

# Fence (Feet) Code 382

Natural Resources Conservation Service  
Conservation Practice Standard

## I. Definition

A constructed barrier to livestock, wildlife or people.

## II. Purposes

To: (1) Exclude livestock or big game from areas that should be protected from grazing, (2) confine livestock or big game on an area, (3) control domestic livestock while permitting wildlife movement, (4) subdivide grazing land to permit use of grazing systems, (5) protect new seeding and plantings from grazing, and (6) regulate access to areas by people, prevent trespassing or for purposes of safety.

This practice may be applied as part of a conservation management system to facilitate the application of conservation practices that treat the soil, water, air, plant animal and human resource concerns.

## III. Conditions Where Practice Applies

On any area requiring control or exclusion of livestock, or where access to people is to be regulated.

## IV. Federal, State and Local Laws

Location and construction of all fences shall comply with all local, state, and federal laws, rules or regulations. This standard does not contain the text of the federal, state or local laws.

## V. Criteria

### A. General Criteria

Fence systems shall be positioned and selected to control the animal(s) or people of concern, meet the intended management objectives and the anticipated life.

Height, number, and spacing of wires shall be installed to facilitate control and management of the animal(s) and people of concern.

Fencing materials shall be high quality and durable. Components for a fence shall meet or exceed the following minimum criteria.

### 1. Fasteners

Staples shall be 9 gauge and have a minimum length of  $\frac{3}{4}$  inch.

Wire fasteners or clips shall be 12 gauge or heavier galvanized wire.

### 2. Safety

When the intended use of the fence is to protect people and animals from safety hazards, the fence shall be a minimum of 42 inches above grade and not allow passage of a 6 inch sphere between any fence member. All openings shall have gates that can be shut and fastened.

## B. Specific Criteria

### 1. Permanent Fences - Electric and Non-electric

a. **Posts** - Posts may be wood, metal, fiberglass, or Polyvinylchloride (PVC) schedule 40, 1" diameter pipe. Wooden posts and braces may be red cedar, black locust, and mulberry. Other species may be used provided they have been treated. For post size and length, refer to Table 1.

b. **Braces** - Adequate braces are required at all corners, gates, and definite angles in the fence. *Pull assemblies*<sup>1</sup> are required in straight runs over 1/4 mile.

<sup>1</sup> Words in the standard that are shown in italics are described in X. Definitions. The words are italicized the first time they are used in the text.

Table 1 - Post Type, Size, and Length

Post Type	Size	Total Length (ft)	Embedded (ft)
Wood (line)	3 inch diameter <sup>1</sup>	6.5	2
Wood (corner, gate, brace, or end)	5 inch diameter <sup>1</sup>	7	3
Wood (horizontal or diagonal bracing)	3 inch diameter <sup>1</sup>	6	X
Steel	“T”, “U”, or “Y” <sup>2</sup>	5.5	1.5
PVC (schedule 40) pipe	1 inch diameter	5	1.7
Fiberglass	¼ inch	5	1.7

<sup>1</sup> Rectangular post can be used if the required diameter can be inscribed on the post.

<sup>2</sup> Steel Post with a minimum weight of 1.25 lb./ft

- c. **Offset Brackets** - *Offset brackets* can be attached to non-electric fence to provide a transmission line and/or to electrify the fence. Offset brackets shall be a maximum of 80 feet apart.

when under maximum anticipated load.

- (2) Equipped with one digital read-out volt meter.

## 2. Permanent Fences - Electric

- a. **Wire** - Smooth wire shall be at least 12 ½ gauge *high tensile steel* with a minimum tensile strength of 180,000 psi and class III galvanized or aluminum coating.

Grounding of energizers shall be according to the manufacturers' directions and specifications.

All energizers above 110 volts shall be equipped with a surge protector. A ground rod shall be installed at the electrical circuit breaker box.

- b. **Post Spacing** - Wood line post for high tensile electric shall not exceed 100 foot spacing with suitable *stays* placed at 30 to 50 foot intervals. Other line post for high tensile electric shall not exceed 45 feet.

A lightning arrester or lightning choke is required.

A conventional energizer is adequate for electric fences around filter strip and other small critical areas.

Line post for *non-high tensile* electric shall not exceed a 45 foot spacing interval.

The terrain should dictate spacing widths below these maximums.

- c. **Energizers and Components** - Energizers for permanent electric fencing shall be:

- (1) *High voltage/low impedance*, short pulse which can produce at least 5000 volts output with all livestock containment fences charged (on)

- d. **Electrical Accessories** - Insulators used for steel and other conductive material posts shall be high density polyethylene with ultra-violet stabilizer or porcelain that withstands 10,000 volts or more current leakage. Insulated cable for underground burial shall be galvanized wire with two layers of insulation. The insulation must be high density polyethylene with ultra-violet stabilizer. Copper wire should not be used due to corrosion.

