



## Practice Specification Fence (Code 382)

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### INTENDED USE OF FENCE

Fences are constructed as barriers to control the movement of animals, people, and vehicles and may be designed or installed as permanent or temporary use.

The type and class of livestock, as well as the degree of control needed, will have a specific influence in the type of fence selected. Consider the following in the planning process:

- The number and spacing of fence wires
- The spacing of vertical stays (for woven wire fence)
- The height of the fence
- The need for an electric component to the system
- The terrain
- The lifespan of the materials
- The operation and maintenance of the fence

**Permanent fencing** is intended to be in place for long periods of time with minimum maintenance requirements; therefore, it should be built with durable materials and constructed to endure a longer life span. Permanent fences are most often used for exterior grazing, property boundaries, or when excluding animals or humans.

**Temporary or moveable fences** are designed to be in place for short periods of time. Temporary fences are best used as subdivision fences for frequent movement or control of animals and where the location of the fence may change. This fencing offers maximum flexibility to enhance grazing efficiency, livestock movement, and afford temporary stream and riparian protection.

### Fence Type or Style

**Barbed wire fence** is commonly used as a multi-strand permanent fencing material for perimeter fences, land use boundaries, exclusion, livestock containment and isolation areas, and interior cross fencing to facilitate grazing management. Barbed wire fencing is not recommended for horses, sheep, goats, or hogs.

**Woven, net and mesh wire fences** are used as permanent fences for both perimeter and subdivision fences. Wire-spacing and height varies depending on the type of animals being controlled.

**Woven wire fences** consist of a series of horizontal (line) wires and vertical (stay) wires and are offered in two main types including “hinge joint” and “continuous stay fixed knot.”

In a hinge joint woven wire fence the vertical stays wrap around the line wires. In a continuous stay fixed knot fence the vertical stay wires are fixed with another separate wire to the line wire. Both main fence types come in various designs (line and stay spacing), tensile strength grades, and metallic coating types and grades. High tensile continuous stay fixed knot woven wire 12½ gauge may be used for all animals as specified by manufacturer.

**High tensile smooth wire fence** is commonly used as a multi-strand permanent fence for both perimeter and subdivision purposes. It can be used to control most animals when properly spaced. Smooth wire may be steel, aluminum, or vinyl coated and electrified or non-electrified.

**Electric fences** may be permanent or temporary. The electrical power source can be from 110v or 220v electrical current or from a battery. Batteries may be re-charged by solar or electrical power. Livestock must be trained to respect electric fence.

**Board fences** are usually wood, or some composite material used for permanent and subdivision purposes. Board fence is used primarily where aesthetics or animal safety is of concern, and most often used around horses or working facilities.

**Other fence types** may include chain-link, steel pipe, vinyl, galvanized panel, guard rail, and cable fences. These are commonly used around homesteads and corrals. They may be used to restrict access to unsafe or prohibited areas.

**Heavy use feed area containment fencing** is used to control access into and out of feeding areas to minimize damage to soil and pasture. This fencing is usually constructed of board, steel pipe, cable, or high tensile smooth wire and is built to sustain heavy use of livestock around a confined area.

**Non-conventional fencing** includes variations of alternative fence systems that may be acceptable when installed according to manufacturer's recommendations and are pre-approved by NRCS. Alternative fence systems are often applicable for horses and animals having special needs.

## **MATERIALS SPECIFICATIONS**

Acceptable fencing criteria for various fencing needs may be selected from Tables 1 and 2, found in the Field Office Technical Guide (FOTG).

The materials used in the construction of a chosen fence type must be of high quality and meet the size, strength, durability, and lifespan requirements found in this specification including Tables 3 – 9, found in the FOTG.

All variances must be submitted in writing

## **CONSTRUCTION SPECIFICATIONS**

### **Fence-Line Clearing**

Clear fence lines prior to construction.

### **Setting Posts**

Set and maintain all posts in a vertical position or leaning slightly (1-2" off vertical) away from direction of wire tension.

Set posts approximately 4" off vertical in curves. Posts may set on slopes greater than 21%. Posts set with a driver have about 9 times the holding strength of hand-set posts. If hand set, holes should be at least 6" larger than the diameter of the posts, and all backfilled material shall be thoroughly tamped in layers no thicker than 4 inches. Fill the post hole to the ground surface.

Concrete backfill is not necessary when posts are driven, or hand set with proper tamping; however, if used, it shall be rodded into place in layers not thicker than 12 inches and shall completely fill the post hole to the ground surface. Do not apply stress posts set in concrete for 24 hours.

### **Line Posts**

Specifications of line posts are found in Table 4. The maximum spacing of line posts for permanent fences is found in Table 1 and will be the same for all types of posts. **Spacing will vary depending on terrain and livestock pressure.** Ensure that adequate fence height is maintained based on its purpose.

Note: Do not use landscaping timbers for any posts or bracing.

### **Installing Curves**

Installing curves in high tensile, woven wire, and barbed wire fences is permissible if the change in direction from one post to the next does not exceed 20 degrees. Posts on curves shall be 5-inch minimum top diameter for changes up to 14 degrees and 6-inch minimum top diameter for changes up to 20 degrees.

Posts on curves should be driven 48 inches deep with 4 inches of lean to the outside of the curve and spaced no closer than 4 feet apart. (In an 8-foot long section, 14 degrees is approximately 24 inches off straight line and 20 degrees is approx. 35 inches off straight line).

### **Line Posts – Stream Crossing**

Anchor (pull) posts are required on both sides of a stream crossing. For crossings less than 16 feet wide, standard line posts set on both sides is acceptable. For crossings wider than 16 feet, or when non-electrified heavy flood gate is used, a single H-brace assembly or other suitable brace will be used.

Where needed, flood gates will be attached below bottom wire and will be designed to allow water and debris to pass and still control livestock. A hinged or breakaway floodgate works best.

Posts that are set in low areas or gullies may need to be weighted or anchored to prevent lifting out.

### **Stays or Battens Between Line Posts**

Stays, wire spacers, or battens may be used to maintain desired wire spacing between line posts. Note that specifications for post spacing differs with and without stays (Table 1). Stays shall be secured to remain in position along wire line.

### **Offset Brackets**

Offset brackets made of galvanized high tensile spring wire with an insulator of high-density polyethylene with ultraviolet stabilizer or porcelain can be attached to standard barbed wire fence or woven wire fence to provide transmission line and or to protect a standard fence. Other corrosion resistant offset brackets with insulators that attach directly to the fence posts can also be used.

Place offset brackets up to 60 feet apart and attach to wires of standard fence next to post. If control of animals is desired, place offset brackets at 2/3 the height of the animals to be controlled. Make sure no wires of the old fence contact the electric fence wire to prevent electrical grounding. Use offset brackets that hold the electric wire at least 4 inches from the non- electrified fence material.

### **Post Bracing**

Bracing of anchor (pull) posts is required at all corners, gates, fence ends, and at definite slope and alignment changes in the fence line. The type of fence, number of fence wires, and length of span will determine the type, size, and spacing of bracing required to support a fence. See table 8.

The purpose of bracing is to withstand the forces of the fence load and transfer them to the surrounding soil. They come in several configurations depending on the purpose and number of posts utilized. The width of braces should be at least 2 times the height of the fence fabric they are supporting, but 2 ½ times is recommended.

