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INSTRUCTIONS
for
Model's DY-10, or C-10
Quick Hoop Benders

Inventors and picneers of these amazing Greenhouse bending tools,

Please visit our web sites for more great Greenhouse related products, featuring my own best selling E-books,

“Drill Your Own Water Well” &

“Heating Tables and Mats”

Web Sites

www.lostcreek.net

www.hoopbenders.net

Email

herbs@lostcreek.net

info@hoopbenders.net

Phone

903-569-8541

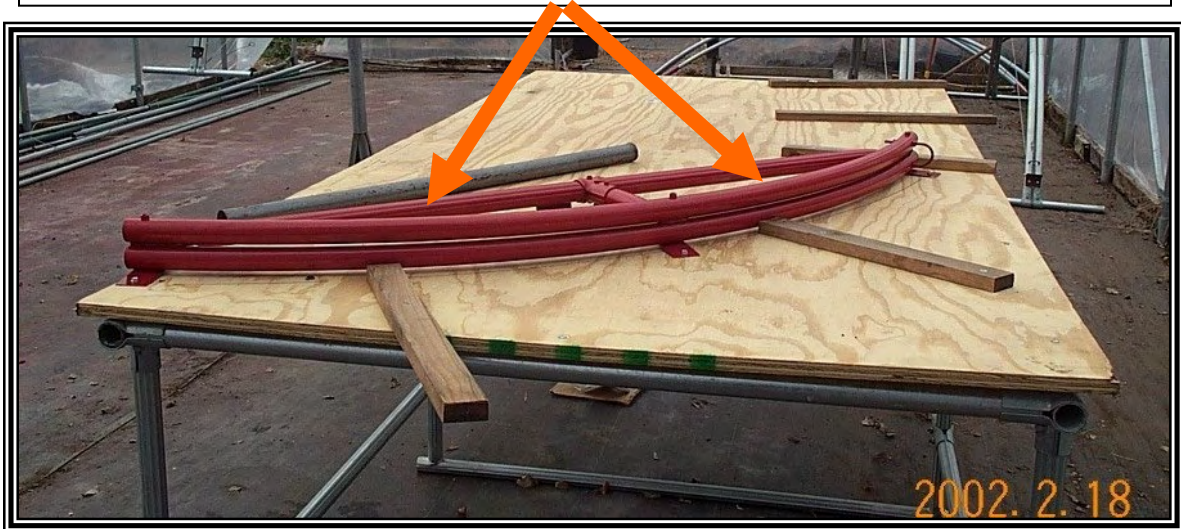
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If you are viewing these instructions in their digital format, Please note that any text highlighted in **RED** is of extra importance. **Other colors** are used at times to emphasize content.

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Mounting Your Hoop Bender

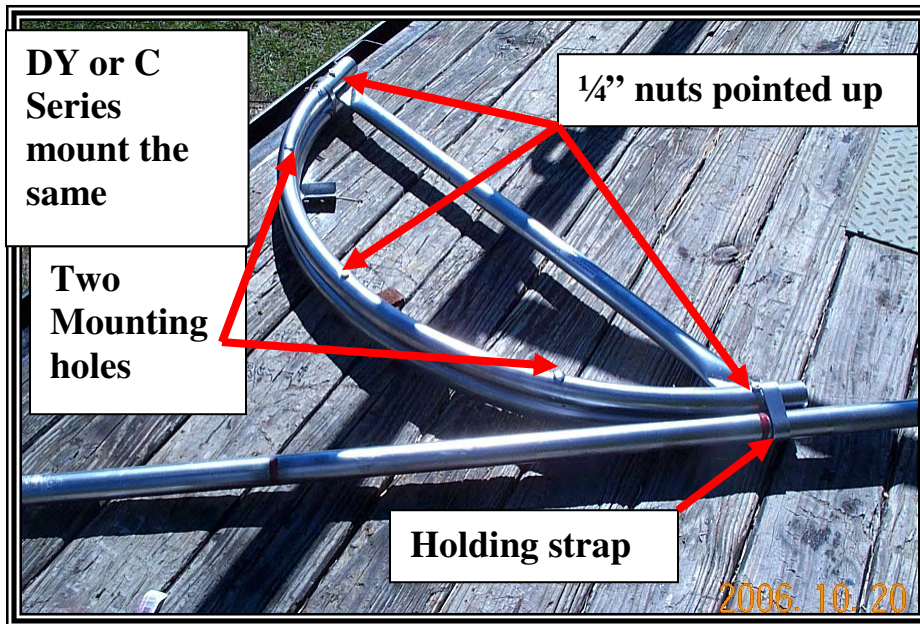
Recommended Horizontal Mounting For All “DY” & “C” series mount using two ¼” bolts in the 2 holes drilled & provided here.



