

Fencing Systems for Rotational Grazing



Using High Tensile Wire

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Installing the High Tensile Wires

There are five basic steps involved in installing the high tensile wires and each of those steps has several different, equally effective options. They are:

- Deciding how many wires you'll need and then marking how high up and far apart they need to be placed on the ends and corners.
- Insulating the electric wires from the end and corner posts.
- Stretching the wire.
- Connecting the wire.
- Installing the in-line strainers, tension springs and then tightening the wire.

Step 1: How many wires, how high up and how far apart.

There aren't hard and fast rules on how high up a fence wire should be and how far apart they should be in a multi-wire fence. The most common height for the top wire in a multi-wire fence intended for livestock purposes is somewhere between 36 and 48 inches and the bottom wire between 6 to 12 inches. Once you've decided the wire placement then mark all of the ends and corner posts at the heights where wires will be connected.

Step 2: Insulating the electric wires from the ends and corner posts

Once the wire placement on the end and corner post have been set we have a couple of different general options available to us for insulating the electric wires from the posts, donut style versus wrap-around insulators, and a couple of

different methods for connecting insulators to the posts, looped high-tensile versus single wire with knots. First we'll showing donut style insulators being fastened by both looped wire and single wire knots and then we'll cover some the modifications that are commonly used and cover some of their advantages and disadvantages.

The process described here is for putting the insulators on out in the field once the end or corner assembly is already built. Start the process by cutting high-tensile wire long enough to be loosely wrapped around the fence post two times then wrap the precut wire around the post slipping it through the insulator you've chosen to use. Next, fasten the ends of the wire together. For our example we're using wire-crimping sleeves. When using crimping sleeves use at least two, keep them slightly apart and twist the ends of the wire so that they keep the wire from slipping through them. Finally, use a fencing staple to loosely attach the insulator that spots already marked on the fence post.

For the person who is planning on doing a lot of fencing it may worth the time to learn how to tie fence knots with high-tensile electric

fencing. If done properly the knot actually tighten up and become more secure as force is applied to the fence. But like anything else high-tensile wire fence knot tying does take some practice to make sure its done properly and if you don't do it all the time you'll generally have to relearn how to do it the next time you build fence. One of its big advantages is it doesn't require extra tools, but there are a couple of disadvantages. It is tough to tie knots with wire testing over 170,000 psi, and if the wire is kinked in the knot tying process it can be easier to break when a force is applied to it.



Figure 1 Knots

- **Wrap-around insulators**

Another popular insulating concept is the wrap-around insulator. Figure 4.2 shows a common type of wrap-around insulator that is made of a plastic material designed to insulate against the high voltage and amperage currents and uses an embedded metal band that helps protect the insulator from being cut through by the high-tensile wire. There are some fence suppliers that have gone with a thicker plastic material and have done away with metal band. The big advantage of

wrap-around insulators is they cut a whole step out of the process by eliminating building the insulator assembly previously described. The line wire is hooked right to the post. The disadvantage is the long-term reliability. Over time some insulators will fail and if a wrap-around insulator fails it is difficult to see. It is obvious when a donut type insulator has broken.



Figure 2 Wrap around insulator

- **Lock-pin insulators at the corners**

The donut type insulator assemblies that have been described can be used at both the ends and the corners. At the corners the donut style insulator assemblies bring the fence around the corner on the inside of the corner assembly. Depending on which side of the fence the animals are on that can be an advantage or disadvantage. The popular thinking is it is better to have the fence on the side of the posts that the animals are on to help protect the post. But in practice with high tensile wire electric fences, out in pasture situation, this is seldom a concern and in many instances animals are on both sides of the fence anyways. For ease of installation and maintenance on

corner assemblies lock-pin insulators are definitely something to take a look at. In the event a corner post needs to be reset, the wire can simply be taken out of the insulators then, slipped up over the post while the corner is being reset and then put back in

Some fence specialists suggest tying off the fence at each of the corners. Not only is it not necessary, it increases the cost of the fence and makes it less resilient. High tensile wire can stretch for several thousand feet without risk of breaking. The longer the stretch the more wire to absorb the shock of when something hits the fence. Tying the fence off at every corner just puts that much more pressure on the posts.

- **Insulator alternatives**

As high-tensile electric fencing systems have gained in use there have been many new products come onto the market. Here are a few of the options commonly seen in use.

White porcelain donut insulator: Figure 3 shows a porcelain donut style insulator that has been used in electric fencing for decades. It is a very good insulator, easily available and cheap. The problem with it is its strength. These weren't intended to be used with high tensile wire systems but if installed properly will hold up pretty well. To help distribute the force exerted by the wire, notice in the picture how the fence wire is wrapped around the insulator one full turn before it is tied off. This helps distribute the force around the entire insulator.



Figure 3 Donut insulator

Grey porcelain, bull nose insulator: Figure 4 shows an insulator designed just for these applications. These insulators are engineered to take the pressure of high-tensile fence.



Figure 4 Bullnose insulator

Plastic insulators: Figure 5 shows an end post with insulators engineered very much like the grey porcelain bull nose insulators except they are black plastic. These insulators are a good option to take a look at. The biggest downside may be their longevity compared to porcelain but with the high grade UV stabilized plastics in use today that isn't much of a concern.



