



What are Permanent Electric (energized) Fences?

Permanent Energized (Electric) Fences provide a low cost alternative and more flexibility to the other types of fences. They are mostly used for interior cross fencing but can also be used for boundary fences. They can be powered by a variety of types of energizers. Livestock must be trained to respect electric fences if they are to be effective.

Purpose

This practice facilitates the accomplishment of conservation objectives by providing a means to control movement of animals and people, including vehicles.

Applying the practice

The fencing materials, type and design of fence installed shall be of a high quality and durability and installed to meet the management objectives and site challenges.

Fences shall be positioned to facilitate management requirements. Ingress/egress features such as gates and cattle guards shall be planned.

Where applicable, cleared rights-of-way may be established which would facilitate fence construction and maintenance. Avoid clearing of vegetation during the nesting season for migratory birds.

Fences across gullies, canyons or streams may require special bracing, designs or approaches.

Fence design and location should consider ease of access for construction, repair and maintenance. Where practical, in order to minimize maintenance and installation costs, avoid areas such as rough and irregular terrain, excess trees and brush, areas with long-standing water and water crossings

Fence construction requiring the removal of existing unusable fence should provide for the proper disposal of scrap materials to prevent harm to animals, people and equipment.

Operation and maintenance

Regular inspection of fences should be part of an ongoing maintenance program. Inspection of fences after storms and other disturbance events is necessary to insure the continued proper function of the fence. Maintenance and repairs will be performed in a timely manner as needed, including tree/limb removal and water gap replacement.

Remove and properly discard all broken fencing material and hardware. All necessary precautions should be taken to ensure the safety of construction and maintenance crews

Specifications

Specifications included in this job sheet are prepared in accordance with the NRCS Field Office Technical Guide, Oklahoma Fence (382) practice standard.

This job sheet provides general design criteria, material specifications and installation requirements.

Any variations in materials and installation from those provided in this job sheet must be discussed and approved by the responsible planner at the time of planning and prior to installation. Failure to do so could result in the practice not being certified.

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PERMANENT FENCE CONSTRUCTION DATA SHEET – Electric Fences

Cooperator: _____ Field Office: _____

Plan No: _____ Field No: _____ Location: _____

Planned by: _____ Title: _____ Date: _____

Purpose / Livestock Type: _____

Length of Planned Fence (if more than one fence is planned, with the same materials, components and installation requirements number each fence and provide planned length for each.)

Fence # _____ Length _____ Fence # _____ Length _____ Fence # _____ Length _____

COMPONENTS – MATERIAL SPECIFICATIONS AND INSTALLATION (Check/Complete Applicable Items)

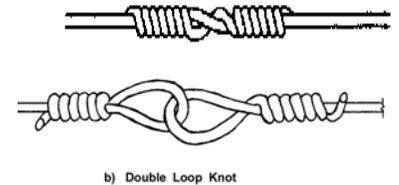
WIRE TYPE – Based on Planned Fence Type. All wire must be new	# Wires	Top Wire – Average Height	Bottom Wire – height above ground
<input type="checkbox"/> Smooth - High Tensile: 12 1/2 gauge; Class III galvanization; Heat treated high tensile, 170,000 psi			
<input type="checkbox"/> Smooth - Standard (Malleable): 9 gauge; Class I galvanization; 70,000 psi			

Wire Spacing: Heights of top and bottom wire will be as specified above. All other wires should be equally spaced between the top and bottom wires unless there is a combination of livestock, such as cattle and sheep, in which case the lower wires shall be designed for the smaller animal and overall height will be for the larger animal.

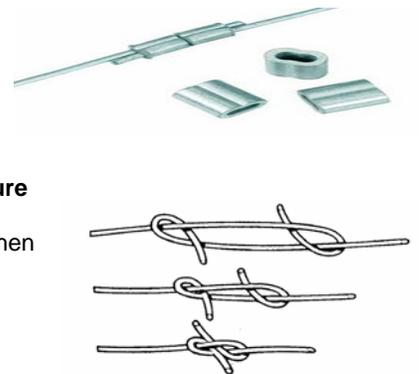
Installation: Fence wire will be stretched to sufficient tension prior to being fastened to posts. Temperature variations must be considered (wire will tighten in cold weather and expand in hot weather). Wherever possible, wire will be attached to fence post on side receiving most pressure, at top wire heights based on intended use.