IMPORTANT: PLEASE READ ALL INSTRUCTIONS BEFORE BEGINNING

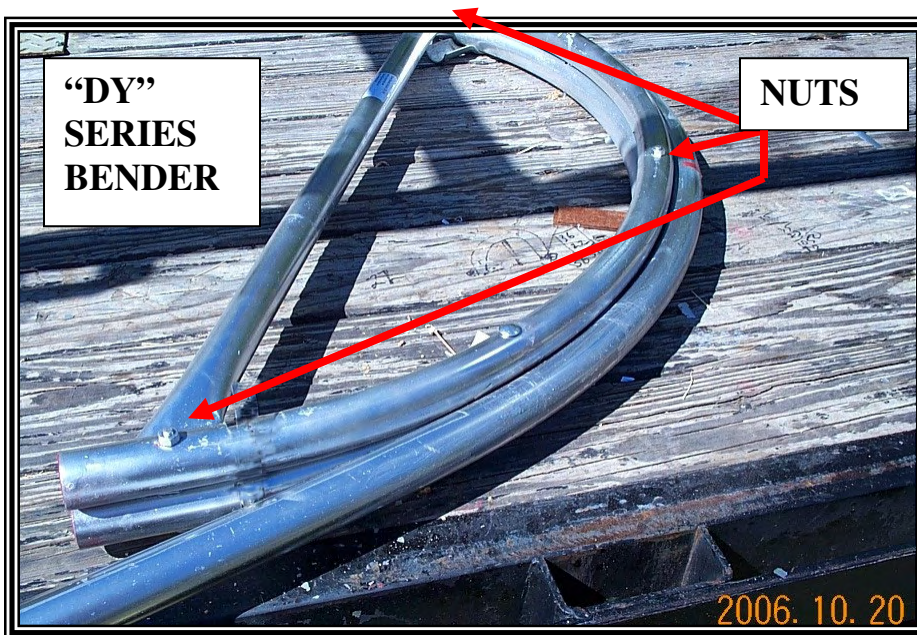
The “DY” & “C” Series can be mounted either in the horizontal or vertical position. We recommend the horizontal (Table Mount). The vertical position usually takes less time and materials to mount the bender, **however the horizontal position is best for the beginner.** Photo shows mounting points for both the “C” series and the “DY”

We recommend mounting your bender on a 4’x8’ plywood table as shown above or any similar surface. The table legs must be secured to the ground or floor to prevent the table from twisting during the bending of your hoops. Note the 1”x2” wood strips which are fasten to the table top, these wood strips are very important to keep the tubing on a level plane to the bender body, they may be positioned as needed to support the tubing in this correct level with simple drywall screws to allow moving/ adjust them if necessary later. Most of the photos, above depict our “C” series bender however the shorter “DY” series is positioned on the table in the same manner. Both the DY and C series mount the same way using either two ¼” carriage bolts or two ¼” lag bolts inserted through the two predrilled hole as shown on next page. Please note also that the holding strap is at the end of the bender nearest to the center of the table.



