



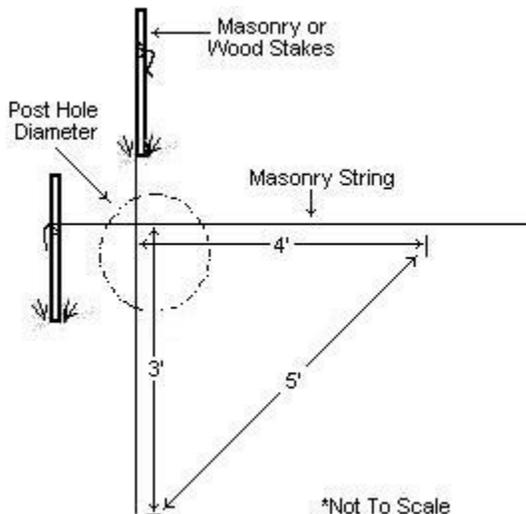
Basic Chain Link Fence Installation Instructions

Before You Begin:

1. Obtain necessary zoning and building permits. There may be local zoning or deed restrictions pertaining to height and type of fence. Check out property line setback requirements.
2. Find surveyors pins if the fence is to be located near property lines or have the lot surveyed.
3. Measure fence footage and locate gate placement.
4. Call your local or state utilities protection service to locate potential buried utilities. In Missouri, call Digrite at **1-800-DIG-RITE**. In Kansas, call Digsafe at **1-800-DIG-SAFE**. There is no charge to locate.
5. Purchase fence materials from [Mann Fence Company](http://www.mannfence.com)

Layout:

Three-Four-Five Triangulation Method to Squaring Corners:



Creating Square Corners Using the 3-4-5 method:

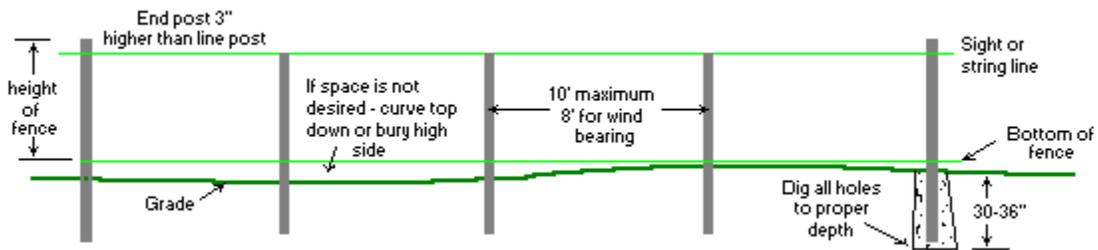
- 1.) Stretch string down two adjacent sides as shown in drawing.
- 2.) Measure and make mark 3' down one line.
- 3.) Measure and make mark 4' down other line.
- 4.) Measure diagonally between two marks and adjust lines to achieve 5'.

*For further accuracy, use measurements in multiples of 3-4-5, such as 6-8-10 etc.

1. Drive stakes a foot or two away from where you want corner and end posts to be located; this will allow you to drill/ dig holes without obstructions. It may also allow you to 'drop' the string while excavating for holes. Be careful not to bump or move stakes. If you remove the string to excavate holes, take care to restretch the string line back the way it was prior to removing.
2. Stretch masonry guide string tight between these stakes. This string will represent the location of the fence and serve as a guide string as you set posts. Posts will be set in concrete 1/8-1/4" from string line.

- Intermediate stakes may be required for longer stretches of fence. Be sure to pull string taut as string which sags or moves with the wind will cause posts to be set incorrectly. Keep in mind, the fence can only be as straight as the guide string.
- Locate gate posts first and mark their location. Next measure each stretch of fence. Chain link posts are typically spaced with a maximum of ten feet apart. For aesthetic reasons, space posts evenly, but do NOT exceed ten feet between posts. If you plan on installing privacy slats or another type of material that will increase wind load, consider using larger diameter posts or reduced post spacing.

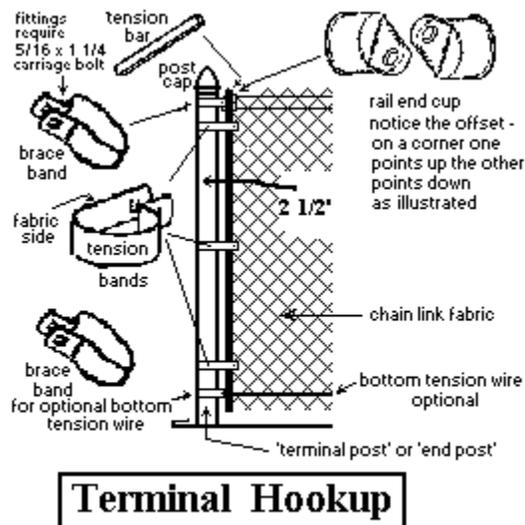
Setting Posts:



- Depending on the geographical location, fence height, and materials, hole sizes may vary. In general for residential chain link fences, dig holes 6" in diameter by 30" deep (or below frost line in your area). Another rule of thumb is to dig the holes three times the diameter of the post, i.e. a 2" diameter post would require a 6" diameter hole. Typically gate post holes are dug larger in diameter and deeper to withstand the additional stress of a moving gate. The guide string may be removed temporarily prior to excavating to prevent cutting it. Be sure to replace it as it was originally stretched.
- Restretch guide string and check holes for accuracy visually and/or by placing a post in the hole and plumbing in all directions. If the hole needs 'shaved' or moved, do it now. If holes are shallow because you hit an object you can't remove, 'bell' the hole at the bottom. To 'bell' a hole, use hand jammers and/ or a rock bar to make the bottom of the hole larger than the top. This further anchors the concrete footer which will support your fence. 'Belling' will compensate for holes as shallow as 18" deep. If necessary, move the hole slightly to miss any obstructions. This will change your post spacing. However, there is no harm in the case of line posts. If you must move it more than a couple of feet, consider installing an extra post midway in the enlarged space.
- Mix concrete with water using pre-mixed bag. Mix per manufacturer instructions. If you are mixing from scratch using aggregate like gravel, limestone or sea shells, concrete sand and Portland cement, mix 3 to 4 parts (shovels) of aggregate to 2 parts sand and 1 part cement.
- Mark post grade mark. End, corner and gate posts should be marked at the height of the fence plus 1 inch; 49" for a 4' fence, 61" for a 5' fence, etc. Mark intermediate or line posts at height of the fence minus 3 inches; 45" for 4' fence, 57" for 5' fence, etc. When you add your line post cap and top rail, the height will be accurate. Grade marks represent the bottom of the fence and are essential in setting posts to the correct depth. If you bury the post hiding the grade mark by 1", you will need to trench to bury the fence here. If your grade mark is above ground by 3", your fence will be off the ground by three inches and you better plan to cut it off later or fill under the fence if a tight fit is necessary.
- Fill holes with wet cement. Do not fill too many and risk having the concrete cure before you can 'stick' your posts. Do not fill holes to the top with concrete, leave the concrete down 3-4". Filling the hole completely with cement is a common mistake. If this is done, water will collect under this 'lip' of concrete. When it freezes, the ground will literally squeeze the concrete footer and 'heave' the post up.

6. Stick Posts. Most chain link posts can be installed by actually pouring the cement in the hole first and then 'sticking' the post in the wet cement. Simply push the post into the cement mix in the center of the hole. Set terminal posts as tight to the string as possible without touching the string. Set line posts approx. 1/8"-1/4" off string. DO NOT let the line posts touch the string. Another way of setting posts is for one person to hold the post plumb to the string line while another shovels concrete mix around the post. The first method explained is actually easier and assures there is concrete around the post as well as in it.
7. After setting each post to grade, backfill with dirt and step on the backfill to hold the post to height. Repeat for all posts in this length of fence.
8. Sight posts. To 'sight' in posts, stand at end of length of fence and look across the tops of the posts. Adjust heights of posts as necessary to account for gradual slopes and changes in grade. The goal is to have smooth transitions between posts and to avoid sharp changes or "peaks and valleys". This is easiest for two people to accomplish. Be sure to check plumb on each post after adjusting and watch the grade mark as noted above.
9. Install gate posts with the exact opening size as recommended by gate manufacturer/supplier, Mann Fence Company. The opening size is the distance between the two gate posts. If possible make the tops of gate posts level to each other by placing a post across the tops of the posts and checking with a level. If the ground slopes off sharply under the gate, set the gate posts to grade. It won't look proper to make them level.
10. Let concrete cure for at least 24 hours prior to continuing work.

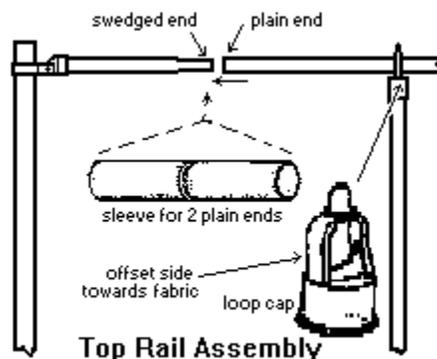
Install Fittings:



1. Place tension bands on end and corner posts.
2. Quantity of tension bands per hook-up = height of fence minus one; minimum of four. For example, a 4' high chain link fence requires 4 tension bands per hook-up.
3. A *hook-up* is each connection of chain link to an end or corner post. End posts have one hook-up; corner posts have two hook-ups.

4. Place one brace band on first to use if bottom tension wire will be installed. This fitting requires one bolt and nut. Install nut and bolt loosely.
5. Next, install tension bands. The tension bands are offset. The offset (flat side) faces 'out', the same side as the chain link fabric will be installed. This is normally the outside of the enclosed area. Do not install nuts and bolts on these.
6. Place one brace band per hook-up over the tension bands. This fitting requires one rail end, one bolt and nut. This band and rail end will be used for the top rail. Tighten with a ratchet and socket.
7. The rail end is offset also. This offset can be up or down on an end post. Regardless of if you choose to position the offset rail end up or down, be consistent. On a corner, since two sets of brace bands and rail end must share the same space, the bottom rail end is to be offset up and the bottom rail end is to be offset down. This enables the two rail ends to be level to each other, so your top rail can be inserted into the rail end and be level to each other.
8. Typically all nuts are kept on the inside of the fence; this prevents someone on the outside from removing the nuts easily.
9. Place caps on posts. The end and corner post caps are simple. There is only one way to install them. The loop caps, as they are called, are offset, if you look at them carefully. The offset side faces the outside of the enclosure; the same side as the chain link will be installed.

Install Top Rail:



1. Slide top rail through a couple loop caps and butt end firmly into rail end. Adjust height of rail end if necessary. Tighten rail end band firmly.
2. Some top rail has a 'swaged' end, which tapers down so it will fit into another piece of rail. Fit the non-swaged end into the rail end at the end or corner post.
3. Add sections of rail, sliding each non-swaged end into a swaged end. Be certain to push rails toward your beginning point to 'seat' them all the way into each other. Push firmly. If the top rail has no swaged end then you need a 'sleeve' that acts as a coupling.
4. Add additional top rail until you reach the next terminal post, i.e. end, corner, gate post.
5. Cut excess rail off with hand held band saw or pipe cutter. Mark the cut-off point carefully so the rail will fit snugly into the rail end. Any slack in your entire length of rail will allow the chain link, when stretched tight, to pull the end posts in towards each other. **Tip:** Each piece of rail should be supported by two posts. Do not cut rail so that a seam will be in-between the last line post and terminal post. This point will be weak and tend to sag.
6. Install top rail in all stretches of fence. At this point, visually check the height of line posts once top rail is installed. If a post is too high, remove rail and trim as necessary.

7. If a post is 1/4" too short you may also cut a sliver of pipe, the same diameter size as the line post and slip it under the loop cap.
8. **NOTE:** Industrial job sites occasionally substitute a top tension wire in lieu of top rail to cut down on cost. See page 6 for details.



Fig. 1



Fig. 2



Fig. 3



Fig. 4

Tension wire may be installed at the top and/or bottom of a chain link fence. Top tension wire helps cut down on cost when used in lieu of top rail. Bottom wire helps deter animals from digging and pushing the bottom of the fabric out. It is frequently used with vinyl coated chain link as this tends to be more elastic in nature. Both types of wire are attached to the chain link, once stretched, with hog rings. It is easiest to install when one person holds the coil of wire upright while the other 'walks' the loose end to the other end of the fence. The next step is to hook up the loose end to the terminal post using a brace band and nut and bolt. The loose end is looped through the bolt and wrapped around the wire itself (**Fig. 1 & 2**) The tension wire loop is 'sandwiched' in the brace band. Bottom tension wire is installed on the same side of the posts as the chain link fabric (**Fig. 4**.) Once chain link is stretched, the bottom tension wire will be 'sandwiched' between line/ intermediate posts and the chain link fabric (**Fig. 10**). If used as a top wire, thread tension wire through loop caps and connect at each terminal post.



Fig. 5



Fig. 6



Fig. 7



Fig. 8

Tension wire is most commonly stretched using a come-a-long and wire grip. Do not wrap the cable of the come-a-long around the post (**Fig. 5**). This action done repetitively will cause the cable to fray and be destroyed. Instead a 'sling' may be made of rope or cable to wrap around the stretch post (**Fig. 6**). Release and pull out 6-10' feet of cable from the come-along. The length of cable to pull out will depend on the length of stretch of tension wire. Hook a cable puller to the ratchet end of the come-a-long. Secure tension wire to cable puller (**Fig. 7**). Crank the handle of the come-a-long until the tension wire is tight (**Fig. 7 & 9**). Do not tighten too much or post damage or physical injury may occur.



Fig. 9



Fig. 10



Fig. 11



Fig. 12

With the come-a-long cranked tight, bend the tension wire where it would loop into the nut and bolt. Next, cut 6-8" past this bend with bolt cutters. Be careful as both ends of the wire will 'whip' from the tension and can be dangerous. Fish the looped end of wire through the nut and bolt and wrap

as before. Release come-a-long; repeat process for other runs of fence. Note: Short lengths, approx. 12' and less, are difficult to do using a come-a-long. These are often simply done by hand. The tension wire naturally has crimps in it. With the use of fence pliers in their open position, these crimps can be crimped further causing the wire to tighten (**Fig. 8**). Be sure to crimp throughout the length for uniform appearance.



Fig. 13



Fig. 14



Fig. 15



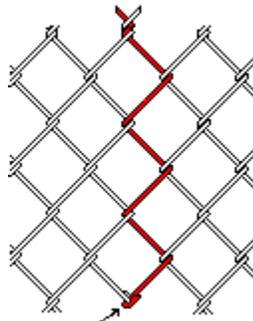
Fig. 16

Once tension wire is installed, the chain link fabric may be stretched. Chain link is installed to terminal posts using tension bars, tension bands, and nuts and bolts. Often one end is installed with the roll upright for ease (**Fig. 14**). The roll may then be laid down flat of the ground and rolled to other end. Additional rolls may be added easily and the weaving is easily done on the flat ground. Chain link is stretched with a come-a-long and fabric stretcher for longer stretches (10' or more). Hand tongs are used for shorter stretches (10' or less). As tension bands are installed an equal distance apart, usually the bottom brace band holding the tension wire may be adjusted so that the tension wire is centered on the bottom diamond of the fabric. The top rail, line posts are tied last. Hog rings are installed to secure the tension wire to the chain link fabric using hog ring pliers.

Stretch Chain Link:

Weaving The Chain Link Fabric:

barbed end (twisted)



A weave is continuous from top to bottom.

Untwist the ends and spin it out to disconnect

Don't cut the ends...The weave can be reused

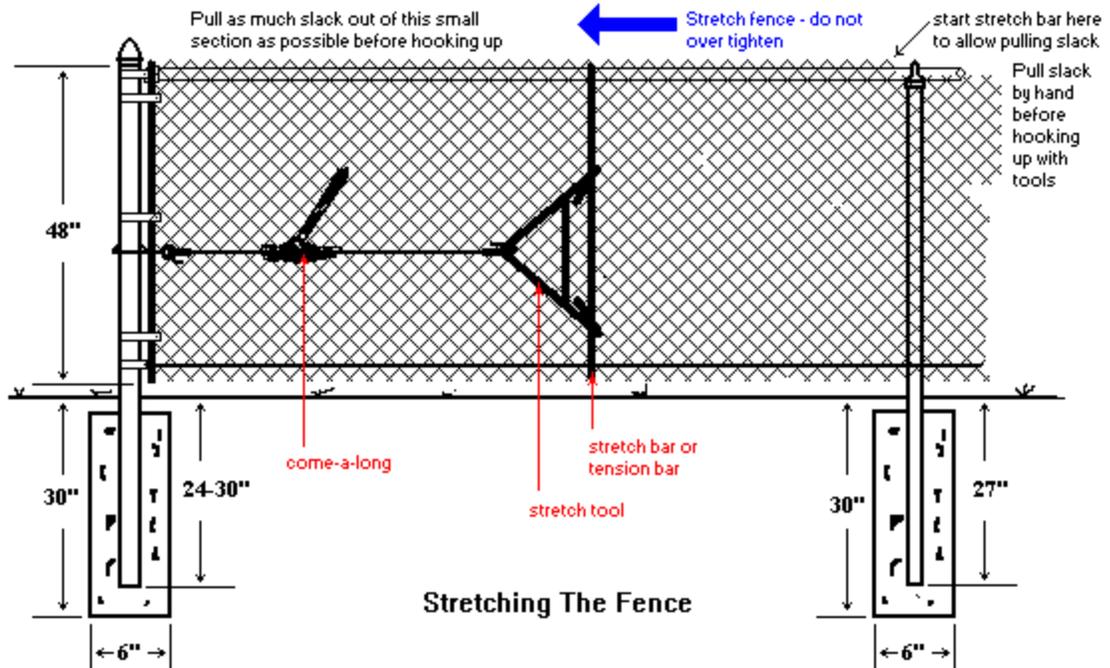
Reverse the process to 'weave' two sections together. Rebend or twist ends together.

knuckled end

1. Starting at one end of a line of fence, roll chain link out on the outside of the enclosed area or the side you previously have chosen.
2. Roll out another roll, if more is needed to reach the next end post. Chain link is stretched in one continuous length of woven chain link from end post to end post.
3. **'Weave'** chain link rolls together. This can be a little tricky, if never done before, and requires some explanation.
4. Each weave is continuous from the top to the bottom along the vertical or height of the roll. If you follow the strand, starting at the top, you will see that it zig-zags back and forth to the bottom. It starts and ends with either a 'knuckled' or a 'twisted' end.

5. To remove a weave, unbend the end of the weave 'knuckle' straight. Unbend the adjacent weave that is knuckled to it. If it has a twisted end, simply untwist the two weaves until they can be separated.
6. Follow the weave to the other end as it zig-zags back and forth and untwist or unknuckle the opposite end. Be certain you follow carefully, so you undo the proper weave.
7. At the top of the fence or the bottom, spin the weave in a counter-clockwise direction, as if to unscrew it from the roll. Most newly manufactured chain link spins out counter-clockwise, whereas some chain link manufactured years ago spins out clockwise. Continue spinning and you will see the other end unweaving from its adjacent weaves. If you are having difficulty, you may have disconnected the wrong weaves at the opposite end. Also check that you have bent the far end straight or it will snag as you try to spin it. Another problem that may occur is the chain link is stretched too tight; give yourself some slack.
8. The procedure for weaving two rolls together is just the opposite except it can be tricky getting started. It is easiest to weave two rolls together when they lay flat on the ground, however rolls may be wove together in the upright position as well.
9. **To start weaving:** Chain link forms squares or 'diamonds' as they are frequently called. You must match two sections or rolls together before you start weaving in such a way that one roll has a full diamond and the other roll has a half diamond. This match will be at the top and bottom of the rolls. When you add a weave, you will end up with a full diamond and two ends to knuckle or twist together.
10. Many rolls of chain link will have a loose wire in the roll. Use this to piece two rolls together or remove one wire from one of the rolls to splice with. Spin the single weave into the first full diamond. Spin it through the next full diamond of the other roll. Continue spinning and make certain that the weave end goes through each full diamond on each roll in each revolution.
11. If you have trouble, it could be from one or more of the following reasons: Your chain link is too tight; give some slack. You missed a diamond somewhere, unweave and try again. Or you may have mismatched rolls that came from different manufacturers or the rolls have different mesh sizes. Count the number of full diamonds in each roll, they should match in number and size.
12. After you have successfully woven the two rolls together, twist or re-knuckle the ends together. If you have no counter weave to fasten to, you started with either two half diamonds on each roll or two full diamonds on each roll. Take it apart and try again. Sometimes you have to flip the one roll over (most have a half diamond at one end and a full diamond at the other) or remove a weave from one roll to create a starting half or full diamond.

Stretching The Fabric:



After rolling out the chain link and weaving the rolls together, 'hookup' one end. Space the tension bands evenly as illustrated above. Make sure the nuts are on the inside of the fence so they can not be removed from outside the enclosure.

1. If you have a sharp incline approaching a terminal post, the fabric must be cut on the end. This is called a 'bias cut'.
2. Pull the chain link tight by hand to the other end. You may stand the chain link and lean it against the posts or leave it on the ground and lean it up as you stretch the fabric later. Generally the latter is easier and better on long stretches.
3. Hook up stretching tools as illustrated on inside of fence. Slide a tension bar 10-12' away vertical in chain link fabric; hook fabric stretcher to it on inside.
4. Make sure the come-a-long hook faces away from the fabric or it may get caught in the diamonds.
5. Tighten the come-a-long slowly. Check that the fabric is not getting caught on posts, tree roots, or other obstacles.
6. 'Dress' the fabric as you tighten it. 'Dressing' involves straightening the fabric diamonds so they run true. This is vital for heavier gauge fabrics. Some spots will be higher than others as you sight down the top. Lift the fabric in the low spots. This must be done before the fabric gets too tight. Once it is tight, little can be done to straighten the fabric. Some fabric dresses easily, some does not. If the fabric does not dress up properly, you can always loosen the come-a-long and try again. Check top and bottom diamonds for any wires that may bind out of proper shape. Lift and shake fabric to assure an even tension throughout roll(s).
7. The fabric is stretched sufficiently when you can't squeeze the diamonds together with one hand. Do not over stretch or post damage will occur. The top of the fence should 'snap' back to the posts when pulled out a little.
8. Hand stretch the small section of chain link left between the come-a-long and terminal post by hand. Remove a weave to 'cut' the fabric to proper length. Slide the tension bar

into the mesh and make your last hookup. Once all bolts are in place, remove the stretching tools.

Tie The Fabric:

1. Install tie wires onto top rail first to establish the height of the fence. The top diamond of chain link should be centered on the top rail.
2. Space tie wires evenly and no more than 2' apart.
3. Tie line posts last. Use the same number of tie wires per line post as tension bands per terminal. This quantity is a minimum of 1 per foot.

Install Gates:

There are many different types of hinges and latches on the market today for use with chain link gates. Most are self-explanatory and do not include a set of installation instructions. Installation instructions usually accompany the more complicated hinges and latches. For the most basic of hardware:

1. Install female hinges on gates using nuts and bolts. Again, nuts should be installed on the inside of the enclosure. Space them the maximum distance apart as possible.
2. Hold gate in opening and mark the location of male hinges. Point the male hinge on the bottom up and the one on top down.
3. Install bottom and top male hinge with bolts. Tighten bottom hinge snug, but leave top hinge loose.
4. Place gate on bottom hinge and lower top male hinge into female hinge.
5. If the space under the gate is acceptable. Tighten top male hinge snug.
6. Test swing the gate to see if it will miss the ground. Adjust as needed.
7. Tighten all hinge bolts. Do not over tighten.
8. Install the latch at a convenient height (nuts inside).
9. In the case of a double swing gate, install the gate closest to the ground first, unless the ground is perfectly level. Hang second gate level to the first. Although you may 'step' the gates for a tight fit to the ground, it looks best to install them level to one another.
10. Install double gate drop rod/latch assembly.
11. Install center stop for double swing gate. Close the double gate, making certain the two leaves are lined up (straight w/ fence line). Mark the ground where the center stop needs to be installed. You may simply use a cut-off piece of pipe as a center stop by driving it into the ground. Proceed slowly, checking the gate to make certain you are driving the pipe straight. You may also use a prefabricated center stop and cement it for a better appearance. If the center stop is in a concrete drive, simply drill a hole in the concrete larger than the drop rod diameter. Be sure to drill clear through the concrete drive to allow water to drain. Always make a much larger hole (or pipe size) than the diameter of the drop rod to allow for gate sag, posts shifting, ice and other factors.
12. Install gate holdbacks if desired. Open gate(s) to the desired 'open' position. Cement or drive a 2" O.D. post a couple inches beyond this point. Install holdback at correct height using U-bolts provided.
13. Install all post caps.