



Practice Specification
NY-382B Fence

High Tensile Smooth and Coated Wire and Braided Electrified Rope

1. Scope

The work consists of furnishing and installing permanent electric and non-electric high tensile smooth wire fences and braided electrified rope, including related essential components.

A complete high tensile smooth wire and/or braided rope fence system may be installed in strict accordance to a single manufacturer's recommendations, subject to review and acceptance by the approving official.

Provide a Certificate of Inspection for the electrical work to the approving official prior to final approval and payment.

2. Material

All materials – Use the type, size and quality listed below unless otherwise shown in the drawings, or specified in the Implementation Requirements (IR) or the Specific Site Requirements section. All materials are subject to acceptance by the approving official.

Wire - Use smooth or coated Class III galvanized wire with a minimum of 12-1/2 gauge and with a minimum tensile strength of 150,000 psi. Use new braided electrified rope with a minimum warranty of 5 years. For all materials, the minimum material breaking strength must be 750 pounds.

For electrified fences, the wire used as a lead-out from the energizer to the charged strands of fence, the grounding system, or used to pass electric current across gate openings or watercourses must be insulated 12-1/2 gauge wire rated a minimum of 20,000 volts.

Note: Wire used for residential and commercial electric applications does NOT have adequate insulation for use with fence energizers.

Insulators - Use high density porcelain, ultra-violet light resistant high-density molded plastic, or flexible plastic tube type insulators labeled for electric or high tensile wire fence applications.

Fasteners - Use Class III galvanized or stainless steel, slash cut point, minimum 9 gauge wire staples.

For fastening to hardwood posts, use staples with a minimum length of 1 inch. For fastening to softwood posts, use barbed staples with a minimum length of 1½ inches.

For fastening to preservative pressure treated wood posts, use either hot-dipped Class III galvanized, stainless steel, or other material recommended by the hardware manufacturer.

For fastening to steel, fiberglass, and composite posts, use a minimum of 16 gauge Class III galvanized wire or manufacturer's clips. If fence is electrified the fastener wire must be

wrapped three times around the insulator on both sides of the post.

Brace, corner, and gate posts - Use black locust, red or white cedar, or preservative pressure treated wood treated in accordance with American Wood Protection Association (AWPA) Standard U1 to the requirements of Use Category 4A (UC4A). Fiberglass, composite, or other types of posts will not be accepted.

Use round posts with a minimum diameter of 5 inches, square posts with a minimum of 5-1/2 inches in both directions. Use posts with a minimum length of 7-1/2 feet. Use posts that are structurally sound, predominantly straight throughout their length, with all limbs trimmed flush with the body of the post.

Line posts – Use posts with a minimum length of 5-1/2 feet unless otherwise specified.

Wood - Use black locust, red or white cedar, preservative pressure treated wood treated in accordance with American Wood Protection Association (AWPA) Standard U1 to the requirements of Use Category 4A (UC4A). Use round posts with a minimum diameter of 4 inches. Use square posts with a minimum dimension of 3-1/2 in both directions.

Landscaping lumber is not acceptable.

Steel – Use galvanized steel "T" or "U" posts with a minimum weight of 1.25 pounds per foot of length.

Fiberglass or composite – Use "T" posts with a minimum width of 1.2 inches. Use solid round posts with a minimum diameter of 3/4 inch. Use solid composite posts with UV treatment certified to last 20 years.

Live trees may be used as shown on the plan map and as flagged in the field. The quality, location and extent of use of live trees will be subject to acceptance by the approving official. Do not fasten wire or insulators directly to live trees – use a spacer or offset acceptable to the approving official. Do not use live trees for corner or end posts.

Brace rails - Use round wood with a minimum diameter of 4 inches and a minimum of 8 feet long where horizontal and a minimum of 10 feet long where diagonal.

Landscaping lumber and square rails are not acceptable wood.

Battens—Use battens with a minimum length of 3 feet. Attach each batten vertically to all strands of wire and rope. Use naturally decay resistant hardwood, plastic or composite 1 to 1½ inches in width and 1 inch in thickness; or fiberglass or composite notch "T" posts of 5/8 inch minimum width and round posts of 1/2 inch minimum diameter.

Gates - Provide and install gates of the types, sizes, and quality shown in the drawings or specified in the IR or the Specific Site Requirements section. Provide and install all hardware necessary for the proper functioning of the gate. Install gates and associated hardware according to the manufacturer's recommendations.