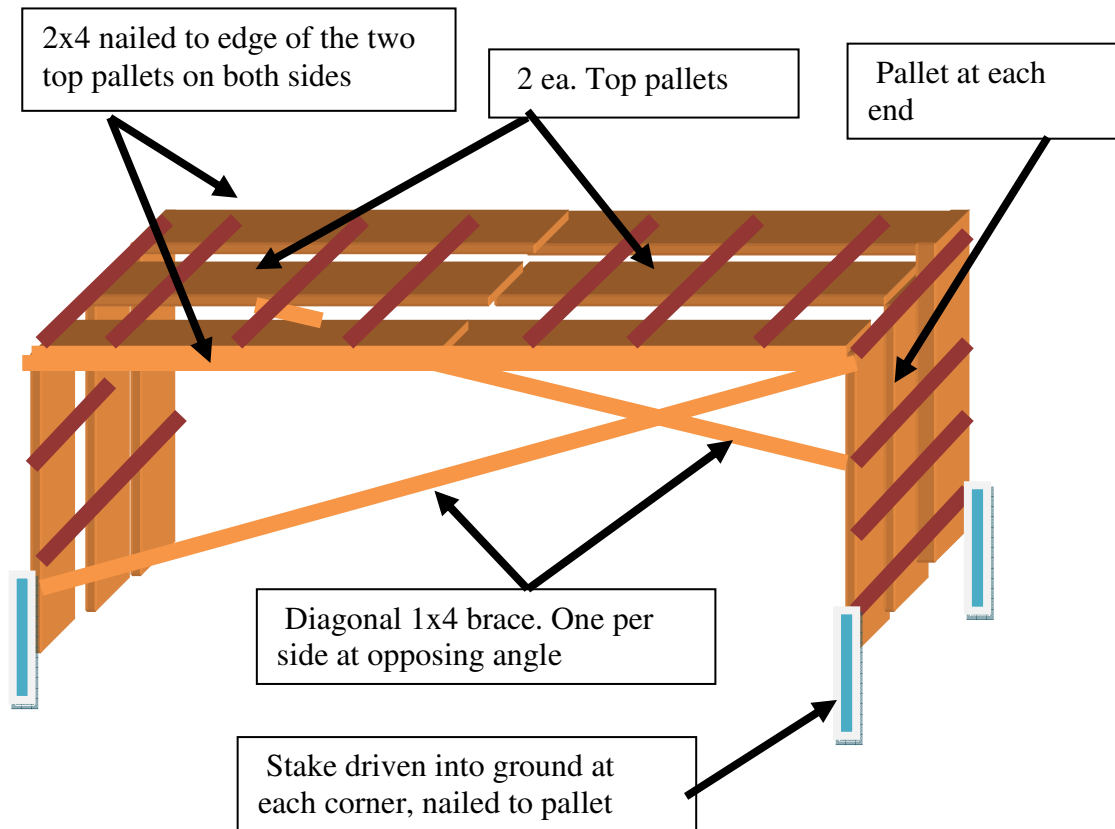
The following photos are of benders mounted in different ways. We recommend mounting your bender horizontally (flat) on a 4'x8' table or suitable flat surface.

In the photos it is simply lag bolted to a flat bed truck. The bender body is held together with three 1/4" carriage bolts, Be sure the side of the bender that faces up, is the side with the three 1/4" nuts.



I will show you several different methods of mounting your bender in the following pages. The mounting table can be anything that is at the proper

work height and will not move as you bend the tubing. The mounting table doesn't need to be elaborate. In fact the first example is a simple and effective table constructed with four wooded pallets shown below in the drawing, two 8 ft. 2x4s and a few 1x4 boards.



This pallet table does not require any plywood for the top. Just mount bender directly to the pallets in position shown for a plywood table top on page 3.