See Tables 5 and 6 for selection criteria and design specifications of single and double brace assemblies.

**Corner braces** are required at all points where the fence alignment has a change of 20 degrees or more from one post to the next. (In an 8-foot long section, 20 degrees is approx. 35 inches off straight line).

**End braces** are required where the fence ends, on both sides of gate openings, and where the fence has pull from only one direction.

**In-line anchor (pull) post** assemblies are in straight sections of the fence line and where there are sudden changes in elevations, such as at the bottom and top of slopes. Tie off all wires at in-line anchor (pull) assemblies and start new wires for the next fence section. Posts that are set in low areas or gullies may need to be weighted or anchored to prevent lifting.

**Single post braces** may be used with 1- or 2-strand high tensile electrical wire fence (Table 7).

### **Brace Rails**

Refer to Table 6 for brace rail criteria and specifications.

- Placement of the horizontal brace rail will be between the top 2 wires of the fence or fence fabric and a minimum of 3 feet above ground.
- The horizontal brace rail will be 6 to 12 feet long.
- The length of the horizontal brace shall be at least 2 times the height of the fence fabric it is supporting.
- The longer the brace rail, the stronger the brace. (e.g. a single H brace with a 10' brace rail is strong enough to take the place of a double 8' H brace).
- The brace post and anchor (pull) posts should be fastened to the compression brace using galvanized brace pins (1/2" X 10" and 1/2" X 4") drilled through the vertical post and into end of the horizontal brace, 2 inches deep.
- Do not notch wooden vertical posts as this will increase the chance of wood rot.

### **Diagonal Floating Brace Assembly**

The diagonal floating brace assembly can be substituted at corner, gate, end post H-brace assemblies, and in-line pull assemblies. The brace post specifications for diagonal floating brace assemblies are consistent with the specifications in Table 5.

The diagonal floating brace rail specification is found in Table 6. The brace member will be installed below the top wire and be at least 2 ½ times the height of the top wire.

Brace blocks for the diagonal floating brace will have a minimum of 100 square inches of top surface area and can be made of a flat rock, solid concrete block, or a paving stone.

**Note: Do not use landscaping timbers for any posts or bracing.**

### **Adjoining Fences**

A fence adjoining an existing fence must terminate in a brace assembly as required per the fence brace specifications in Table 5, 6, and 7.

### **Tension of Brace (Guy) Wires**

For guy wires, use 2 complete loops of 12½-gage high tensile wire, or 1 loop of 9-gauge soft wire, or a single 3/16"-galvanized cable with cable lock.

For horizontal braces, brace wire will be double wrapped and stapled to brace post at a height of just above the brace member and to the anchor (pull) post at a point approximately 2-3 inches above the ground level.

Brace (guy) wire will be tightened using a wire tightener or strainer. Another suitable method is to use a twist stick of 18-24" approximately midway along brace wire to provide moderate tension and to remain in place.

## **INSTALLATION OF WIRE**

In accordance with the wire specification requirements shown in Table 3, barbed and woven wire will be stretched to sufficient tension prior to being fastened to posts. Temperature variations must be considered (wire will tighten in cold weather and expand in hot weather).

### **Tensioning the wire**

**Woven Wire** - In warm weather, wire shall be stretched until 1/3 of the height of the "tension curve" is removed. In cold weather, remove ½ of the tension curve. In fixed-knot high tensile woven wire, the tension crimp should be ½ the size of an un-tensioned crimp.

**Barbed Wire** - In warm weather, a 100-ft stretch of wire should sag no more than 4 inches in the middle (prior to attaching to posts) and no more than 2 inches in cold weather.

**High Tensile Wire** - Tension should be 200 lbs. for cattle and horses, and 300 lbs. for goats and sheep.

For electrified high tensile wire, the tension should be enough to maintain the proper average height and spacing of the fence wires.

### **Tension springs**

In-line wire spring-tensioners are designed to indicate lbs. of tension on the line, assuming placement within the line is appropriate. On most fences the use of one tensioner per pull will be an indicator of the tension on adjacent wires.

Note: Springs provide only 3-6 inches of elasticity.

### **Staples and fasteners**

Install staples into the post to allow free slippage of wire.

Drive the staples diagonally across the grain of the wood and at a slight downward angle (except in concave topography) and do not drive so tightly as to bind the wire against the post.

Electrically charged smooth wires must be attached to conductive posts with an appropriate ceramic UV resistant HDPE (High Density Polyethylene), or HDPP (High Density Polypropylene), or tube-type plastic reinforced insulators.

For steel line posts, the fencing will be fastened with either 2 turns of 14-gauge galvanized steel wire or the post manufacturer's special wire clips. For all other types of posts, attach as specified by manufacturer.

**Tie off of wire or insulators:** High tensile wire is tied off using the "thread through method" (a half hitch and 3 wraps) or with compression sleeves. A length of high tensile wire is fastened around the groove of the insulator, then looped around the post and stapled on the opposite side of the post. An alternative is the tubular plastic reinforced insulator to prevent cracking of the plastic and grounding of the wire. All insulators must be rated for use with high tensile fence.

### **Wire attachment to posts**

#### **Attaching Fence Wire to Anchor (Pull) Post:**

For **Barbed** wire fences with wooden posts, attach wires to anchor (pull) post by one complete wrap around the post, double staple, and end tightly wrapped around the stretched wire five times. For steel posts, attach wires to anchor (pull) post by one complete wrap around the post, wire to the post, and end tightly wrapped around the stretched wire five times. Compression sleeves may be used to connect ends of brace wire.

For **Woven or Mesh wire**, determine amount of wire needed to fully wrap around post once, then remove enough vertical stays to provide that length. The wire ends are then attached as described in previous paragraph.

For **High Tensile** wire, the line wires are attached to each anchor (pull) post by wrapping the post and securing with a half hitch with 3 wraps or using double crimp sleeves.

**Fixed-knot woven wire** fence will be stapled to wood post or fastened to steel post at every horizontal wire using manufacturer's special wire clips.

**High Tensile** wire that pulls through corners or bends may be suspended from the inside of posts in corners and bends using ceramic or appropriate UV resistant HDPE or HDPP donut-type plastic high strain insulators. The tubular plastic reinforced high strain insulators can wrap around the outside of bends and corner posts.

**Barbed wire** will be attached at each post with 1.5-inch staples driven to allow for slippage. The top wire will be at least 2 inches below the top of wood posts, and at least 1 inch below the top of steel posts. Wire will be spaced no more than 10 inches apart and may be spaced closer based on type of livestock.

**Woven wire** fencing will be attached, at a minimum to every other horizontal strand and staples will be driven to allow for slippage.

**Post side wire placement:** the wire will be placed on the livestock side of line posts and on the outside of curves and bends. High tensile electric wire may be suspended from the inside of posts in corners and bends using ceramic or appropriate UV resistant HDPE or HDPP plastic donut type insulators. The tubular plastic reinforced high strain insulator can be used on the outside of corners, curves, or bends.

