

NATURAL RESOURCES CONSERVATION SERVICE
Wyoming
CONSTRUCTION SPECIFICATIONS
FOR
FENCE

Application of Fence (382) shall adhere to the Wyoming NRCS Conservation Practice Standard.

I. SCOPE

- The work shall consist of furnishing materials and installing barbed, barbless, and smooth wire, or combinations thereof, at the location(s) shown on the plan map and, if needed, on the drawings or as staked in the field. Fencing includes brace assemblies, gates, cattle guards, and other components required to meet site conditions and achieve objectives for practice application.

II. SPECIFICATIONS

- Planned designs departing from available specifications will be developed on a case-by-case basis and submitted to the State Resource Conservationist for approval prior to installation.
- All materials used in construction shall be new unless otherwise stated. At a minimum, the construction materials must meet or exceed the strength and durability of the following specifications:

Fence Wire

- Barbed wire shall be either zinc or aluminum coated that meets or exceeds *ASTM A-641* or *ASTM A-121* standard. Wire shall be No. 12 ½ gauge diameter or greater and have a minimum double strand breaking strength of 950 pounds. All wire shall be flexible enough so that proper splices can be made without damage to wire or coating. Barbs shall be spaced not more than 5 inches apart and shall be of 14 gauge or heavier wire with at least 2 points. All barbed wire shall consist of 2 strands of wire.
- Barbless wire shall meet or exceed the requirements established herein for barbed wire except those covering barbs.
- All line wires shall be tied-off on the anchor pull-post of gate, corner, and in-line brace assemblies. Wire ends shall be double wrapped around the anchor pull-post, stapled, and twisted back on the stretched line wire with at least 6 tightly wound wraps.

- The fence wire shall be placed on the side of the post expected to receive the most pressure.
- Every wire shall be attached to every post with an approved staple, clip, or fastener.

Bracing Wire

- Brace wires (tension members or guide wires) shall be formed from two complete loops of No. 9 gauge smooth wire or two complete loops of No. 12 ½ gauge barbed or barb less wire and be zinc or aluminum coated as per *ASTM A-641* or *ASTM A-121* standards.

Line Posts

- Maximum spacing between line posts shall be 20 feet with or without stays.
- Depth in soil of wooden line posts shall be a minimum of 30 inches.
- Steel "T" or grooved "Ω" posts shall be driven to a depth where the top of the steel plate is a minimum of 2 inches below the soil surface.
- Line posts must be set at significant high and low points along fence line to maintain proper wire height.
- All wooden posts except pitch pine, juniper, red cedar and Osage orange shall be, as a minimum, pressure treated with an approved EPA method such that complete penetration of the sapwood shall be obtained.
- Regular wood posts shall be a minimum nominal diameter of 3.5 inches inside the bark.
- Wood posts used for jacklegs shall be a minimum nominal diameter of 5 inches inside the bark.
- Juniper, Osage orange, or red cedar wood posts shall be a minimum nominal diameter of 2 inches inside the bark.

- All standard steel fence-posts shall have a minimum weight of 1.33 pounds per foot of length exclusive of anchor plate. They shall have suitable means for supporting wires such as studs, grooves, etc. Posts with lugs or lips that are punched out of the post itself shall not be used. All steel posts shall have a suitable anchor plate securely fastened near the bottom.
- Railroad ties or telephone poles that are sound and free from decay may be used, so long as minimum diameter and length requirements are met for the type of fence to be constructed.

Braces and Posts

- All wooden posts except pitch pine, juniper, red cedar and Osage orange shall be, as a minimum, pressure treated with an approved EPA method such that complete penetration of the sapwood shall be obtained.
- Regular wood posts shall be a minimum nominal diameter of 5 inches inside the bark.
- Juniper, Osage orange, or red cedar wood posts and shall be a minimum nominal diameter of 4 inches inside the bark.
- Wood posts shall be buried a minimum of 36 inches.
- Steel pipe, having an outside diameter of $2\frac{3}{8}$ inches or larger outside diameter and a weight of 4.7 pounds per lineal foot or greater may be used as a post.
- Steel pipe posts shall be buried a minimum of 30 inches and set in concrete.
- Horizontal or diagonal brace material shall be nominal 4 inch by four 4 milled lumber, a four 4 inch minimum diameter wooden post or pole or a 2 inch minimum diameter steel pipe with a 0.125 inch wall thickness.
- Horizontal brace posts shall be a minimum of 8 foot in length and a maximum of 12 foot in length.
- Diagonal brace posts must be a minimum of 2.5 times the height of the top wire (42 inch wire height will require a 4 inch X $8\frac{3}{4}$ foot brace).
- For standard horizontal braces, a tension member will be incorporated in all brace panels. This will be composed of 2 complete loops of No. 9 gauge

smooth wire or two complete loops of No. 12 $\frac{1}{2}$ gauge wire or its equivalent in heavier gauge wire, either smooth or barbed. This tension wire shall extend from a point approximately equal to the top wire of the fence, but at least one inch below the top of the brace post, to near, but not below the ground level of the post being braced. The brace wire shall be twisted to provide needed rigidity.