Perhaps the simplest table mount ever used was supplied by one of my customers. He simply bolted the bender to a 4'x8' sheet of plywood and slide the plywood into his pickup bed, with the tail gate down he let the plywood overhang the tailgate. Leaving enough plywood between the fender wells inside the bed to keep the plywood wedged firmly when he pulled the tubing around the bender. If he needed to run to the hardware store he pushed the whole sheet into his pickup bed closed the tail gate and off he went. That's really a slick setup, and it does not get simpler than that. You may need to tinker with the placement of the bender onto the plywood to allow bending of a complete section within the confines of the bed but he did it and so can you. The slide in truck bed table top, works even better if you build a simple 2x4 wood frame to fasten the plywood too as he did. Short wood blocks can be used to further wedge the unit between the fender wells of the pickup



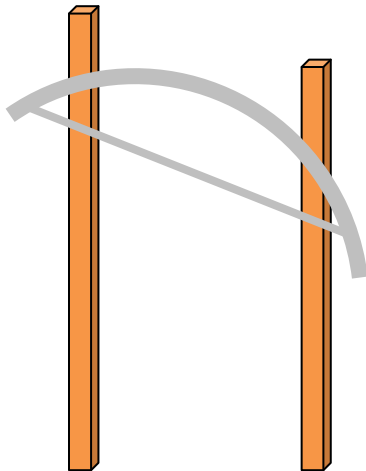


Vertical mounting can also be preformed several different ways without a lot of cost and labor.

The picture above is an ingenious mounting configuration sent in by another customer if you have a tractor with a front bucket, if not you get the ideal.

This allows easy changing of bender angle and height.

Another quick vertical mount is simply two post with the bender bolted to them see drawing below.



Vertical mounting can be made to any available, existing wall or fence, as long as it is stable and does not move.

General Bending Instructions

Important:

All greenhouse hoops must be 12 to 18 inches wider across the base than the Installed Width.

After bending the hoops, connect the sections together laying flat on the ground and measure across the base. Example if your bending a 10 ft wide hoop using any of our 10 ft benders, then the hoop must measure at between 11 to 11 1/2 feet across the base, when the two sections are connected and laying flat on the ground, This extra width is necessary because the hoops must be compressed inward to install into the ground anchor tubes. This is referred to as “post tension” which strengthens and smooths out the hoops.

To start with purchase only enough tubing to build one or two test hoops.