Figure 5 Plastic insulators

Fiberglass insulators: Figure 4.6 shows a fiberglass rod that has a couple of holes drilled in it and sleeves installed to help keep the wire from splitting it out. Although this is a small diameter rod with a 14.5 gauge high-tensile wire, a larger rod can be used for more applications that might be under more stress. The drawback of these types of insulators is the fiberglass will break down over time and the design has the wires away from each other, not against each other as in the donut type insulators.



Figure 6 Fiberglass insulator

Step 3: Stretching the wire

Compared to other types of fences this is probably one of the easiest

parts of the whole process. Unlike woven and barb wire fences that need to be rolled down the fence because they get caught up on everything along the way, high tensile wire can just be pulled down the length of the fence. There are however a couple of cautions. High-tensile wire is strong but does have a memory. Without some kind of device to help unwind it will turn into big ball of wire. Typically high tensile wire comes in 4000 or 8000 foot rolls. Before you untie the wire to start working with it you'll need some kind of unrolling device often called payout reel. It doesn't need to be fancy but it does need to be able to keep the wire on the reel so it feeds out only as fast as you want it to. Figure 7 shows a manufactured reel that can be sat on the ground and Figure 8 is a homemade reel mounted to the back of a tractor.

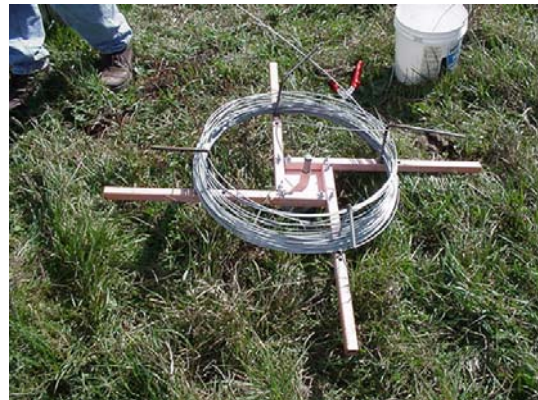


Figure 7 Manufactured fence reel



Figure 8 Homemade fence reel

Step 4: Fastening the wire

Now that the fence is stretched it time to either hook it up to the posts, either with the insulator assembly or with the wrap around insulators. Regardless of the insulators used there are three common ways of fastening the wire. The first is by tying the wire on with a fencing knot. . Another common practice is to use the crimping sleeves. Not as common but just as effective is the use of something called a twistlink. The twistlink shown in Figure 9 is a product of the utilities industry and is very easy to work with. Once it is wrapped onto the wire it actually gets tighter as the fence is tightened. One of its great advantages is it can be taken apart easily if the fence ever needs to be repaired. Its biggest disadvantage is the cost compared to tying knots or crimping sleeves.



Figure 9 Twistlink

Step 5: Installing the in-line strainers, tension springs and then tightening the wire

The final step in the process is tightening the wire. That's another beauty of high-tensile wire fence systems that have been developed. High-tensile wire fences are primarily pain barriers but they need to be kept in place if animals are going to respect them. Since the wire can take a tremendous amount of force without breaking, wire tightening devices called inline strainer have been developed to tighten and loosen the wire. Once the fence wire has been hooked to the ends it run the inline strainers can be installed. There are three options that are commonly used; a ratchet style inline strainer and compression spring combination, a ratchet style inline strainer by itself and a Daisy strainer. Each has its advantages and disadvantages.

- Ratchet inline strainer and compression spring: A ratchet style inline strainer and compression spring combination as seen in Figure 10 is usually suggested where there

is a short (less than 440 feet) run of fence where there isn't a great deal of wire to absorb the shock of something either striking the fence or below freezing temperatures that causes the metal to contract. The spring arrangements usually have marks on them to denote the force exerted on the spring.



Figure 10 In-line strainer and spring

- Ratchet inline strainer by itself: When high-tensile wires are being stretched for long (greater than 440 feet) runs the compression springs aren't quite as important. Just inserting an inline strainer will be adequate to keep the fence tight and the wire has enough spring in it to absorb shocks without putting all the pressure on the posts. Figure 11 shows one type of inline strainer.



Figure 11 In-line strainer

- Daisy strainer: The daisy strainer is probably the most popular inline strainer for a couple of reasons. The first is because it is less expensive than the ratchet style strainers, and the second reason is it can be put on the wire without cutting. The strainer is simply put on the wire and twisted until the desired tension is reached (Figure 12). The disadvantage is it is a bit more difficult to adjust the tension because of the way the way it attached to the fence.



Figure 12 Daisy strainer

Where should the strainers be placed?

It is suggested that the inline strainers be put about halfway along a run of fence, especially on long runs of wire. Putting the strainer on one end of the fence makes it difficult to get even tension along the fence.

How tight should the wire be?

Fence supplier generally recommend about the fence be tightened to about 200 pounds but the only way to know this is to have a spring that can actually measure the amount of force. That's also assuming the

spring doesn't lose its strength. For most applications its just important to have the wires so they have very little sag on them between the posts. As long as the wires are kept apart, off the ground and at a height that the animals aren't inclined to jump over the tension isn't that important. Getting them too tight just means more pressure on the posts.