### 3. Permanent - Non-Electric

- a. **Post Spacing** - Line posts for permanent non-electric fence shall be a maximum of 16 ½ foot spacing, except for chain link which should be at a 10 foot spacing.
- b. **Barbed and Smooth Wire** - Barbed and smooth wire fences shall have a minimum of three strands, a minimum of 14 gauge in diameter. The wire shall be galvanized double strand barbed wire or smooth high tensile steel class III.
- c. **Woven Wire and Panels** - Fence with woven wire less than 32 inches high shall have at least two barbed wires above the woven wire. Fences with woven wire 32 to 48 inches high shall have at least one barbed wire above the woven wire. Fences with woven wire above 48 inches in height do not require a barbed wire above the woven wire.
 

The top and bottom wires in the woven wire shall be 11 gauge or heavier. The line and stay wires shall be 14 ½ gauge or heavier. All wires shall be galvanized.

The barbed wire above the woven wire shall be two twisted strands of 14 gauge or heavier. The wire shall be galvanized.
- d. **Chain Link** - Chain link fences shall be a minimum of 5 feet in height. The wire shall be 9 gauge or heavier.

### 4. Temporary Electric Fences

Temporary electric fence is constructed with the intent of being left in place for less than 30 days.

- a. **Post** - Plastic and fiberglass post shall be a minimum of 3 feet in length, ¼ inch in diameter and a maximum spacing of 35 feet.
- b. **Wire** - Wire shall be polyethylene wire or tape with steel or aluminum wire woven into them. Temporary net fence

may be used for animals such as sheep, goats, hogs, and crowding areas.

**VI. Considerations** – Additional recommendations relating to design which may enhance the use of, or avoid problems with, this practice, but are not required to ensure its basic conservation function are as follows:

- A. Battery powered fences require more management to assure timely replacement of batteries. Extra batteries should be kept on hand to use when charging.
- B. Consider the kinds and habits of livestock and wildlife when designing and locating handling, watering and feeding facilities.
- C. Solar powered energizers may be applicable in some areas and may be used where appropriate.
- D. Training areas should be used to condition livestock to fences. Select a well fenced area with an interior cross fence where the animals will come in contact with the fence. Normally a 24 hour exposure to the electric fence is adequate. When animals are approaching the fence with caution or staying a distance away, they are trained.
- E. Gates should be placed at corners or other convenient locations to facilitate livestock movement. Position gates on flat, firm ground to avoid erosion and water holes.

### VII. Plans and Specifications

Plans and specifications are to be prepared for specific field sites. Document location of fences on the plan map. Indicate fence type and materials used on job sheet and provide detail drawings where necessary, such as corner braces, etc.

### VIII. Operation and Maintenance

Materials shall be replaced when necessary to maintain the integrity of the fence. Electric fences will be regularly checked to determine the voltage on the fence. Maintain proper tension on the fence wire. Clear brush from the fence lines to reduce voltage loss. Walk all fences regularly to remove fallen limbs, check wire tension, and replace broken or worn components. Overhanging trees and limbs should be trimmed or removed as needed to prevent

them from falling onto the fence. Electrified flood gates must be maintained. Keep clear of debris.

## **IX. References**

Gallagher Power Fence Manual. 10<sup>th</sup> edition.

Northeast Regional Agricultural Engineering Service, High-Tensile Wire Fencing. Ithaca, N.Y.

University of Wisconsin, Center for Integrated Ag. Systems, Grazing References Materials Manual, January 1997.

USDI-Bureau of Land Management, USDA- Forest Service, Fences. Pub. # 2400, Range 8824 2803, July, 1988.

## **X. Definitions**

*High Tensile Wire* (V.B.2.a.) - Refers to the amount of zinc coating on the wire. All high tensile wires have Class III zinc coating. Class 3 wire carries three times as much zinc coating per unit area as Class 1 wire. High tensile wire exceeds 100,000 psi breaking strength.

*High voltage - Low Impedance* - An energizer, which has a pulse length of less than .003 seconds.

*Non-High Tensile Fence* - Any fence that does not fit the criteria for High Tensile Wire.

*Off Set Brackets* - Brackets used on barbed or smooth wire fences to renovate existing fence lines.

*Pull Assembly* - An in-line single or double span brace assembly which aids in tightening the wires.

*Stay* - A post comprising wood, fiberglass or insul-timber which is used between the corner or end run post to maintain stability and desired fence height within the fence.