NATURAL RESOURCES CONSERVATION SERVICE
CONSTRUCTION SPECIFICATION

382 - FENCE

1. SCOPE

The work will consist of furnishing and installing permanent fences, including gates and fittings, as shown on the drawings.

The completed job will present a workmanlike appearance and will conform to the requirements indicated and shown on the drawings.

All operations will be carried out in a safe and skillful manner. Safety and health regulations will be observed and appropriate safety measures used. Contractor will not begin construction prior to confirming buried utilities have been located.

2. MATERIALS

Materials for fences will conform to the requirements shown on the drawings, except the tolerance for minimum diameter of wooden line posts will be within 1/2 inch of the standard as measured on the small end. All other posts will conform as indicated on the drawings. **No used wood, steel or wire material will be installed; all material must comply with weight and strength requirements and have a minimum life expectancy of 20 years.**

Wooden posts will consist of high quality species with high resistance to decay which include black locust, red cedar (diameter will be at least 50% heartwood), catalpa, osage orange, iron bark eucalyptus, or other wood of equal life and strength and approved by NRCS.

Wood posts will be sound and free of decay with all limbs trimmed substantially flush with the body. They will be relatively straight throughout, free from heat checks or any other damage or defects that would impair their usefulness or durability.

Pressure treated wood will be treated with pentachlorophenol (0.4 lbs/ft^3), creosote solution (6.0-8.0 lbs/ft^3), or chromate copper arsenate (0.4 lbs/ft^3).

The use of “S” irons is not permitted.

Landscape timbers will not be used.

All steel posts will conform to the requirements of ASTM A 702, have a minimum weight of 1.33 pounds per foot, exclusive of the anchor plate. Steel posts will have studs or grooves that allow for a suitable means of supporting the wire. Steel posts will be “T” or “U” type and painted or galvanized.

Fiberglass line posts will be a minimum diameter of 3/4 inches for internal fence and 7/8 inches for external fence. Polyvinylchloride (PVC) solid round sucker rod will be a minimum diameter of 5/8 inches. PVC pipe can be used as stays but will not be used as posts. **Other post types will be evaluated on a case by case basis and will be approved by the IN NRCS State Conservation Engineer.**

Brace pins will be class III galvanized steel with a minimum diameter of 3/8 inches. Brace pins will be a minimum length of 5 inches on the end post and 10 inches on the pull post. The horizontal brace piece for "H" braces will be placed between 6 and 12 inches of the top of the post and be a minimum 84 inches long. No used material will be utilized.

For fences with 3 or more wires, corner, gate and brace/pull posts will be eight feet long or longer with a six-inch minimum diameter. Pull, gate and corner posts will be placed a minimum 36 inches in the ground and be a minimum seven feet apart.

Horizontal Braces will be a minimum of 84 inches long may be wood or steel.

- Wood - A minimum of 4 inches diameter or 4 inches square at the small end.
- Steel - A minimum of 2 1/2 inch diameter tubular or 2 inches x 2 inches x 3/16 inches or heavier for angular.

Wire for bracing will be 1 or more strands of 9 gauge or heavier wire or 2 or more strands of 12 ½ gauge High Tensile wire.

For 1 and 2 wire fences corner, gate, end and brace post assemblies will consist of one of the following:

- Wood posts with a minimum top diameter of 3.5 inches set 36 inches in the ground with an appropriate knee, dead-man, angle, anchor, or H brace.
- Wood, steel pipe or fiberglass post with a minimum top diameter of 5 inches, set to a depth equal to or greater than the height of the post above the ground without any bracing.
- Steel pipe or fiberglass post with a minimum diameter of 2 inches, set 36 inches in the ground with appropriate angle, H bracing, knee brace, dead-man or anchor plate.

Fencing material will conform to the requirements of ASTM A 121 for barbed wire, ASTM A 116 for woven wire, and ASTM A 854 for high-tensile wire. All high tensile wire will have a minimum tensile strength of 140,000 psi. (Grade 140) High-tensile, barbed wire and woven wire will be class 3 galvanized as specified in ASTM A 641 unless otherwise specified.

Table 1: High Tensile and Barbed Wire Specifications

	Minimum Wire Gauge	Barb		Max Stay Spacing	Galvanization Required
		Type	Max Spacing		
High Tensile	12 1/2	N/A	N/A	12"	Class 3
Barbed Wire	12 1/2 - 15 1/2	4 Point	10"	N/A	Class 3

Table 2: Woven Wire Specifications

	Minimum Wire Gauge			Max. Spacing	Galvanization Required
	Top & Bottom	Middle	Stays		
Standard	9	12 1/2	14	12"	Class 3
High Tensile	12 1/2	12 1/2	14	12"	Class 3
No Climb (4" x 4" or closer)	12 1/2	12 1/2	14	4"	Class 3

3. POST INSTALLATION

Wood posts may be driven or set in holes backfilled with concrete, tamped earth or tamped crushed limestone except where otherwise specified. Steel, fiberglass, and PVC posts will be driven unless otherwise specified.

Steel posts will be placed in the ground to a depth that the flange is buried a minimum of 2 inches below ground level. Fiberglass and PVC posts and steel posts without flanges will be placed a minimum of 24 inches in the ground.

Post holes will be at least 6 inches larger than the maximum diameter or side dimension of the posts when set in concrete or tamped ground limestone. Posts holes will be at least 4 inches larger than the maximum diameter or side dimension of the posts when tamped with earth except where otherwise specified.

Earth and limestone backfill around posts will be thoroughly tamped in layers not thicker than 4 inches and will completely fill the post hole up to the ground surface. Concrete backfill around posts will be rodded into place in layers not thicker than 12 inches and will completely fill the post hole up to the ground surface except where otherwise specified. All backfill types will be crowned up around posts at the ground surface. No stress will be applied to posts set in concrete until at least 24 hours after the concrete has set.

4. PULL ASSEMBLIES

Unless otherwise specified, corner assemblies will be installed at all points where the fence alignment changes 15 degrees or more, at any section end including at gates, at midline for stretches over 1320 feet, and where the vertical angle change exceeds 15 percent or as otherwise specified. Double assemblies will be used in corner and end assemblies in high tensile fence stretches over 1,320 feet with more than 3 wires including high tensile woven and barbed wire. The horizontal bracing in an H brace, if wood, must have a minimum diameter of 4 inches or be 4 inches square on the small end. The horizontal bracing materials may also be steel with a minimum 2.5 inch diameter or 2 inches by 3/16 inch or heavier angular. The minimum horizontal brace length will

be 84 inches. The diagonal brace wire will be double wrapped if using 12.5 gauge wire and single wrapped if 9 gauge.

5. WIRE AND ATTACHEMENT TO POSTS

Wire will conform to the requirements shown on the drawings. Staples will conform to the requirements shown on the drawings. Staples will allow for wire movement. Wire attachment to steel and fiberglass posts will be according to post manufacturer's recommendations or two turns of 14 gauge galvanized wire.

Staples required to secure the fence wire to wood posts will be 9-gauge galvanized wire with a minimum length of 1.5 inches for soft woods and a minimum length of 1 inch for close-grain hardwoods.

Driven posts can have high tensile wire attached the same day. Set posts need to "rest" and settle in before attaching and tightening high tensile wire.

The fencing wire (woven and barbed) will be fastened to each end post, corner post, and pull post by wrapping each horizontal strand around the post and tying it back on itself with not less than three tightly wound wraps. High Tensile wire will be fastened likewise except it will be wound no less than five tight wraps or attached with a crimping sleeve.

Wire will be spliced by means of a Western Union splice or by suitable splice sleeves applied with a tool designed for the purpose. The Western Union splice will have not less than 8 wraps of each end about the other. All wraps will be tightly wound and closely spaced. Splices made with splice sleeves will have a tensile strength not less than 80 percent of the strength of the wire. Spliced high tensile wire will have a minimum of two single crimping sleeves or one double crimping sleeve.

6. BOARD ATTACHMENT TO POSTS

Each board will be attached to each post with a minimum of two 16 d. hot dipped galvanized steel, stainless steel, copper, silicon bronze, or equivalent proprietary coated nails. Two 3-inch decking screws with like treatments may be used instead of nails. Unless painting is selected, lumber will be treated with a minimum treatment of 0.4 lbs/ft^3 of chromated copper arsenate or equivalent treatment. (Use Category UC4A). Boards will be attached to the animal side of the fence posts. A continuous vertical 1" x 4" face board may be used at each line post to cover and help to secure the horizontal boards (rails) to the line posts on wooden board fences. If used, boards will be attached with four 4-inch long hot dipped galvanized steel, stainless steel, copper, silicon bronze, or equivalent proprietary coated nails or decking screws.

7. ENERGIZERS

Barbed wire will not be energized.

Energizers will be installed and grounded according to manufacturer's recommendations. All energizers should be protected by a lightning arrestor and a surge protector. Energizers will be high power, low impedance with a minimum 5,000 volt peak output with a short pulse that is less than 300 mAmps in intensity, finished within 300-millionths of a second (0.0003 seconds) at a rate of 35-65 pulses per minute and a high impact weather resistant case. Ground rods will not be placed inside buildings. The grounding system when applicable will be heading towards the center of the energized acreage. Do not put ground rods near milking barns, water pipes or any other metal leading into barns or working areas.

8. <u>ADDITIONAL ITEMS WHICH APPLY TO THIS JOB</u>