Wire Splices: When wire splices are needed, specific splicing methods should be used depending on type of wire. The following splice will be used:

Standard, Malleable wire types – **The Western Union** splice is the preferred method for malleable wire types. The splice shall have a minimum of 8 wraps on each side of center tightly wound and closely spaced. Mechanical splices, such as crimping sleeves or the Gripper splice, designed specifically for the planned wire type, may also be used. An accepted alternative is the **“double loop knot” splice** where the wire has a minimum of 8 wraps on each side of the loops. Do not use the on high tensile wire.



High Tensile Wire – **Mechanical Splices** are the preferred splice method for high tensile wire. Mechanical splices must be designed for the type of wire installed and have a tensile strength of at least 80% of the wire strength. Various types are available and each functions in a different manner and will be installed according to manufacturer’s recommendations. Special tools may be needed for installation of these splices. **The “Figure – 8” splice** is an alternative method for HT Wire and works best on single strand, smooth wire. Install by overlapping wires 2 inches, looping each wire over and back through, and then pulling together. As the fence is stretched the splice will tighten.



In-Line Strainers (only for permanent, high tensile steel, smooth wire fences). Used to maintain tension. Install on each wire between each pull assembly at a distance not to exceed 4,000 feet for straight line stretches and 1200 feet for uneven terrain or non-straight stretches.



LINE POSTS - Minimum lengths of all posts will allow for required setting depths and fence height plus at least 2 inches of post above the top wire

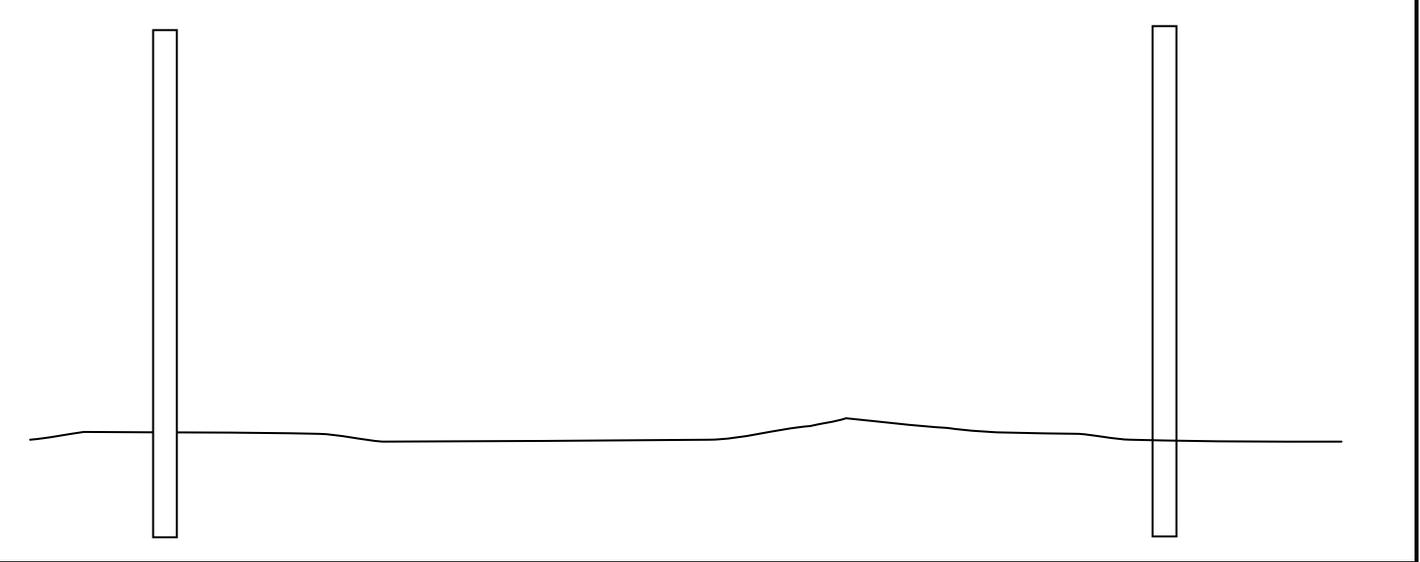
Post Type and size	Materials Specifications – All posts must be new
<input type="checkbox"/> Wood - 3" diameter	Must be sound and free from decay. Except for red cedar, mesquite, Osage orange, catalpa, and black locust, all wood posts shall be treated with a preservative which is approved by either Federal Specification TT-W-571 or the American Wood Preservers Association (AWPA)
<input type="checkbox"/> Steel Pipe - 2" OD Schedule 40	Posts will be painted or galvanized for rust resistance. Posts will have the top closed to prevent rainfall from entering post.
<input type="checkbox"/> Standard "T" Min. 1.25 lb per foot	Will be galvanized, enameled and baked, or painted with weather resistant steel paint.
<input type="checkbox"/> Fiberglass "T" or Round – 1" cross section	Special wire clips or drilled holes may be used
<input type="checkbox"/> Insulators - Porcelain, ceramic, high quality UV Stabilized polyethylene or equivalent insulators will be used on wood and steel line posts as well as corner and end assemblies. Offset Brackets can be attached to standard fences at intervals of 50-60 feet and a height equal to 2/3 the height of the animal controlled.	

