

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 appurtenances in accordance with the Conservation Practice Standard, Fence, 382, this construction specification and as shown on related drawings.

2. Wire Spacing

Wire spacing depends on the purpose for the fence and any associated livestock. Farm border fences and roadside fences must be constructed of at least seven wires, with wire a minimum of 42 inches high.

Construct cross fences with three to 8 wires having a minimum fence height of 42 inches.

Refer to **TABLE 1. COMMON WIRE SPACING FOR NON-ELECTRIC SMOOTH HIGH TENSILE WIRE** for wire spacing examples.

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

Install brace or pull assemblies at intervals ≤ 1320 apart on straight sections and flat terrain of the fence. Assemblies should consist of at least two posts with brace and brace wire. Install additional assemblies when landscape features dictates the need, fence turns greater than 30 degrees, or as fence boundaries dictate Wire must be kept tight. Also see section 8, Corners and Braces.

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. They shall be a minimum of 5.5 ft. long and weigh at least 1.25 lbs. /in. 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 in 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. Buckets should be fully buried if at all possible. Avoid using live trees if at all possible. 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.
- Plastic+wood composite posts with a diameter of at least 1 inch.

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 nominal diameter of 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, U1-15, UC4A or later standard.

Below are some common preservative treatments with minimum retention rates:

	Retention (lb/ft ³)
Wood Preservative Treatment	UC4A (general use)
Creosote coal tar	8
Pentachlorophenol	0.4
Copper naphthenate	0.055
Ammoniacal copper zinc arsenate*	0.4
Chromated Copper Arsenate	0.4
Alkaline copper quat (ACQ)*	0.4
Copper azole, type B (CA-B)*	0.21
Copper azole, type C (CA-C)*	0.15
Dispersed copper azole (ESR reports)	0.15

UC4A: General use, agricultural posts, cross bracing.

*Do not use aluminum fasteners or metals when using wood treated with ACQ. Use hot dipped galvanized treated fasteners or metals. Do not use landscape wood products for fence construction.

- 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

Avoid using live trees for fencing if at all possible. However, if necessary live trees may be used. The 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. Protection will be placed 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 directional changes 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, N, H+H, H+N, or floating angle brace assemblies.

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

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. Consider using dead man bracing when using 5 inch brace posts. Refer to Fence Drawing AL-ECS-382-20.

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 between the top two wires, 8' – 12' below the top of the fence post. The horizontal brace member shall be at least 8 ft. long.

The brace wire shall be number 9 gauge smooth wire or 12½-gauge high tensile strength smooth wire. Metal or treated wood 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 passed 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 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.

Use appropriate carter pins, or wires to attach wires to non-wooden posts. Post manufacturer instructions should be followed.

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.

TABLE 1. COMMON WIRE SPACING FOR NON-ELECTRIC SMOOTH HIGH TENSILE WIRE.		
WIRES	ANIMAL TYPE	SPACING FROM GROUND (in.)
3	Cattle, Calves	18, 30, 42
	Cattle, Horses	20, 34, 46
4	Cattle, Calves	12, 22, 32, 42
	Cattle, Sheep, Goats	8, 16, 24, 36
5	Cattle, Horses, Sheep, Goats	8, 16, 24, 36, 48
6-8	Deer, Predator Control	6, 12, 18, 26, 36, 46, 56, 68