Energizers - For electrified fences, use manufactured fence energizers, which are safety approved by U.S. Bureau of Standards, Underwriters Laboratories (UL), or other standards

acceptable to the approving official, with safety approvals printed on the energizer name plate.

All energizers must be protected by a lightning fence arrestor and a surge protector, either internally installed by the manufacturer or external to the energizer. Install surge protector on the commercial electrical grid side of the energizer if external.

Fence energizers are powered by commercial/public electric utility (115/230VAC), battery, or solar. Energizer must be sized to properly charge the fence as designed, and as specified in the IR.

Where solar panels are a component of the fence charger, provide the panels specified in the IR or the Specific Site Requirements section. Where solar panels are used, the panels and battery must be adequately sized for the system designed.

Fence wires must be alternately charged at a minimum. The number and layout of charged strands of wire is shown on the drawings or specified in the IR or the Specific Site Requirements section.

Ground Rods - use at least ½ inch diameter galvanized steel or copper-clad steel rod or UL approved ground rod, with a minimum length of 6 feet. The energizer terminals, ground wire, and ground rods must be made of the same material (steel to steel, copper to copper). The ground rods must be free of any corrosion, and must be manufactured products intended for electrical purposes.

3. Setting posts and battens

Spacing - Space posts and battens according to Table 1 below, unless otherwise specified in the IR or the Specific Site Requirements section.

Table 1 - Maximum Spacing of Fence Posts for High-Tensile Wire and Braided Electrified Rope Fence

Number of Wires	Maximum Line Post Spacing (feet)		Maximum Batten Spacing (feet)
	with Battens	without Battens	
1	-	75	-
2	150	75	75
3	150	50	50
4	150	50	50
5	150	50	50
7-10	66	33	33

Method of Installation - Unless otherwise shown on the drawings or specified in the IR or the Specific Site Requirements, install corner, gate, and end assembly posts to a minimum depth of

3-1/2 feet. Install line posts 2 feet deep.

When posts are driven, protect the top of the post from splitting by applying driving pressure uniformly over the entire post end area. Remove and replace posts that are damaged during driving.

Where posts are set in hand-dug or augured holes:

- Make hand-dug postholes at least 6 inches larger than the diameter or side dimensions of the posts. Make augured postholes at least the same as or slightly smaller than the diameter or side dimensions of the posts, then pound the post in.
- Hand compact earth backfill around the posts in 4 inch layers to the ground surface. When concrete is used, rod concrete backfill around the posts in maximum 12 inch layers, completely filling the posthole to the ground surface. Crown all backfill up around the posts to 2 inches above the ground surface.
- Allow concrete backfill around line posts to set at least 24 hours before stress is applied. Allow concrete backfill around corner, gate, and brace posts to set at least 48 hours before stress is applied.

4. Brace assemblies

Construct a single brace assembly - 'H' brace or diagonal floating brace - with 6 or fewer strands of wire or rope on corners, gates, ends, changes in topography and at watercourse crossings unless otherwise shown on the drawings or specified in the IR or the Specific Site Requirements section.

Place diagonal floating braces at 2/3 the height of the fence, measured from the ground up.

Single corner posts may be used for 2 or less strands of wire or rope, provided posts are set by power post driver and installed with a 3 to 4 inch lean away from the resultant pull of wires. Use a double brace assembly with fences where more than 6 strands of wire are used.

Construct line brace assemblies a maximum of 2000 feet apart on continuous straight reaches.

Install brace assemblies where there are 3 or more strands of wire or rope and the fence line changes horizontal direction greater than 20 degrees, vertically greater than 30 degrees, and on both sides of a watercourse crossing.

Where there are 2 or less strands of wire or rope and the fence line changes horizontal direction greater than 20 degrees, but less than 45 degrees, a single corner post may be installed. Install brace assemblies when the directional change is greater than 45 degrees, vertically greater than 30 degrees, and on both sides of a watercourse crossing when there are 2 or fewer strands of wire or rope.

Additional locations needing brace assemblies are specified in the IR.