LINE POSTS INSTALLATION - Installation shall ensure that adequate fence height is maintained based on its purpose. Line posts will be set in as straight a line as possible between corners or turns. When fencing along curved lines, use straight sections with appropriate in-line bracing.

Minimum Setting Depth (inches)	<input type="checkbox"/> Rocky Soils - 18"	<input type="checkbox"/> Sandy Soils - 30"	<input type="checkbox"/> All Other - 24"
"T" Posts - Anchor plate must be fully into ground. (15-18")			
Line Post Spacing (based on livestock type and fence type. Refer to Table 1 in Fence Standard)	<input type="checkbox"/> Stays will not be used	Maximum spacing between line posts _____ Ft.	
	<input type="checkbox"/> Stays will be used		

** Stays shall be evenly spaced between line posts at no more than 15 foot intervals between posts. Stays will be constructed of durable materials designed for this purpose.

FENCE DIAGRAM (items may include post spacing, fence height, wire spacings, stays, post depth, etc. as needed)



ENERGIZERS will be installed according to manufacturer's recommendations and should meet or exceed the following minimum criteria:

- May be solar, 110 or 220 volt, or 12 volt battery units.
- High power, low impedance with a 5,000 volt peak output and a pulse that is less than 300 milliamps (mAmps) in intensity, finished within 0.0003 of a second, and at a rate of 35-65 pulses per minute.
- Solid state circuitry and high impact weather resistant case.
- Safety pace fuse to prevent overpulsing
- Joule rating high enough to provide a minimum shock at the farthest point as follows:
 - a. Cattle – 1600 volts
 - b. Sheep and hair goats – 2000 volts
 - c. Horses, hogs and meat goats –1200 volts
- Rule of Thumb for Joules – 1 output joule will power 3 miles of fence under normal loads. Heavy, dense vegetation will increase the load, therefore requiring more joules.
- Chargers will be grounded and protected from lightning according to energizer manufacturer recommendations.
- When two or more wires are used, the top wire should always be hot. With two wires, the bottom can be hot or grounded, with three or more, wires will alternate hot / ground with top and bottom being hot.
- Gates for energized fences shall be installed according to manufacturer's recommendations.

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Fence Layout and Location Diagram: The following diagram indicates fence location, length, alignment and bracing requirements. Bracing locations and types are indicated in order to assist with proper selection of brace assemblies based on soils, length of pulls and fence types. An aerial photograph with the same information may also be used.

BRACING:

Materials and installation requirements are included in the attached brace diagrams. The table below indicates brace types needed and reference to the appropriate brace diagrams.

Corner Braces are required at all points where the fence alignment has a change of 20 degrees or more and the pull is from two directions. Corner braces are comprised of the anchor (pull) post where wires are stretched and tied off and one or more brace posts installed in-line with direction of both pulls.

End braces are required where the fence ends, on both sides of gate openings and for water gaps / crossings greater than 20 feet. End braces will have an anchor (pull) post where wires are stretched and tied off and one or more brace posts installed in-line with direction of pull, in only one direction.

In – Line Pull Post assemblies are located in straight sections of the fence line with pulls in both directions and where there are sudden changes in elevations, such as at the bottom and top of steep slopes. Best used in long stretches where fence has no corners or ends and can be used to tie off wire and stretch.

Corner Braces		End / Gate Braces		In-Line pull assemblies	
Brace #	Brace Type	Brace #	Brace Type	Brace #	Brace Type

Additional Requirements: