

## Fence (Feet) 382

Michigan Public Act 382 of 1976 prohibits animals to run at large.

Michigan's Right to Farm Act and the Generally Accepted Agricultural and Management Practices for the Care of Farm Animals require fence to be an adequate physical barrier for livestock containment and be properly maintained to remain in compliance.

### DEFINITION

A constructed barrier to animals or people.

### PURPOSES

This practice is applied to facilitate the application of conservation practices by providing a means to control movement of animals and people.

### CONDITIONS WHERE PRACTICE APPLIES

This practice may be applied on any area where a permanent barrier is needed for management of animals or to:

- Implement a prescribed grazing plan and provide better distribution of grazing livestock.
- Confine livestock or domesticated wildlife on an area.
- Reduce erosion and improve water quality by controlling livestock access to streams, springs, wetlands, and ponds.
- Facilitate handling, movement, and feeding of livestock.
- Protect newly planted areas from disturbance until established.
- Protect sensitive environmental areas and their flora from vehicular, pedestrian, or animal traffic and use.
- Protect the safety of people, livestock, and wildlife by limiting or denying access to hazardous areas.

Fences are not needed where natural barriers will give adequate protection and serve the intended purpose.

### CRITERIA

**NOTE: Specific program guidance may be more restrictive on a number of these criteria. Refer to program manual for specific program requirements.**

#### General Criteria Applicable To All Purposes

The purpose of the fence shall be factored into determining the type of fence to be constructed. For example, sheep and hogs may require woven wire, cattle may be contained with electrified wire, and chain link fence may be required to control public access to areas.

Fencing materials, type and design of fence installed shall be of a high quality and durability. The type and design of fence installed will meet the management objectives and topographic challenges of the site. Material used for permanent fence shall have a minimum life expectancy of 20 years.

Fences shall be positioned to facilitate management requirements. The fence design and installation shall follow all federal, state, tribal, or local fencing codes, laws, or regulations.

All State of Michigan permits will be secured prior to installation.

Standard or conventional (barbed or smooth wire), suspension, woven wire, or electric fences shall consist of acceptable fencing designs to control the animal(s) or people of concern and meet the intended life of the practice.

Fence materials shall be attached to the post on the side receiving the greatest pressure from livestock, wildlife, or humans.

Height, number, and spacing of wires will be installed to facilitate control and management of the animal(s) and people of concern.

Other types of fence materials can provide good quality control of animals and people of concern. These types include but are not limited to pipe, vinyl, galvanized panel, welded wire, and cable fences. Materials will be installed according to the manufacturer's recommendations and approved prior to installation.

Manufacturer's guidelines shall be adhered to during installation and meet the minimum construction specifications of each type of fence to ensure proper component assembly.

Construction and maintenance safety is a primary concern. Wire that is overstretched may break and recoil. Eye and hand protection should be worn.

Place warning signs on electric fences bordering public thoroughfares spaced every 100 feet.

The Wildlife Conservation Order under Act 256 of the Public Acts of 1988 mandates that passage for wildlife in known travel lanes shall be accommodated by using perimeter fencing less than 52 inches in height and the bottom of the fence is spaced at least 4-inches above the ground. Alternatively, constructing passage areas 40 feet wide, 52 inches or less in height, and no more than 660 feet from the next passage will allow wildlife passage. This order does not apply to an exclusion structure which does not kill, harm, capture, trap, or collect animals and which is constructed to deter or prevent damage by wild animals to private property, including but not limited to fences to protect livestock, poultry, and other birds, including captive-reared game birds; farm crops; orchards; and gardens.

A permit for temporary enclosure of wild, free-ranging deer, elk, bear, or moose is needed when constructing fence greater than 52 inches in height above the adjacent grade anywhere along its length and the total length of the constructed structure is more than 1/4 mile and does not contain passages constructed in such a manner as to ensure passage of wildlife. The permitting agency is the Michigan Department of Natural Resources.

### **1. Posts**

Refer to Table 1. Fence Materials and Installation Requirements for specifications applicable to posts.

Wood posts shall be set in holes and backfilled with tamped earth or shall be driven unless otherwise specified. Steel and fiberglass posts shall be driven unless otherwise specified. Post holes shall be at least 6 inches larger than the maximum diameter or side dimension of the posts.

When live trees are used as line post, avoid short-lived or disease susceptible species (e.g., elm, ironwood, dogwood). Also, avoid species that are considered valuable for timber production (e.g., black walnut, oak, etc.).

Live trees used for line posts shall have a diameter breast height equal to or greater than those prescribed for normal wooden posts. Some alignment variation shall be allowed. Wire or insulators will not be fastened directly to live trees.

At no time shall live trees constitute more than 10% of the line posts used.

Landscape timbers are not allowed.

### **2. Brace Assemblies**

Refer to Table 1. Fence Materials and Installation Requirements for brace specifications.

Brace assemblies are needed for woven wire, barbed wire, high tensile, and any combination of woven, barbed, and high tensile wire fence.

All standard brace structures shall maintain a minimum of a two to one (2:1) ratio of brace length to height of the top wire.

When using wooden posts, a single brace is needed for high tensile wire with 4 to 6 strands. Double span assemblies shall be used for 7 or more strands of wire.

Combination single and double brace spans shall be used on rolling land.

### **3. Gates**

Refer to Table 1. Fence Materials and Installation Requirements for gate posts specifications.

Gates shall be designed to accommodate the landowner's objectives.

Commercial metal, painted or galvanized steel, or aluminum gates are allowed.

Gates should be constructed of durable material that equals or exceeds the quality of the adjoining fence.

All wood members must be of durable wood or pressure treated with a preservative.

Panel gates shall be of equivalent quality and shall be fitted with at least two hinges and a latch or galvanized chain for fastening.

Gate hinges shall be attached directly to an end post.

Gates for energized fences shall be installed in accordance with the manufacturer's instructions.

Electrified gates may be constructed of a single straight wire, galvanized cable, or polytape with a spring-loaded insulated handle, or an expandable, coiled, high tensile wire attached to an insulated handle. The number of wires shall be determined by the fence objective. The gate shall be constructed so that it is non-electrified when the gate is open.

Overhead or underground transmission lines will be used to carry electricity past the gate to the remainder of the fence.

Flood gates will be designed with provisions that allow passage of driftwood and debris.

#### **4. Fasteners and Connectors**

Nails used for wooden fence shall be hot dip galvanized. Steel fasteners shall be hot dip galvanized or stainless.

Staples should be of 9 gauge galvanized wire with a minimum of 1.25 inch length. Select length based on the type of wood. Drive staples at a diagonal. Staples shall be set to allow for wire movement.

The type and size of fastening clips shall meet the manufacturer's requirements for attachment of the wire.

The type and size of insulators shall meet the requirements to fasten electric fence materials to a post. Insulators shall be of high quality and designed to last as long as the wire and posts.

Join wire with commercially available connectors, such as splice sleeves, applied with a tool designed for the purpose, or by Western Union, figure eight, square knot or thread-through knot or manufacturer-recommended tying methods.

#### **5. Wire Fence**

Refer to Table 2. Permanent Perimeter Livestock Fence Criteria for minimum wire numbers and spacing by livestock species.

Barbed Wire - Shall consist of two twisted strands of 12.5 gauge wire, or high tensile strength wire of 15.5 gauge. Barbs shall be spaced no more than 5 inches apart and shall be of 14 gauge or heavier wire with at least two points. Barbed wire should never be electrified.

Woven Wire - Will consist of a high tensile woven wire with a minimum gauge of 12.5.

High Tensile - Will consist of 12.5 gauge, minimum tensile strength of 110,000 psi, and type III galvanized.

Each wire will be tensioned to a minimum of 200 pounds and maximum of 250 pounds after being installed on the posts. Ratcheting type in-line strainers will be used on each wire to maintain the proper tension. Compression springs will be installed when the fence length is less than 200 feet. Springs will be on each wire to absorb the shock of animal impact with the fence.

Polywire/Polytape - Shall have a minimum of 6 stainless steel, copper, or aluminum strands, or one 12.5 gauge high tensile wire running through the fabric.

#### **6. Energized High Tensile Wire**

Electronic energizers or power fence controllers will be powered by a 12-volt battery powered system, solar cell, or household electric current.

Energizers must have a lightning arrestor.

Energizers will be high power, low impedance with a 5000 to 6000 volt peak output and have a high impact, weather-resistant case.

All energized fence must be grounded. Follow the manufacturer recommendations on feet of ground rod needed per joule of energizer output. Minimum ground rod is 3 feet of rod for each joule of output. More ground rods may be needed for the system to function properly. Space ground rods at least 6 feet apart.

Connections between the energizer, connecting wire, and ground rods shall be of high quality materials, adequately sized, and designed to accommodate a change in metals if applicable.

Do not put ground stakes near milking barns, water pipes, or any other metal items leading into the barn or working area. Lightning arrestors should be placed no closer than 10 feet from the energizer.

When using electric fences, training areas should be used to condition livestock to fences. Select a well-fenced area and construct an electric fence across, or around, the area to allow animals to come in contact with the electric fence.

## 7. Wooden Fence

Refer to Table 2. Permanent Perimeter Livestock Fence Criteria for minimum wire numbers and spacing by livestock species.

Boards and Rails - The boards or rails shall be treated with a wood preservative, or be a rot-resistant species such as cedar. Boards shall be a nominal thickness of 1 inch and at least 5 inches in width (1x6) with lengths of 16 feet whenever possible.

## 8. Chain Link Fence

Chain Link - Fence, including fittings and gates, shall conform to the requirements of appropriate ASTM Specifications for residential, commercial, or industrial fence, as appropriate (ASTM A 121, A 392, ASTM F 1043 and F 1083). The wire fabric shall be a minimum of 4 feet high and be manufactured from a minimum of 11 gauge wire. Fittings and gates shall conform to the requirements of ASTM F 626 "Standard Specification for Fence Fittings" and ASTM F 900 "Standard Specification for Industrial and Commercial Swing Gates."

Fencing fabric shall be stretched taut and securely fastened, by means of tie clips, to the posts at intervals not exceeding 15 inches and to the top rails

or tension wires at intervals not exceeding 2 feet. Tension should be equalized on each side of each post.

### Additional Criteria To Implement Prescribed Grazing

Improve resource management by locating fences to separate areas with differences in forage seasons of growth and palatability, use, topography, or production potential.

Pasture/paddock divisions shall be consistent with grazing needs as projected by a grazing plan developed under Michigan Conservation Practice Standard Prescribed Grazing, 528.

Paddock division **temporary** fencing should have adequate number of wires for animal confinement. Woven wire, electric twine or ribbon, and electric net may be used for division fencing. Posts to support fencing may be of fiberglass, plastic, or steel. Division fencing may attach to the permanent perimeter fence directly or on a secured reel.

Locate fences to control livestock access to water and handling facilities.

Any permanent fencing for grazing livestock should allow flexibility to facilitate implementation of the prescribed grazing plan and permit land management activities such as nutrient application, pest control, forage harvest, and other appropriate practices.

### Additional Criteria For Deer Exclusion

Depending on deer density, electric high tensile wire installed as vertical 5 strands, spaced at 10, 22, 34, 46, and 58 inches above the ground. Vertical 7 strands spaced at 10, 18, 26, 34, 42, 50, and 58. Vertical electric fence will reach a height of 58 inches.

Slanted 7 strand electric high tensile wire spaced at 10, 22, 34, 46, 58, 70, and 82 inches from the base. Slanted fence will reach a height of 48 inches and cover a 6 foot horizontal width.

## CONSIDERATIONS

The fence design and location should consider: topography, soil properties, safety and management of livestock, wildlife movement, location and

adequacy of water facilities, development of potential grazing systems, human access, landscape aesthetics, erosion problems, moisture conditions, flooding potential, stream crossings, and durability of materials.

Diamond mesh wire and chain link fences are excellent choices for containment of livestock; however, the cost is usually prohibitive. Such fence materials may be necessary for livestock of high value or to restrict access to dangerous or sensitive areas by livestock and people.

Consider wildlife movement needs when locating fences. Fence wire height may require adjustments to repel predators or avoid entanglement.

Consider livestock management, handling, watering, and feeding when locating fences.

Consider the livestock and machinery pressure applied to gates.

Where applicable, clear right-of-ways will be established which facilitate fence construction and maintenance.

Fences across gullies, ravines, or streams may require special bracing, designs, or approaches. Refer to Michigan Standard Drawings for Fence for design details.

Consider needs for improved future grazing management and the development of potential grazing systems, especially before installing permanent interior fence.

Fence design and location should consider ease of access for construction, repair, and maintenance.

A 10 or 12 foot gate is usually adequate for the movement of livestock. If the gate will be regularly used for truck or farm machinery, consider installing 14 to 16 foot gates. A 4 foot wide swinging wood or metal gate similar to the larger gates is often desirable in a fence for use by people and small equipment.

Consider stiles and walk-through passageways to provide passage for people that limit animal passage.

Consider raising lower wire of fences located in the floodplain.

For deer exclusion, keep the fence charged throughout the year. Uncharged fences may be broken or ignored. When lower wire or wires become buried in snow, consider disconnecting them.

Consider the potential effects of installation and operation of fence on the cultural, archeological, historic, and economic resources.

## PLANS AND SPECIFICATIONS

Plans and specifications for installing fences shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve all of its intended purposes.

The written fence plan will consist of the following items:

- A statement of purpose for the fence.
- A map showing the location and alignment including gates and lanes, of the fence.
- List of permits required.
- Materials list for the fence components including the quantity and specifications as herein described in the criteria and on tables.
- Design modifications recorded on the field map for as-built documentation and on the Standard Drawing with as-built documentation.
- Use the appropriate Standard Fence Drawing number.
- Use of the Michigan Conservation Sheet for Fence or the Fence Estimator spreadsheet.
- Operation and maintenance requirements will be included with a fence plan.

The landowner will call MISS DIG to locate underground utilities in compliance with the NRCS national and state utility safety policy.

Construction specifications are described in NRCS-MI-170-1.

## OPERATION AND MAINTENANCE

Regular inspection of fences should be part of an ongoing maintenance program.

Inspection of fences after storm events is necessary to ensure the continued proper function of the fence.

Maintenance and repairs will be performed in a timely manner as needed.

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

Remove fallen limbs and maintain proper tension on the fence wires. Overhanging trees and limbs should be trimmed or removed as needed.

Clear the brush from fence lines to reduce voltage loss. Vegetative control can be achieved by herbicides applied per the manufacturer's label.

Maintain proper tension on the fence wires.

Electric fences will be regularly checked to determine the voltage on the fence. If voltage is not sufficient, determine the cause and correct.

During dry weather, ground rods may need water applied to soil around them.

Electrified floodgates must be maintained and kept clear of debris. During extended flooding periods, switch off the floodgates.

## REFERENCES

Turner, J.H. 1997. *Planning Fences*. American Association for Vocational Instructional Materials (AAVIM): Winterville, Ga.

Turner, J.H. and G.W. Smith. 1974. *Building Fences*. American Association for Vocational Instructional Materials (AAVIM): Winterville, Ga.

"Fence Construction for Barbed Wire or Woven Fence," New York USDA, NRCS.

"High Tensile Wire Fencing," published by Northeast Regional Agricultural Engineering Service.

"Installation and Operation of Electric Fences, Cow Trainers and Crowd Gates," published by Wisconsin Farm Electric Council.

"Construction Principles of Perimeter-Electric-High Tensile Fence," by Ben Bartlett and Jack Middleton, MSU Extension.

Specifications for Farm Fence Construction, ASAE Standard EP250.2.

Gallagher Power Fence manual. 10th Edition.

Harper, Frederick. *Fencing for Horses*. In Horse Industry Handbook. 1993. American Youth Horse Council.

Michigan NRCS Standard Fence Drawings.

Many fencing companies also have reference material available for recommendations. Keep in mind that they are in the business to sell a product.

## DEFINITIONS

*Corner Assembly* - An anchor and brace assembly used when pull is from two or more different angles.

*End Assembly* - A single or double span horizontal brace assembly at the end of the fence or gate opening, with a brace wire for tension from the bottom of the end post to the top of the brace post.

*Flood gate* - A structure across a stream, or a draw, that will permit water and debris to pass and still fence livestock.

*High voltage - Low Impedance* - An energizer, which has a pulse length of less than .003 seconds.

*Non-High Tensile Fence* - Any fence that does not fit the criteria for High Tensile Wire.

*Off Set Brackets* - Brackets used on barbed or smooth wire fences to renovate existing fence lines.

*Permanent fence* - Used to exclude livestock and other animals or people from all areas needing permanent protection and/or also used to establish permanent grazing system boundary areas. Also used to regulate or restrict public or vehicular access to areas.

*Pull Assembly* - An in-line single or double span brace assembly, which aids in tightening the wires.

*Stay* - A post comprising wood, fiberglass, or insul-timber, which is used between the line posts to maintain stability and desired fence height within the fence.

*Temporary fence* - Used to subdivide land on a temporary basis within grazing areas to permit the implementation of a planned grazing system, or to provide for the temporary exclusion of livestock as part of a riparian zone management area, or to temporarily exclude livestock from areas needing grazing protection until seeding establishment.

**TABLE 1. FENCE MATERIALS AND INSTALLATION REQUIREMENTS**

Fence Type	Line Post Type, Size, and Spacing	Corner, End, Gate, and Brace Post Size <sup>2/3/</sup>	Brace Intervals <sup>4/</sup>
Smooth Wire High Tensile- Non-Energized or Electric	<p>Type: Wood, Steel, PVC, Fiberglass, Insultimber or other materials. <sup>1/</sup> Untreated durable wood (e.g., red cedar, northern white cedar, redwood, pitch pine, or black locust) with bark removed. Sound and free of decay, with all limbs trimmed flush with the body. Non-durable wood that is preservative pressure treated. Heavy duty steel “T,” “U,” or “Y” posts galvanized or painted, with anchor plates.</p> <p>Size: Wooden posts: At least 4 inches in diameter or 4 inches square, and at least 7 feet long. Set 36 inches in the ground. Steel posts: Set in the ground to a depth that the flange is buried. Steel pipe posts: Minimum diameter of 2 inches, minimum 5 foot length. Fiberglass posts: Minimum diameter of 1 inch and 6 foot length.</p> <p>Spacing: Posts will be spaced no further than 100 feet apart. When spacing exceeds 50 feet, stays will be centered. A wooden post will be used every 165 feet when steel or fiberglass line posts are used.</p>	<p>Size: Wooden and Synthetic posts 5 inches in diameter and at least 7 feet long, placed 36 inches in the ground and no more than 8 feet apart. See Note 2 at the end of this table.</p> <p>Steel posts - minimum 4 inch diameter and 8 feet long.</p> <p>Brace Members: Horizontal or diagonal member: Wood and Synthetic diameter a minimum of 3 inches. Steel pipe diameter a minimum of 2 inches.</p>	<p>Required at all corners, gates, and change in angle. Use a corner post assembly for fence alignment changes of 15 degrees or greater.</p> <p>Single brace used when fence length is greater than 660 feet (40 rods) of run and on fence with less than 7 wires.</p> <p>Double brace used when fence length is 660-1,320 feet (40-80 rods) of run and on fence with 7 or more wires.</p> <p>Double span end, corner, and angle change required on runs of greater than 1,320 feet (80 rods).</p>
Woven and Barbed Wire	<p>Type: Same as above. Size: Same as above. Spacing: Maximum 16.5 feet (1 rod) apart, on center, for standard wire. Maximum 20 feet apart, on center, for high tensile wire. Set to a depth of at least 36 inches. A wooden post will be used every 165-feet when steel, fiberglass, or other line posts are used.</p>	<p>Size: Same as above.</p>	<p>Required at all gates, corners, and ends. Corner bracing will be used when fence alignment changes 15 degrees or greater.</p> <p>Straight section runs up to 330 feet (20 rods) for woven wire and barbed wire require a single brace pull assembly.</p> <p>Double bracing shall be used when run of barbed wire fence is greater than 660 feet, greater than 330 feet for woven wire.</p> <p>Use braces at tops and bottoms of hills, and to divide fence lengths where runs of fence are more than 660 feet long.</p>

**TABLE 1. FENCE MATERIALS AND INSTALLATION REQUIREMENTS - Continued**

Fence Type	Line Post Type, Size, and Spacing	Corner, End, Gate, and Brace Post Size <sup>2/3/</sup>	Brace Intervals <sup>4/</sup>
Wooden Board	<p>Rails - Well seasoned or kiln dried wood. Rails are a minimum of 1x6 inches and at least 8 feet long.</p> <p>Posts: Untreated durable wood with bark removed, OR non-durable wood that is preservative pressure treated.</p> <p>Heavy duty steel “T,” “U,” or “Y” posts, galvanized or painted with anchor plates.</p> <p>Size: Wooden post minimum of 4 inches in diameter or 4 inches square. Length sufficient to support desired height of fence and be set in the ground a minimum of 36-inches.</p> <p>Spacing: 8-10 feet apart.</p>	<p>Wooden posts with a minimum 6 inch diameter or 6 inch square set in the ground to a minimum depth of 36 inches. See Note 2 at the end of this table.</p> <p>Maximum spacing no further than 8 feet apart.</p>	Not applicable.

**Table 1 Notes:**

- 1/ PVC or other types of plastic line posts may be used as long as they are capable of providing support for the fence and are installed to the manufacturer’s recommendations.
- 2/ A single 12 foot long, 6 inch minimum diameter post may be substituted for end panel, corner and vertical change bracing, and pull post assembly. The 12 foot long post shall extend a minimum of 7.5 feet into the ground and be backfilled with gravel.
- 3/ Where posts cannot be set to the specified depth, additional anchors or deadman applied against the direction of pull will be needed.
- 4/ The strongest brace assembly is the double horizontal (H) brace.



**TABLE 2. PERMANENT PERIMETER <sup>4/</sup> LIVESTOCK FENCE AND MICHIGAN ENGINEERING STANDARD DRAWINGS**

<b>Type of Livestock</b>	<b>Non-Electric High Tensile Smooth Wire MI-210-B</b>	<b>Electric High Tensile Smooth Wire MI-230-B</b>	<b>Woven Wire <sup>5/</sup> MI-220-B</b>	<b>Barbed Wire <sup>1/</sup> MI-200-B</b>	<b>Wooden Board</b>
Beef-Steers, Cows and Calves	Minimum of 5 strands, spaced beginning 5 to 10 inches above the ground with a total height to top wire not less than 46 inches above the ground.	Minimum of 4 strands, equally spaced beginning at 10 inches above the ground.	Minimum of 42 inches high, plus 1 or 2 additional wires (either barbed or electrified smooth) at the top at least 4 inches above the woven wire and 1 inch below the top of the post.	Minimum of 4 wires spaced an equal 10 inches apart at 12-16, 22-26, 32-36, and 42-46 inches above the ground.	4 boards spaced on 16 inch centers; bottom board at 9 to 12 inches above the ground, with 8 to 9 inch spaces between board to a minimum height of 54 inches above the ground.
Dairy Cows and Heifers	Minimum of 5 strands, spaced beginning 5 to 10 inches above the ground with a total height to top wire not less than 46 inches above the ground.	Minimum of 4 strands, equally spaced beginning at 10 inches above the ground.	Minimum of 42 inches high, plus 1 or 2 additional wires (either barbed or electrified smooth) at the top at least 4 inches above the woven wire and 1 inch below the top of the post.	Minimum of 4 wires spaced an equal 10 inches apart at 12-16, 22-26, 32-36, and 42-46 inches above the ground.	4 boards spaced on 16 inch centers; bottom board at 9 to 12 inches above the ground, with 8 to 9 inch spaces between board to a minimum height of 54 inches above the ground.
Horses and Foals, Mules, Llama, Alpaca and Similar	<sup>2/</sup> Minimum of 5 strands, spaced beginning 5 to 10 inches above the ground with a total height to top wire not less than 46 inches above the ground.	<sup>2/</sup> Minimum of 4 strands equally spaced beginning at 10 inches above the ground.	Minimum of 42 inches high, plus at least 1 additional electrified smooth wire at the top at least 4 inches above the woven wire and 1 inch below the top of the post. Alternatively a wooden rail (board) plus an electrified smooth wire may be added at the top of the woven wire.	Not Recommended.	4 boards spaced on 16 inch centers; bottom board at 9 to 12 inches above the ground, with 8 to 9 inch spaces between board to a minimum height of 54 inches above the ground.
Goats and Kids, and Sheep and Lambs	Not recommended.	<sup>3/</sup> Minimum of 4 strands (at least 2 electrified), spaced beginning at 5 to 6 inches above the ground with bottom 2 wires closer together than top 2 wires.	Minimum height of 42 inches. An additional barbed or smooth electrified wire may be used above the woven wire, spaced at least 1 inch below the top of the post.	Minimum of 4 wires spaced an equal 10 inches apart at 12-16, 22-26, 32-36, and 42-46 inches above the ground.	Not Recommended.

**TABLE 2. PERMANENT PERIMETER <sup>4/</sup> LIVESTOCK FENCE AND MICHIGAN ENGINEERING STANDARD DRAWINGS - Continued**

Type of Livestock	Non-Electric High Tensile Smooth Wire MI-210-B	Electric High Tensile Smooth Wire MI-230-B	Woven Wire <sup>5/</sup> MI-220-B	Barbed Wire <sup>1/</sup> MI-200-B	Wooden Board
Hogs	Not recommended.	Minimum of 4 strands (at least 2 electrified), spaced beginning at 6 inches above the ground.	Minimum of 35 inches high.	Not Recommended.	Not Recommended.
Large Animals such as, Exotic Species, Captive Deer Herds, Bison, and Similar <sup>6/</sup>	10 strands spaced at equal intervals, a minimum of 46 inches and up to 96 inches above the ground determined by animal need.	Minimum of 8 strands spaced beginning at 6 inches, equally spaced to a minimum height of 56 inches above the ground.	Minimum height of 46 inches (60 inches for bison) and up to 96 inches above the ground.	Not Recommended.	Not Recommended.

**Table 2 Notes:**

- <sup>1/</sup> Barbed wire fence should never be electrified.
- <sup>2/</sup> To increase fence visibility, substitute one or more strands of vinyl coated wire or high tensile polywire rope or tape for the smooth wire.
- <sup>3/</sup> With kids and/or lambs present, adjust the spacing of wires to accommodate their height.
- <sup>4/</sup> Interior exclusion fence: the number of wire strands should be adequate to exclude livestock from the area of concern with the minimum number being one less than required for perimeter fencing.  
 Spacing for interior barbed wire at  $\pm 2$  inches from 14, 24, and 34 inches above the ground.  
 Spacing for high tensile wire at  $\pm 2$  inches from 12, 22, and 32 inches above the ground.
- <sup>5/</sup> Woven wire for cattle or horses comes in standard heights depending on the manufacturer. These vary in increments between 22 and 50 inches.
- <sup>6/</sup> Fence height will be based upon potential for animal escape or injury by the fence. Chain link or diamond mesh wire fencing of appropriate height can be used.