-brace, or a floating angle brace assemblies are required at all corner, gate, and end or pull assemblies. Posts will be 6-inch nominal wood or 2.5-inch nominal steel pipe (capped). Steel pipe shall be set in concrete 30 inches deep. Posts will be sufficient length to permit driving or setting the post at least 36 inches deep. Earth backfill shall be thoroughly tamped. If concrete is used, set the posts a minimum of 30 inches deep. Posts of equivalent strength may be substituted if they have suitable means of attaching wires and braces.

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

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

Corner, gate, and end or pull assemblies will be an H-brace, N-brace assembly, or a floating angle brace. Posts will be 6" nominal wood or 2.5" nominal steel pipe (capped). Steel posts shall be set in 30" of concrete. Wood posts will be sufficient length for the construction of at least a 42" high fence and permit driving or setting the posts at least 36" deep. Earth backfill shall be thoroughly tamped. If concrete is used, set the posts a minimum of 30" deep.

H. Bracing

(See Standard Drawing No. FEN-382-BR1 and BR2.)

The brace member shall be the equivalent of a 4-inch diameter post or standard weight galvanized steel pipe of 2-inch diameter installed at least 3 feet aboveground or between the top two wires, whichever is higher. An 8' – 10' brace member is ideal but the brace member shall be at least 6' long. Floating brace member will ideally be 10' long but must be a minimum of 8' long when fence is flat or sloping downhill for uphill slopes it must be 10' long. Do not use floating brace in high animal pressure area (e.g. adjacent to feed pad or water trough).

The brace wire shall be number 9 gauge smooth wire, or 12 1/2-gauge high tensile strength smooth wire. Twist sticks or inline strainers will be used to tighten brace wire. Twist sticks must be a minimum of 2" x 2" and remain in place.

I. 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 9-gauge steel or heavier with a minimum length of 1½ inches for softwoods and a minimum length of 1 inch for close-grained hardwoods. Double barbed staples shall be used for pressure-treated posts. Drive staple 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 of in-line strainers will be used on each wire to obtain the correct tension. Tension springs are optional, but are helpful in maintaining proper tension and absorbing sudden shocks to the wire.