### **Wire Splicing**

There are four basic ways to splice wire:

1. Figure 8 knot
2. Western Union splice
3. Square knot (reef knot)
4. Crimping sleeves (per manufacturer recommendation)

**Barbed wire and woven wire** will be spliced by means of a western union splice or by compression sleeves.

### **Gates**

Gates weighing less than 100 lbs. may be hung from a single end post. Heavy metal or wooden gates greater than 6 feet wide will be attached to the anchor (pull) post of an H-brace or diagonal floating brace. Install gates capable of withstanding expected pressures from livestock and wildlife.

Electrified perimeter fence gates may consist of installing 2 straight or coiled wires, 12 ½ gauge, that are non-electrified when opened.

Gates between electrical subdivision fences may be composed of polywire, polyrope, polytape, or coiled spring connected to spring loaded handles.

A 12 ½ gauge overhead or insulated underground transmission line will be used to carry electricity across all gate openings (including electrified gates) to electrify the remainder of the fence.

### **Gates Over Streams and Ditches**

Hanging gates should terminate approximately 6 inches above average normal water level. Non-electric flood gates should be hinged such that the gate will swing with the rising water during storm events.

An electrified flood gate may be used to minimize debris problems on stream crossings. The electrified flood gate is constructed by stretching an electrified wire across the drainage above high water flow level. Attach hanging galvanized chains or wire to the electrified wire with compression sleeves at a spacing of 6 inches for goats, hogs, and sheep, or 12 inches for cattle and horses. It is advisable to connect the gate to an electric fence with double insulated cable through a cut-off switch and flood gate controller.

### **Stream Bank Protection**

Permanent fencing will be placed at least 10 feet from the top of the stream bank. Fencing must allow for more area in meanders and in areas with bank erosion to minimize corner bracing.

Permanent fencing setback distance from drainage ditches should allow enough room for vegetation management and fence maintenance.

### **Safety**

Do not electrify barbed wire.

Fencing operations can result in painful and serious injury. Wear heavy gauntlet leather gloves to protect hands and wrists, and boots or high-top shoes to protect legs and ankles.

Tough, close fitting clothing will reduce risks of catching on wire. Wear safety glasses to protect eyes from injury. When stretching woven, fixed- knot, or barbed wire, stand on the opposite side of the post from the wire and stretcher unit.

Do not use a tractor to stretch wire fencing because of potential breaking of the wire resulting in serious injury from the recoil of the clamp bar, chain, or wire. Keep chains and wire stretching clamps in good condition.

Carry staples, nails, or other fasteners in a metal container or in an apron and not in your trouser pockets. Do not hold fasteners in your mouth, which is a common, but extremely dangerous habit.

If you handle preservative treated posts, wear heavy gauntlet leather gloves and avoid skin contact. Minimize the inhaling of sawdust.

Electrical fences should be clearly labeled or identified with the appropriate warning signs.

### **Use of Trees**

Live trees may be used in place of line posts ONLY under the following criteria:

- Trees should not be used for corners or braces of the fence.
- Alignment of the fence will be kept as straight and consistent as possible (within a few degrees).
- Use low value, but healthy trees.
- Diameter at Breast Height (DBH) must be 5" or greater. In addition, the tree should be of sufficient size such that swaying or other movement will not affect the efficient operation of the fence.
- Live trees will be protected by a pressure treated buffer board. This will keep the tree from growing around the wire. The board should be at least: 3.5 inches wide, 1.5 inches thick and extend 3" above and below the top and bottom wire. Fiberglass or rigid plastic may also be used. Staple the wire to the board as would typically be done with a wooden post (follow guidance for staples in (382) Practice Specification within WV FOTG. Board will be fastened to the tree using a minimum of 2 hot dipped galvanized 20d nails.
- Board should not extend to the bottom of the tree.

### **Considerations and Helpful Hints in Construction**

It is recommended to consult a professional fencing contractor in the planning phase of any fence system. Woven wire for sheep and goats should have vertical wire wide enough (9" to 12") or narrow enough (<4") to minimize catching their heads. Otherwise, use an electric offset wire to keep animals away from woven wire that might entangle them.

Never use household electrical wire for any part of an electrified fence. Splicing wires of different metals often results in oxidation and corrosion which causes short circuits and poor conductivity.

A voltmeter is essential to monitoring and maintaining electrical power fences.

Avoid placing electrical fences parallel with telephone or commercial power lines since a static field can sometimes be created.

It is recommended that fences be located 20 feet or more from streams with a maintenance gate to allow for emergency access to water. This distance can also lessen fence maintenance by reducing flood damage. Temporary fencing may be used to protect streambanks while grazing adjacent to the stream.

### **REFERENCES**

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**WV NATURAL RESOURCES CONSERVATION SERVICE CONSERVATION PRACTICE STANDARD FENCE (382)**

**Table 1. Permanent Fence Selection Criteria**

Fence design and construction must meet the minimum requirements for controlling specific animal types.

| Animal Type to Control | Fence Type                                                              | Purpose of Fence |              |                      |                         | Spacing inches above ground level<br>woven wire fences start 2-4" above the ground | Line Post & Stay Spacing<br>(Maximum spacing) |                 |              |
|------------------------|-------------------------------------------------------------------------|------------------|--------------|----------------------|-------------------------|------------------------------------------------------------------------------------|-----------------------------------------------|-----------------|--------------|
|                        |                                                                         | Perimeter        | Travel Lanes | Interior Subdivision | Surface Water Exclusion |                                                                                    | Posts w/o stay                                | Posts with stay | Stay Spacing |
|                        |                                                                         | Minimum Criteria |              |                      |                         | Inches                                                                             |                                               |                 |              |
| Cattle                 | Barbed 3-wire                                                           | NA               | Meets        | Meets                | NA                      | 18, 28, 38                                                                         | 16.5                                          | 20              | 10           |
| Cattle                 | Barbed 4-wire                                                           | Meets            | Exceeds      | Exceeds              | Meets                   | 14 to 44 evenly spaced                                                             | 12                                            | 20              | 10           |
| Cattle                 | Barbed 5-wire                                                           | Exceeds          | Exceeds      | Exceeds              | Exceeds                 | 10 to 46 evenly spaced                                                             | 12                                            | 20              | 10           |
| Cattle                 | Non-Electric 6-wire high tensile smooth                                 | Meets            | Exceeds      | Exceeds              | Meets                   | 12 to 44 evenly spaced                                                             | 16.5                                          | 30              | 10           |
| Cattle*                | Non-Electric 8-wire high tensile smooth                                 | Exceeds          | Exceeds      | Exceeds              | Exceeds                 | 12 to 44 evenly spaced                                                             | 16.5                                          | 30              | 10           |
| Cattle                 | Electric 1-wire high tensile smooth                                     | NA               | NA           | Meets                | NA                      | 26-32                                                                              | 100                                           | NA              | NA           |
| Cattle                 | Electric 2-wire high tensile smooth (both hot)                          | NA               | Meets        | Exceeds              | Meets                   | 20, 32                                                                             | 100                                           | 150             | 50           |
| Cattle                 | Electric 3-wire high tensile smooth (min. 2 hot)                        | NA               | Exceeds      | Exceeds              | Exceeds                 | 18, 30, 42                                                                         | 50                                            | 150             | 50           |
| Cattle                 | Electric 4-wire high tensile smooth (min. 2 hot)                        | Meets            | Exceeds      | Exceeds              | Exceeds                 | 12 to 42 evenly spaced                                                             | 50                                            | 150             | 50           |
| Cattle                 | Electric 5-wire high tensile smooth (min. 2 hot)                        | Exceeds          | Exceeds      | Exceeds              | Exceeds                 | 12 to 44 evenly spaced                                                             | 50                                            | 150             | 50           |
| Cattle                 | Woven wire (hinge joint) plus one or more HT or barbed top wires        | Meets            | Exceeds      | Exceeds              | Meets                   | 47 min, 6 max between top wires                                                    | 16.5                                          | NA              | NA           |
| Cattle                 | HT woven wire (hinged joint) plus one or more HT or barbed top wires    | Meets            | Exceeds      | Exceeds              | Meets                   | 47min, 6 max between top wires                                                     | 20                                            | NA              | NA           |
| Cattle                 | HT Woven wire (fixed knot)                                              | Meets            | Exceeds      | Exceeds              | Meets                   | 47 min                                                                             | 25                                            | NA              | NA           |
| Cattle                 | Wood or Composition 4 board (6" wide)                                   | Exceeds          | Exceeds      | Exceeds              | Exceeds                 | 6, 6, 8, 10 between boards                                                         | 8                                             | NA              | NA           |
| Goats & Sheep**        | Electric 3-wire high tensile smooth (all hot)                           | NA               | Meets        | Meets                | NA                      | 8, 18, 30                                                                          | 50                                            | 100             | 20           |
| Goats & Sheep**        | Electric 4-wire high tensile smooth (all hot)                           | NA               | Exceeds      | Exceeds              | Meets                   | 6 to 36 evenly spaced                                                              | 50                                            | 100             | 20           |
| Goats & Sheep**        | Electric 5-wire high tensile smooth (all hot)                           | Meets            | Exceeds      | Exceeds              | Exceeds                 | 6, 12, 18, 28, 38                                                                  | 50                                            | 100             | 20           |
| Goats & Sheep          | Woven wire plus one HTE offset inside                                   | Meets            | Meets        | Meets                | Meets                   | 42 min, one HTE offset 2/3 animal ht.                                              | 16.5                                          | NA              | NA           |
| Goats & Sheep          | Woven wire plus one or more HT or Barbed top wires to 48"               | Meets            | Meets        | Meets                | Meets                   | 36 min, 6 max between top wires                                                    | 16.5                                          | NA              | NA           |
| Goats & Sheep          | HT fixed knot woven wire plus one or more HT or Barbed top wires to 48" | Meets            | Exceeds      | Meets                | Meets                   | 36 min, 6 max between top wires                                                    | 25                                            | NA              | NA           |
| Horses***              | Electric 2-wire high tensile smooth (both hot)                          | NA               | Meets        | Meets                | Meets                   | 28, 38                                                                             | 50                                            | 100             | 20           |
| Horses***              | Electric 3-wire high tensile smooth (min 2 hot)                         | NA               | Exceeds      | Exceeds              | Exceeds                 | 28, 38, 48                                                                         | 50                                            | 100             | 20           |
| Horses***              | Electric 4-wire high tensile smooth (min 2 hot)                         | Meets            | Exceeds      | Exceeds              | Exceeds                 | 18 – 54 evenly spaced, minimum 2 hot                                               | 50                                            | 100             | 20           |
| Horses                 | Woven wire w/1 wire HT on top                                           | Meets            | Exceeds      | Exceeds              | Meets                   | 48 + HT at 54                                                                      | 16.5                                          | NA              | NA           |
| Horses                 | HT woven wire (fixed knot)                                              | Meets            | Exceeds      | Exceeds              | Meets                   | 60                                                                                 | 25                                            | NA              | NA           |
| Horses                 | Mesh "No climb" 2"x4" spacing                                           | Exceeds          | Exceeds      | Exceeds              | Exceeds                 | 48 + HT at 54                                                                      | 16.5                                          | NA              | NA           |
| Horses                 | Wood or Composition boards (6" wide)                                    | Exceeds          | Exceeds      | Exceeds              | Exceeds                 | 18 min, 12 max. between boards                                                     | 8                                             | NA              | NA           |

**WV NATURAL RESOURCES CONSERVATION SERVICE CONSERVATION PRACTICE STANDARD FENCE (382)**

**Table 1. Permanent Fence Selection Criteria Continued**

Fence design and construction must meet the minimum requirements for controlling specific animal types.

| Animal Type to Control | Fence Type                                                 | Purpose of Fence |                  |                      |                         |                                                                               | Spacing inches above ground level<br>woven wire fences start 2.4" above the ground | Line Post & Stay Spacing<br>(Maximum spacing) |                 |              |
|------------------------|------------------------------------------------------------|------------------|------------------|----------------------|-------------------------|-------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-----------------------------------------------|-----------------|--------------|
|                        |                                                            | Perimeter        | Travel Lanes     | Interior Subdivision | Surface Water Exclusion | Inches                                                                        |                                                                                    | Posts w/o stay                                | Posts with stay | Stay Spacing |
| Hogs                   | Electric 2-wire high tensile smooth (both hot)             | NA               | Meets            | Meets                | Meets                   | 6-10, & 16-18                                                                 |                                                                                    | 20                                            | 30              | 15           |
| Hogs                   | Electric 6-wire high tensile smooth (min 2 hot)            | Meets            | Exceeds          | Exceeds              | Exceeds                 | 6, 12(+), 18(+), 26, 34, 42                                                   |                                                                                    | 20                                            | 30              | 15           |
| Hogs                   | Woven wire 32" w/ 1 barbed wire                            | Meets            | Exceeds          | Exceeds              | Meets                   | 32 + 1 barb above, and one barbed 2 off ground and 2 below woven wire         |                                                                                    | 16.5                                          | NA              | NA           |
| Hogs                   | Woven wire 32" w/ 1 HT electric inside                     | Meets            | Exceeds          | Exceeds              | Meets                   | 32 + 1barbed or HTE 6 above and one HTE wire 8 off ground, 8 inside of fence. |                                                                                    | 16.5                                          | NA              | NA           |
| Hogs                   | HT woven wire (fixed knot) 32" w/ 1 barb or HTE            | Meets            | Exceeds          | Exceeds              | Meets                   | 35 + 1 HTE offset like above                                                  |                                                                                    | 25                                            | NA              | NA           |
| Deer <sup>***</sup>    | HT woven wire (fixed knot) 96" tall                        | Meets            | Meets            | Meets                | Meets                   | 96                                                                            |                                                                                    | 25                                            | NA              | NA           |
| Deer <sup>***</sup>    | Electric 7-wire High tensile smooth wire slanted           | Meets            | Meets            | Meets                | Meets                   | See diagram of slant measurements                                             |                                                                                    | 30                                            | 100             | 25           |
| Deer <sup>***</sup>    | Electric 9-wire High tensile smooth wire                   | Meets            | Meets            | Meets                | Meets                   | 8 to 72 evenly spaced                                                         |                                                                                    | 30                                            | 100             | 25           |
| Deer <sup>***</sup>    | Electric 12-wire High tensile smooth wire                  | Exceeds          | Exceeds          | Exceeds              | Exceeds                 | 6 to 72 evenly spaced                                                         |                                                                                    | 30                                            | 100             | 25           |
| Deer <sup>***</sup>    | Electric 15-wire High tensile smooth wire                  | Exceeds          | Exceeds          | Exceeds              | Exceeds                 | 2 to 96 evenly spaced                                                         |                                                                                    | 30                                            | 100             | 25           |
| Buffalo                | Electric 4-wire high tensile smooth                        | NA               | Meets            | Meets                | Meets                   | 16 to 42 evenly spaced                                                        |                                                                                    | 30                                            | 100             | 25           |
| Buffalo                | Electric 5-wire high tensile smooth                        | NA               | Exceeds          | Exceeds              | Exceeds                 | 16 to 48 evenly spaced                                                        |                                                                                    | 30                                            | 100             | 25           |
| Buffalo                | Electric 6-wire high tensile smooth                        | Meets            | Exceeds          | Exceeds              | Exceeds                 | 12 to 52 evenly spaced                                                        |                                                                                    | 30                                            | 100             | 25           |
| Buffalo                | HT woven wire (fixed knot)                                 | NA               | Meets            | Meets                | Meets                   | 48                                                                            |                                                                                    | 25                                            | NA              | NA           |
| Buffalo                | HT woven wire (fixed knot)                                 | Meets            | Exceeds          | Exceeds              | Exceeds                 | 60                                                                            |                                                                                    | 25                                            | NA              | NA           |
| Chickens/turkey        | Woven wire 2"x4" 1 wire HT or barb above                   | Exceeds          | Exceeds          | Exceeds              | Exceeds                 | 72                                                                            |                                                                                    | 16.5                                          | NA              | NA           |
| Emu and ostrich        | Woven wire 6"x6" 1 wire HT or barb above                   | Exceeds          | Exceeds          | Exceeds              | Exceeds                 | 72                                                                            |                                                                                    | 16.5                                          | NA              | NA           |
| Chickens/turkey        | HT Woven wire 2"x4" 1 wire HT or barb above                | Exceeds          | Exceeds          | Exceeds              | Exceeds                 | 72                                                                            |                                                                                    | 18                                            | NA              | NA           |
| Emu and ostrich        | HT Woven wire 6"x6" 1 wire HT or barb above                | Exceeds          | Exceeds          | Exceeds              | Exceeds                 | 72                                                                            |                                                                                    | 18                                            | NA              | NA           |
| People                 | Chain link                                                 | Meets            | Preferred option |                      |                         | 60                                                                            |                                                                                    | 8                                             | NA              | NA           |
| People                 | Electric 5-wire                                            | Meets            |                  |                      |                         | 12 to 60 evenly spaced                                                        |                                                                                    | 50                                            | 100             | 25           |
| People                 | Woven wire 47 inch plus 1 or 2 barbed wires or HT electric | Meets            |                  |                      |                         | 47 min. HT or barb at 6 spacing to 48. HT may be electrified                  |                                                                                    | 16.5                                          | NA              | NA           |