- Standard steel fence-posts may be used for bracing if connected with commercially available hardware designed for this use.
- Bracing is required at all corners, gates, direction change angles, and steep vertical angles in the line.
- Maximum distance between brace panels in the fence line shall not exceed 1,320 feet on level terrain and shall be installed at lesser intervals wherever horizontal direction of the fence changes more than 15 degrees or where vertical angles cause excessive strain on fasteners and posts.
- All corner and direction change braces shall be braced in both directions of the fence.

Stays

- Stays are not required or recommended for wildlife friendly fences, but may be used as needed to address site condition.
- Stays for wire fences shall be of wire especially fabricated for this purpose and swing free of the ground to permit the fence to sway when contacted by animals.

Staples and Clips

- Staples for wood posts, shall be serrated and a minimum of 1 $\frac{1}{2}$ inches in length and driven diagonally with the wood grain.
- Serrated $\frac{3}{4}$ inch staples may be used in hardwoods.
- The minimum diameter of staples shall be No. 9 gauge.
- For grooved steel posts, serrated staples will be driven into the groove according to the manufacturer's recommendations.
- Space shall be left between the staple and post to permit movement of the wire.

- Any suitable fastener that is 14 gauge minimum, showing good workmanship, that holds the wire at the proper height and allows the wire to freely contract and expand may be substituted for special clips, but shall not be used in lieu of serrated staples when staples are recommended by the post manufacturer.

Anchoring

- In crossing narrow drainage ways or draws, a weight or dead-man anchor equivalent to a 12-inch X 12-inch X 12-inch concrete block shall be fastened to the fence wires by suspension wire or wires. This will be done in a manner that will result in maintaining wire spacing and clearances approximately the same as that of the rest of the fence.

Gates

- Wire gates shall conform to the kinds, grades, and sizes specified for new fence and shall include the necessary fittings and stays.
- Timber gates shall be constructed of 2 inch or larger dimensional lumber.
- Commercial gates shall be of durable material and installed in accordance with the manufacturer's recommendations.
- Fabricated metal gates shall be constructed of material of a quality and life span equivalent to the rest of fencing material.

Fence Markers

- Markers are required to be installed on fences within 0.6 miles of any sage grouse lek or where fence visibility to grouse or wildlife in general is a

concern. This specification can be waived through a written recommendation from an NRCS or Wyoming Game and Fish Department (WGFD) biologist. WGFD recommend the top wire be marked with a minimum of 2 markers fitted with a high quality reflective tape.

Fence Height and Wire Spacing

- For cattle, total fence height will not exceed 42 inches. Top two wires should be spaced a minimum of 10 inches apart, however 12 inches is preferred. Bottom wire will be barbless and 16 inches or greater from ground, however 18 inches is preferred.
- Barbed wire can be used on the bottom strand if the height is equal to or greater than 19 inches off the ground.
- For Sheep, total fence height will not exceed 32 inches high with a barbless bottom wire no lower than 10 inches.
- For cattle and sheep, total fence height will not exceed 38 inches high with a barbless bottom wires no lower than 10 inches.
- Protective fences, where both livestock and wildlife are excluded, the fence height will be greater than 42 inches and the bottom wire will be lower than 10 inches.
- Standard barbed or barb less wire fence shall not be less than 32 inches high.
- Top wires will be at least 3 inches from the top of wooden posts and at least 1 inch from the top of standard steel or steel pipe posts.
- See Table 1 for recommended fence designs.

Table 1. Preferred fence designs and wire heights, in inches from ground level, for various situations.

Mature Cattle or Calves	
3-wire	18" smooth – 26" barbed – 38" barbed
3-wire	20" barbed – 30" barbed – 42" barbed
4-wire	18" smooth – 23" barbed – 30" barbed – 42" barbed
Mature Cattle, Calves, and Sheep	
4-wire	10" smooth – 18" barbed – 26" barbed – 38"
Sheep	
4-wire	10" smooth – 17" barbed – 24" barbed – 32" barbed

III. ADDITIONAL REFERENCES

United States Department of Interior Bureau of Land Management and United States Department of Agriculture Forest Service. 1988. **Fences**. Missoula Technology and Development Center, Missoula, MT.

Wyoming Game and Fish Department. 2005. **Fencing Guidelines for Wildlife**. Habitat Extension Bulletin No. 53. Wyoming Game and Fish Department, Cheyenne, WY.

Paige, C. 2008. **A Landowners Guide to Wildlife Friendly Fences: How to Build with Wildlife in**

Mind. Landowner/Wildlife Resources Program, Montana Fish, Wildlife and Parks, Helena, MT.

Wyoming Game & Fish Department. 2009. **Fence Marking to Reduce Greater Sage-grouse (*Centrocercus urophasianus*) Collisions and Mortality near Farson, Wyoming – Summary of Interim Results**. Wyoming Game and Fish Department, Cheyenne, WY.

These publications can be found online at: <http://www.wy.nrcs.usda.gov/technical/rangemgt/range.html>