5. Attaching fencing to posts

Attach wire to posts as follows:

- a. Place the wire on the side of the post where the livestock are contained, except on curves and corners where the wire must be placed on the outside away from the livestock, unless swing corner insulators are used.
- b. Fasten wire to the post with staples or other appropriate fasteners. Use insulators for all electrified wires or rope at every contact point with posts, brace rails, and tensioning wires, except where posts, rails, or both are of a non-conductive material.
- c. Terminate wires by splicing, by using manufactured devices such as crimps labeled for those specific high-tensile applications, or by twisting the wires together.
- d. Drive staples diagonally to the grain of the wood as shown on the drawings. Do not drive so tightly as to bind the wire against the post – the wire must be free to slide behind the staples. Drive staples into posts at an upward angle in depressions and at a downward angle on knolls and on level ground.
- e. When wire is used as the fastener, wrap the wire around the opposite side of the posts from the fence wire and twist around the fence wire a minimum of one full turn on both sides of the post. Where insulator tubes are used twist the fastener wire around the tube.
- f. Each wire must have one permanent in-line wire strainer to maintain correct tension; every 4,000 feet for straight line fence stretches, every 2,500 feet for fences with one corner, and every 1,200 feet in uneven terrain with several dips and rises or non-linear reaches. Unless otherwise specified, tension indicator springs are optional, and may be most beneficial in reaches under 700 feet. Place In-line strainers at the center of the spans of fence being tightened.

Where there is a gate between the energizer and other portions of the fence, carry electrical pulses across the opening by burying an insulated wire inserted through a protective sleeve of 1/2 inch diameter plastic pipe 12 inches deep. The insulated wire may be run overhead at a gate, at a minimum height of 10 feet above the ground (unless farm equipment is taller), and will be attached to a wooden board measuring minimum 4 inches by 4 inches nominal that is bolted to the gate fence posts on both sides of the opening.

6. Fencing at depressions

Where fencing is installed parallel to the ground surface, anchor the line posts and battens in the depression that are subject to upward pull by means of extra embedment as specified in the IR or the Specific Site Requirements section, or by special anchors acceptable to the approving official.

Where the fence is installed with the top wire straight across a depression, use extra length posts to allow post embedment at the specified depth. Unless otherwise specified in the IR or the Specific Site Requirements section, close extra space between the bottom of the fence and ground with extra strands of wire or rope, and properly anchor.

7. Crossing watercourses

Where the fence crosses watercourses in the locations shown on the drawings, end the main fence at the top of the streambank on each side with an appropriate brace assembly. From separate posts driven next to the brace assembly but not wired to it, construct a separate section of fence across the watercourse as shown on the drawings. Utilize battens for intermediary line posts as shown or specified. At designated crossing locations, construct a special structure, such as a swing gate, breakaway fence, or flood fence, as shown on the drawings.

Install a switch to manually or automatically de-energize the fence during high flow or flooding conditions. A single electrical connection must be the only tie between the main fence and the section spanning the watercourse. Jumper wires must be used to charge the remaining wires across the watercourse, as shown on the drawings.

For watercourses prone to high flow or flooding conditions, maintain electrical continuity with the fence on the other side of the watercourse as specified in Section 5 for gate openings. If there are multiple watercourse crossings in a system, only one of them must maintain electrical continuity if all fence on the other side is charged from the same system. For fence systems where a breakaway fence is required, install an energy limiter (floodgate controller).

8. Electrical connections

All junctions of conductors normally intended to pass electric pulses must have reliable, mechanically solid, and low resistance electrical connections.

9. Grounding

Ground energizers and protect from lightning strikes coming through the fence. Where the energizer is powered from an alternating current power source, it must also be protected on the power side according to the manufacturer's installation instructions.

Install the correct number and type of ground rods according to manufacturer's recommendations. Fully embed ground rods in the soil with no more than the top 3 inches above ground level. Do not place ground rods inside buildings. Maintain at least 100 feet between the energizer grounding system and all other grounding systems, metal structures, well casings, and other underground metal pipelines. The grounding system when applicable must be heading towards the center of the energized acreage.

Under no circumstances will more than one energizer charge the wires of the same fence.

10. Warning signs

Place signs warning of the potential for electric shock no farther apart than every 200 linear feet along reaches of fence adjacent to public transportation corridors, property boundaries, internal right-of-ways, easements, gates, and any other sites the public is likely to first encounter the fence. Position the signs so they are facing the public contact side of the fence. Follow any additional State and local safety requirements.

Specific Site Requirements