Use the information in this table as a guide to determine the number of strands and spacing requirements. Adjustments may be made based on manufacturer's recommendations and landowner's preference for confinement with NRCS approval.

<sup>\*\*</sup> If the goats or sheep are not trained to electric fencing, then high tensile electric fencing is not a good option for the livestock operation.

<sup>\*\*\*</sup> Consider fence visibility when using high tensile fence for horses. Poly-coated or vinyl encased wire or rail can be used following manufacturer recommendations for installation.

<sup>\*\*\*\*</sup> Exclusion fence only

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**Table 2. Temporary Fence Selection Criteria**

Fence design and construction must meet the minimum requirements for controlling specific animal types.

| Animal Type to Control                                                                                                                                                                                                                                                                                                                                                                                                                       | Fence Type <sup>1</sup><br>(all wires hot)                                          | Purpose of Fence        |                      |                         | Typical Spacing Above Ground Level | Line Posts<br>(maximum spacing) |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------|----------------------|-------------------------|------------------------------------|---------------------------------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                     | Travel Lanes            | Interior Subdivision | Surface Water Exclusion |                                    |                                 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                     | <b>Minimum Criteria</b> |                      |                         | <b>Inches</b>                      | <b>Feet</b>                     |
| <b>Cattle</b>                                                                                                                                                                                                                                                                                                                                                                                                                                | Electric 1-wire <u>Polywire</u> or <u>Polytape</u> or galvanized steel braided wire | Meets                   | Meets                | Meets <sup>2</sup>      | 26-36                              | 60                              |
| <b>Cattle</b>                                                                                                                                                                                                                                                                                                                                                                                                                                | Electric 2-wire <u>Polywire</u> or <u>Polytape</u> or galvanized steel braided wire | Exceeds                 | Exceeds              | Exceeds                 | 20, 32                             | 60                              |
| <b>Goats/Sheep</b>                                                                                                                                                                                                                                                                                                                                                                                                                           | Electric 4-wire <u>Polywire</u> or <u>Polytape</u>                                  | Meets                   | Meets                | NA                      | 8, 16, 24, 32,                     | 60                              |
| <b>Goats/Sheep</b>                                                                                                                                                                                                                                                                                                                                                                                                                           | Electric Net Fencing <sup>3</sup>                                                   | Meets                   | Meets                | Meets                   | 0 (minimum 35 inches tall)         | built in <sup>4</sup>           |
| <b>Horses</b>                                                                                                                                                                                                                                                                                                                                                                                                                                | Electric 1-wire <u>Polywire</u> or <u>Polytape</u>                                  | Meets                   | Meets                | NA                      | 34                                 | 25                              |
| <b>Horses</b>                                                                                                                                                                                                                                                                                                                                                                                                                                | Electric 2-wire <u>Polywire</u> or <u>Polytape</u>                                  | Exceeds                 | Exceeds              | Meets                   | 28, 40                             | 25                              |
| <b>Hogs</b>                                                                                                                                                                                                                                                                                                                                                                                                                                  | Electric 2-wire <u>Polywire</u> or <u>Polytape</u> or galvanized steel braided wire | Meets                   | Meets                | NA                      | 8, 18                              | 40                              |
| <b>Hogs</b>                                                                                                                                                                                                                                                                                                                                                                                                                                  | Electric Net Fencing <sup>3</sup>                                                   | Meets                   | Meets                | Meets                   | 0 (35 inches tall)                 | built in <sup>4</sup>           |
| <b>Poultry</b>                                                                                                                                                                                                                                                                                                                                                                                                                               | Electric Net Fencing <sup>3</sup>                                                   | Meets                   | Meets                | Meets                   | 0 (minimum 42 inches tall)         | built in <sup>4</sup>           |
| <sup>1</sup> Livestock must be trained to respect electric fencing prior to using temporary fence products for complete containment.                                                                                                                                                                                                                                                                                                         |                                                                                     |                         |                      |                         |                                    |                                 |
| <sup>2</sup> Two wires may be needed to prevent young calves from going under the fence.                                                                                                                                                                                                                                                                                                                                                     |                                                                                     |                         |                      |                         |                                    |                                 |
| <sup>3</sup> Use electric netting specifically designed for the type of livestock being controlled; it is not suggested for small animals with horns (consider spacing of vertical stays and horizontal lines and fence height).                                                                                                                                                                                                             |                                                                                     |                         |                      |                         |                                    |                                 |
| <sup>4</sup> Line posts are typically built into the rolls of netting near 12.5 feet spacing.                                                                                                                                                                                                                                                                                                                                                |                                                                                     |                         |                      |                         |                                    |                                 |
| Use the information in this table as a guide to determine the number of strands and spacing for different types of temporary fencing products based on the type of livestock. Adjustments may be made based on manufacturer's recommendations and landowner's preference and ability to control the livestock with NRCS approval. Temporary fencing products are not intended to be used as permanent or semi-permanent containment fencing. |                                                                                     |                         |                      |                         |                                    |                                 |

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Table 3. Wire Specifications

| Wire Type                                                                                | Minimum Wire Size                                                                  | Minimum Wire Coating/Composition                           | Wire Strength and Other Considerations                                                                                                                                                                                                                                  |                                              |
|------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|
| Barbed, Standard Double Strand (must meet ASTM- A121)                                    | 12.5 gauge (ga.) with 4-point barbs spaced on 5" centers                           | Class 3 zinc coating per ASTM-A641                         | 950 lbf                                                                                                                                                                                                                                                                 |                                              |
|                                                                                          | 15.5 ga. with 4-point barbs spaced on 5" centers                                   | Class 3 zinc coating per ASTM-A641                         |                                                                                                                                                                                                                                                                         |                                              |
| Barbed, High-Tensile Double Strand (Gaucho Wire) (must meet ASTM- A121)                  | 15.5 ga. 4-point barbs                                                             | Class 3 zinc coating per ASTM-A641                         | 170,000 psi or 950 lbs.                                                                                                                                                                                                                                                 |                                              |
| High Tensile Smooth single strand (must meet ASTM-A854)                                  | 12.5 ga.                                                                           | Class 3 zinc coating per ASTM-A641                         | 130,000 psi or 1300 lbs.                                                                                                                                                                                                                                                |                                              |
| High Tensile Vinyl Coated or Polymer Encased Wire                                        | 12.5 ga.                                                                           | UV resistant polymer                                       | 1,300 lbs. per wire or 4,000 lbs. per rail                                                                                                                                                                                                                              |                                              |
| Galvanized Steel                                                                         | 1.7 mm                                                                             | Class IV                                                   | 160 lbs.                                                                                                                                                                                                                                                                | Can be used for 1 or 2 wire temporary fences |
| Standard Woven Wire "hinged joint" or continuous stay "fixed knot" (must meet ASTM-A116) | Top & bottom wires: 12-ga. min.<br><br>Intermediate wires: 12.5 ga.                | Class 3 zinc coating per ASTM A641                         | Horizontal and vertical spacing should be appropriate for animal types. Design numbers of woven fence are related to the characteristics of the fence fabric. For example: 1047-12-12 ½ has 10 line wires, is 47" high, has 12" stay wire spacing, and is 12.5-ga.      |                                              |
| High Tensile Woven Wire (must meet ASTM-A116)                                            | 12.5 ga.                                                                           | Class 3 zinc coating per ASTM-A641                         | 175,000 psi on line wires                                                                                                                                                                                                                                               |                                              |
| Mesh Wire; such as Horse-No-Climb                                                        | Top & bottom wires: 10 ga.<br>Intermediate & stay wires: 12.5 ga.                  | Class 3 zinc coating per ASTM-A641                         | At least 48" high, less than or equal to 2-inch x 4- inch mesh spacing.                                                                                                                                                                                                 |                                              |
| Poly wire or twine-type                                                                  | Minimum of 8 strands of aluminum, stainless steel, or mixed metal wires            | Wires interwoven with polyethylene or polypropylene fiber. | Poly wire (twine-type), as compared to poly tape is more durable under frequent movement. Poly tape is best used where high visibility is needed. Do not use on fences more than 1 mile in length (low-conductivity). Life expectancy is 3-5 years if moved frequently. |                                              |
| Poly tape or tape- type                                                                  | Minimum ½ inch wide and 5 strands of stainless steel or mixed metal wire filaments |                                                            |                                                                                                                                                                                                                                                                         |                                              |
| Aluminum                                                                                 | 12.5 ga.                                                                           | Aluminum                                                   | May be used as one of the wires in a multi-wire fence, or as a single wire subdivision fence. May be used as a lead out cable from power energizer to fence.                                                                                                            |                                              |

Only use new and galvanized steel wire and hardware to construct a permanent fence.  
Not all materials are for permanent or containment fencing, reference Table 1 to ensure the fence material selected is appropriate for the type of fence and the livestock.

| WV Natural Resources Conservation Service Conservation Practice Standard Fence (382)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                          |                                                                                                                                                |                                                                                                        |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
| Table 4. Line Post Type, Size and Depth Specifications                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                          |                                                                                                                                                |                                                                                                        |
| Fence Type                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Post Type                                                                                                                                                                | Minimum Diameter/Weight                                                                                                                        | Minimum Depth*                                                                                         |
| Barbed Wire<br>Woven Wire<br>Smooth High Tensile<br>Wire Non-Electrified                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Pressure treated wood (Material Spec 585), black locust, red cedar (>50% heartwood)                                                                                      | 4"                                                                                                                                             | 24" or<br>18" in rocky soil, 30" in very sandy soil                                                    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Steel T posts <sup>1</sup><br>Steel U posts <sup>1</sup><br>Steel L posts <sup>1</sup><br>(When using steel posts, wooden posts shall be set every 4 <sup>th</sup> post) | 1-3/8" x 1-3/8" x 1/8" thick<br>2" x 1-1/4" x 3/32" <u>thick</u><br>2" x 2" x 1/4" thick<br>All 1.25 lbs. per foot, exclusive of anchor plates | 18"                                                                                                    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Steel pipe, galvanized                                                                                                                                                   | 2" outside diameter                                                                                                                            | 16"                                                                                                    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                          |                                                                                                                                                |                                                                                                        |
| Smooth High Tensile<br>Wire Electrified                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Pressure treated wood (Material Spec 585), black locust, red cedar (>50% heartwood)                                                                                      | 4"                                                                                                                                             | 24" or<br>18" in rocky soil, 30" in very sandy soil                                                    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Steel T posts <sup>1</sup><br>Steel U posts <sup>1</sup><br>Steel L posts <sup>1</sup><br>(When using steel posts, wooden posts shall be set every 4 <sup>th</sup> post) | 1-3/8" x 1-3/8" x 1/8" thick<br>2" x 1-1/4" x 3/32" <u>thick</u><br>2" x 2" x 1/4" thick<br>All 1.25 lbs. per foot, exclusive of anchor plates | 16"                                                                                                    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Fiberglass <sup>2,4</sup>                                                                                                                                                | 5/8"                                                                                                                                           | 16"                                                                                                    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | HDPE <sup>3,4</sup>                                                                                                                                                      | 1.33"<br>(per manufacturer recommendations)                                                                                                    | 12"                                                                                                    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Composite <sup>3,4</sup>                                                                                                                                                 | 1 1/8"<br>(per manufacturer recommendations)                                                                                                   | 16"                                                                                                    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | PVC T posts <sup>3,4</sup>                                                                                                                                               | 1.5"                                                                                                                                           | 12"                                                                                                    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                          |                                                                                                                                                |                                                                                                        |
| Stays (Battens, Droppers, or Spacers)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Wire stays<br>Composite<br>Fiberglass<br>Steel T post w insulators<br>Wood<br>PVC                                                                                        | 12 ga. galvanized for barbed wire<br>1"<br>1/2"<br>Listed above<br>1.5"X1.5"<br>1"                                                             | Stays are not always designed to touch the soil surface, but should be enough to maintain wire spacing |
| Temporary Electric Fences                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Fiberglass, composite, plastic, PVC, steel rod                                                                                                                           | 3/8"                                                                                                                                           | 4"                                                                                                     |
| <sup>1</sup> All steel posts shall be new and painted or galvanized.<br><sup>2</sup> Fiberglass posts should be coated to prevent splintering and cracking.<br><sup>3</sup> All HDPE, PVC and composite material must be UV protected.<br><sup>4</sup> Fiberglass, composite, PVC and HDPE posts are not to be used in bends, curves or at places in the fence with abrupt changes in elevation.<br>*Minimum depth unless specified by manufacturer. If top fence wire is greater than 60 inches minimum depth increases, consult NRCS technical specialist during design for approval prior to construction. |                                                                                                                                                                          |                                                                                                                                                |                                                                                                        |

| WV Natural Resources Conservation Service Conservation Practice Standard Fence (382)                                    |                                                              |                                                |                                                                                                                                                                                                                          |
|-------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Table 5. H-Brace Anchor (Pull) Post (corner, gate, and end) Specifications                                              |                                                              |                                                |                                                                                                                                                                                                                          |
| Brace Post Type                                                                                                         | Minimum Top Diameter                                         | Depth Anchoring <sup>1</sup>                   | Other                                                                                                                                                                                                                    |
| Pressure treated pine (Material Spec 585) or other wood of suitable strength: red cedar (>50% heartwood), black locust. | 6" top diameter (corners, ends, anchor/pull posts and gates) | 36 – 42" in ground                             | Minimum post lengths should allow for required buried depth and fence height, plus at least 2 inches of post above top wire.<br><br>Posts will have appropriate treatment to prevent rust and deterioration.             |
|                                                                                                                         | 5" top diameter all other wooden brace posts                 | 36" in ground                                  |                                                                                                                                                                                                                          |
| Steel round pipe – braced <sup>2</sup>                                                                                  | 2 – 3/8" nominal 7 lbs./ft. or equivalent                    | 36" set in 12 in diameter hole with concrete   | The assembly strength of a corner post set 2.5' deep is approximately half compared to a post set at 3.5' deep.<br><br>A single post brace assembly can be used as bracing for ≤2 HT smooth electric wires. See Table 7. |
|                                                                                                                         | 4" nominal 10 lb./foot or equivalent                         | 36" driven                                     |                                                                                                                                                                                                                          |
| Steel, angle iron – braced <sup>2</sup>                                                                                 | 2.5" x 2.5" x 0.25"                                          | 36" set in 12-inch diameter hole with concrete |                                                                                                                                                                                                                          |

<sup>1</sup>If top fence wire is greater than 60 inches, increase the anchoring depth. Prior to construction, consult an NRCS technical specialist during design for approval.

<sup>2</sup>All steel posts must be new and painted or galvanized.

| WV Natural Resources Conservation Service Conservation Practice Standard Fence (382)                                    |                            |                |                                                                                                          |
|-------------------------------------------------------------------------------------------------------------------------|----------------------------|----------------|----------------------------------------------------------------------------------------------------------|
| Table 6. Brace Rail Specifications for H-Brace or Diagonal <sup>1</sup> Floating Brace                                  |                            |                |                                                                                                          |
| Brace Member Type                                                                                                       | Minimum Diameter/ Weight   | Typical Length | Other                                                                                                    |
| Pressure treated pine (Material Spec 585) or other wood of suitable strength; red cedar (>50% heartwood), black locust. | 4"                         | 8-10 feet      | Posts will be straight and free of splintering.                                                          |
| Galvanized steel pipe <sup>2</sup>                                                                                      | 1.5" diameter, schedule 40 | 8-10 feet      | Posts will have appropriate treatment for rust and deterioration.                                        |
| Steel, angle iron <sup>2</sup>                                                                                          | 2.5" x 2.5" x 0.25"        | 8-10 feet      | The wider a brace, the stronger it is. A 10-12' single H-brace may replace a standard double 8' H-brace. |
| <sup>1</sup> Length of the diagonal floating brace rail must be at least 2.5 times the height of the top wire.          |                            |                |                                                                                                          |
| <sup>2</sup> All steel posts must be new and painted or galvanized.                                                     |                            |                |                                                                                                          |

| WV Natural Resources Conservation Service Conservation Practice Standard Fence (382)                                    |                                    |                                                                 |                                                                                                 |
|-------------------------------------------------------------------------------------------------------------------------|------------------------------------|-----------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| Table 7. Single Post Brace <sup>1</sup> Specifications for 1-2 strands high tensile electric fence only                 |                                    |                                                                 |                                                                                                 |
| Brace Post Type                                                                                                         | Minimum Top Diameter               | Minimum Depth Anchoring                                         | Other                                                                                           |
| Steel round pipe or tubular steel <sup>2</sup> (galvanized)                                                             | 2.5" outside diameter schedule 40  | 24" set in 12" diameter hole with concrete                      | For single wire fences, concrete is not needed if posts are driven at least 3' deep.            |
| Steel angle iron <sup>2</sup>                                                                                           | 2.5" x 2.5" x 0.25"                |                                                                 |                                                                                                 |
| Steel <sup>2</sup>                                                                                                      | 4" outside diameter                | Depth equal to or greater than height of top wire above ground. | Concrete is not needed.                                                                         |
| Pressure treated pine (Material Spec 585) or other wood of suitable strength; red cedar (>50% heartwood), black locust. | 6" post (must be driven in ground) |                                                                 | The strength of a corner post set 2.5' deep is approximately half as much as one set 3.5' deep. |
| <sup>1</sup> Single posts as braces should lean approximately 4 inches away from the direction of the pull.             |                                    |                                                                 |                                                                                                 |
| <sup>2</sup> All steel posts must be new and painted or galvanized.                                                     |                                    |                                                                 |                                                                                                 |

| WV Natural Resources Conservation Service Conservation Practice Standard Fence (382)                                                                                                                                                        |                                            |                                                        |                                           |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|--------------------------------------------------------|-------------------------------------------|
| Table 8. Maximum Brace Assembly Spacing (on straight and level pulls)*                                                                                                                                                                      |                                            |                                                        |                                           |
| Fence Type                                                                                                                                                                                                                                  | Distance Between Anchor (Pull) Posts (ft.) | End/Corner Brace Types                                 | Inline Brace Type                         |
| Barbed Wire                                                                                                                                                                                                                                 | 0 - 660                                    | Single H or Diagonal Brace Assembly                    | NA                                        |
|                                                                                                                                                                                                                                             | 660 – 1,320                                | Double H or Diagonal Brace Assembly <sup>1</sup>       | NA                                        |
|                                                                                                                                                                                                                                             | >1,320                                     | Double H or Diagonal Brace Assembly <sup>1</sup>       | Double H-10 ft or Diagonal Brace Assembly |
| Posts with brace assemblies should not exceed 1,320 feet for standard barbed wire in straight sections of fence.                                                                                                                            |                                            |                                                        |                                           |
| Smooth HT wire non-electrified                                                                                                                                                                                                              | 0 – 1,320                                  | Single H or Diagonal Brace Assembly                    | NA                                        |
|                                                                                                                                                                                                                                             | 1,320 – 2,640                              | Double H or Diagonal Brace Assembly <sup>1</sup>       | NA                                        |
|                                                                                                                                                                                                                                             | >2,640                                     | Double H or Diagonal Brace Assembly <sup>1</sup>       | Double H-10 ft or Diagonal Brace Assembly |
| Posts with brace assemblies should not exceed 2,640 feet for HT smooth wire fences in straight sections of fence.                                                                                                                           |                                            |                                                        |                                           |
| Smooth HT wire - electrified                                                                                                                                                                                                                | 0 – 1,320                                  | Single H or Diagonal Brace Assembly <sup>2</sup>       | NA                                        |
|                                                                                                                                                                                                                                             | 1,320 – 2,640                              | Double H or Diagonal Brace Assembly <sup>1&amp;2</sup> | NA                                        |
|                                                                                                                                                                                                                                             | >2,640                                     | Double H or Diagonal Brace Assembly <sup>2</sup>       | Double H-10 ft or Diagonal Brace Assembly |
| Posts with brace assemblies should not exceed 2,640 feet for HTE smooth wire fences in straight sections of fence.                                                                                                                          |                                            |                                                        |                                           |
| Standard Woven (net) wire (Hinge Joint)                                                                                                                                                                                                     | 0 - 330                                    | Single H or Diagonal Brace Assembly                    | N/A                                       |
|                                                                                                                                                                                                                                             | 330 - 660                                  | Double H or Diagonal Brace Assembly <sup>1</sup>       | N/A                                       |
|                                                                                                                                                                                                                                             | >660                                       | Double H or Diagonal Brace Assembly <sup>1</sup>       | Double H-10 ft or Diagonal Brace Assembly |
| Posts with brace assemblies should not exceed 660 feet for standard woven wire fences in straight sections of fence.                                                                                                                        |                                            |                                                        |                                           |
| High Tensile Fixed Knot Woven Wire (Continuous Stay) <sup>3</sup>                                                                                                                                                                           | 0 – 1,320                                  | Double H or Diagonal Brace Assembly <sup>1</sup>       | N/A                                       |
|                                                                                                                                                                                                                                             | >1,320                                     | Double H or Diagonal Brace Assembly <sup>1</sup>       | Double H-10 ft or Diagonal Brace Assembly |
| Posts with brace assemblies should not exceed 1,320 feet for HT fixed knot woven wire fences in straight sections of fence.                                                                                                                 |                                            |                                                        |                                           |
| * The maximum distance between anchor posts of a brace assembly will often be shorter than what is listed in this table. Abrupt changes in topography or fence direction will require closer brace assembly spacing.                        |                                            |                                                        |                                           |
| * All wires must be tied off at the in-line pull assemblies and new wires started for the next fence section.                                                                                                                               |                                            |                                                        |                                           |
| * Use this information as a guide to determine bracing requirements for the type of fence being constructed. With prior NRCS approval, minor adjustments may be made based on topography and the number or height of fence wires installed. |                                            |                                                        |                                           |
| <sup>1</sup> Single H brace with a 10' – 12' brace rail can take the place of the standard double 8' H-brace.                                                                                                                               |                                            |                                                        |                                           |
| <sup>2</sup> Single post brace assembly of suitable diameter can be used for fences with 1-2 strands HT electric wires. See Table 7.                                                                                                        |                                            |                                                        |                                           |
| <sup>3</sup> Build HT fixed knot woven wire fence according to recommendations of the fencing manufacturer.                                                                                                                                 |                                            |                                                        |                                           |

| WV Natural Resources Conservation Service Conservation Practice Standard Fence (382) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
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| Table 9. Specifications of other Fence Components                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Component                                                                            | Description/Specification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Electrical Energizers or "Chargers"                                                  | Energizers for permanent electric fencing must be U.L. or CSA approved and manufactured for agricultural fencing and be high power, low impedance that can produce at least 5,000-volt peak output and a short pulse less than 300 milliamps (mAmps) in intensity, finished within 0.0003 of a second, and at a rate of 35-65 pulses per minute. It is recommended that the energizer have a fence charge meter. Only one charger is allowed per fence. It is recommended the unit include a high impact self-insulating weather resistant case, a snap-in circuit panel, a safety pace fuse, a lightning arrester, and have full power input and reduced power output. May be solar, 110- or 220-volt, or 12-volt battery units. Output joule rating should be based on the size of the fence system, the type of fence being electrified, and be high enough to provide a minimum shock at the farthest point in the fence. To control most livestock, it is recommended to maintain fence line voltage $\geq$ 3,000 volts. Use higher voltage for sheep, goats, and predator control. |
| Lightening Arrester                                                                  | A properly grounded lightning arrester and a "lightning choke" will be installed to protect the energizer from lightning strikes. A voltage spike protector is also recommended.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Electrical Insulators                                                                | Insulators will be made of high-quality glazed porcelain or UV resistant HDPE or HDPP plastic manufactured for durability under high tensile strain. UV resistant tubular plastic insulators that wrap around end and corner posts must have a reinforced strip to prevent cracking and grounding under high tensile strain. Galvanized 12.5-gauge wire may be used on fiberglass and other nonconductive posts to secure wire to post.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Wire connecting energizer to fence or beneath gate or road                           | Underground cable (insulated wire) is often used where wires are buried under gates and as leads from the energizer to the fence. Underground cable should be 12.5 gauge galvanized or soft steel wire with bonded, high density, ultra-violet stabilized polyethylene or polypropylene or polypropylene insulation. Never use household or underground electrical copper wire with fence energizers. Where underground insulated wire is buried under gates or roads, it is strongly recommended to run the wire through a non-metal conduit with water tight connections to decrease the incidence of short circuiting.                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Ground rod and installation                                                          | Ground rods should be 6 to 8 feet long x $\frac{1}{2}$ -inch – $\frac{5}{8}$ -inch galvanized steel rod set a minimum of 10 feet apart and driven no more than 6 inches above the ground. The number of ground rods needed is based on a minimum of 3 feet of ground rod per joule of energizer output capacity. All energizers must be grounded sufficiently to test less than 300 ohms on the last ground rod when the fence is "grounded" 300 feet from the energizer. Galvanized ground rods for the fence must be driven a minimum of 6 feet. If this is not possible, the following alternative methods of grounding are acceptable: inserting rods in trenches surrounded with Epsom salt or bentonite; placing ground rods in damp areas to improve effectiveness. Follow the manufacturer's recommendations for grounding the system.                                                                                                                                                                                                                                           |
| Staples or Fasteners                                                                 | Staples used to fasten wire to wooden posts shall be 9-gauge Class 3 galvanized barbed with a minimum length of 1.5 inches. For steel line posts, the fencing shall be fastened with 14-gauge galvanized steel wire, or the post manufacturer's wire clips. For all other types of posts, attach as specified by the manufacturer.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Gates                                                                                | Gates must be new and made of suitable material and coated to be durable enough to last 10 years with proper maintenance. All non-electrified gates must be able to withstand expected pressures from livestock and wildlife. Gates between electrical subdivision fences must be poly wire, poly rope or coiled spring connected to spring loaded handles.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

## **Specific Site Requirements**