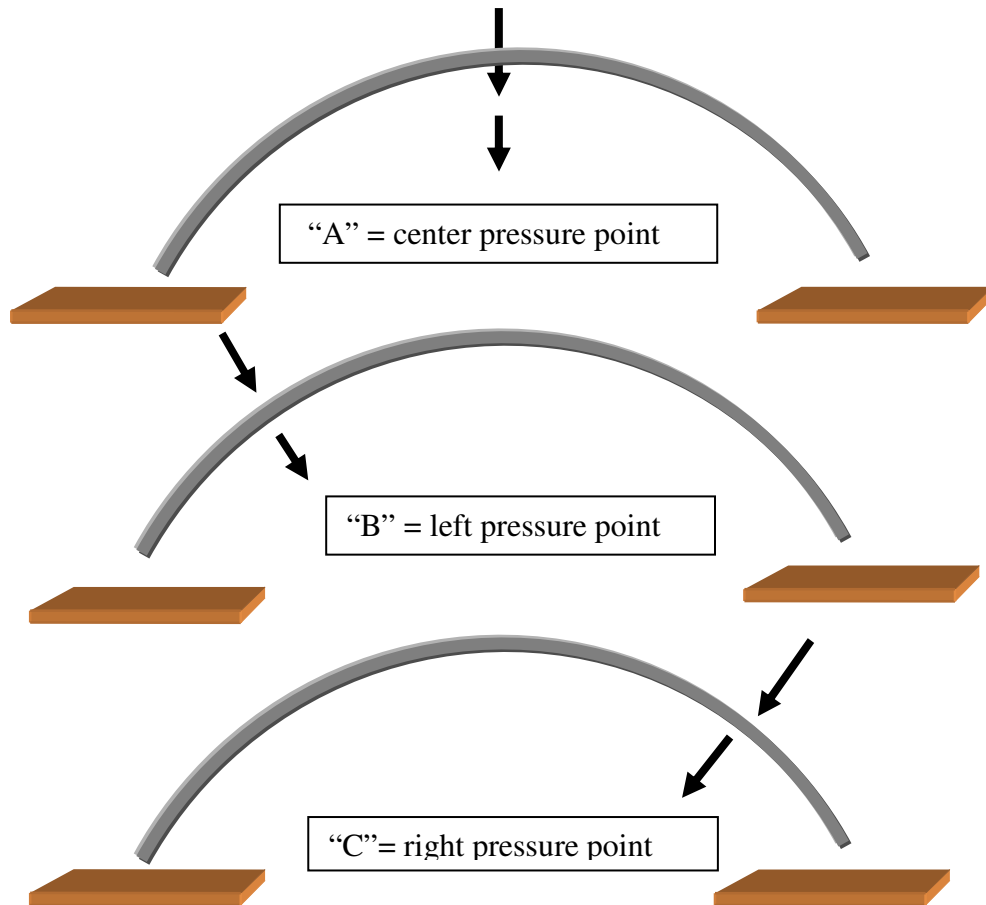
The reason for this is simple; some tubing these days, can be made from a softer base metal. Because tubing springs back (rebounds) after being bent, tubing made from softer metal than normally does not spring back as much after bending, which can result in a hoop that is under size. EXAMPLE: If your hoop is to be a 10 ft wide hoop. As discussed on the previous page, your finished width after bending must be between 11 and 11 1/2 feet wide. The extra foot or two will be compressed inward when installed into the post anchors. Let's say you bent the hoop and its 11 1/2 feet wide. The hoop must

never be pulled outward to install, it must always be compressed inward. So what do you do about this problem?

Actually there is a fast and simple method to get the hoop out to the needed uncompressed width of 11 foot, so it can then be compressed and installed as the required 12 ft hoop. We refer to this method of resizing as “Tune Out” it has been proven to work every time and produce good hoops. Never attempt to resize a hoop by any other method other than the following method, the result will be “well let’s say not good”.

The hoop tune out method is the same regardless of number of hoop sections in your hoop, one hoop section is 10’6” long, ten (10’) wide hoops will have 2 sections.

If your first test hoop measurement is less than 11 feet loose on the ground. Take the sections apart and spring out both section’s as follows. Place two small wood planks or thick cardboard on the ground so that each is positioned under the ends of a hoop section. While holding the section at the center (point “A”) shown below, push the center of section down about two inches and release. The wood planks allow the hoop to slide outward as you push downward. Now move to point “B” on the same section, pushing downward about two inches, at the angle shown by arrows. Now move to point “C” and repeat this step again. Resize each section. Reassemble the sections and measure the width. The hoop will be wider now, if it still is a little narrow repeat the three point spring out steps above, reassemble and check hoop width. When the target width is achieved mark this hoop and use it as a pattern for resizing all other hoops hoop’s. It is not necessary for all of the next hoop sections to match the pattern exactly, just as long as they or close, within a few inches. When all are compressed and installed they will all look exactly the same.



The three pressure points are the same on all 10' 6" long hoop sections. Applying pressure at these three points on each section and by allowing the ends to slide freely when pushing down, each section will uniformly be resized into wider hoops. After a few hoop sections this method will resize a section in about 20 seconds each. AGAIN, NEVER attempt to resize using any other method or press down in more places other than the three points shown above.

Determine the spacing of the hoops. Hoops can be spaced 4, 5 or 6 feet apart, four feet being most often used, although you can space them closer if desired.

Example if you plan for a 10'x 20' greenhouse, then the best spacing is four feet apart so 20 ft. (the greenhouse length) divided by 4 ft. (the hoop spacing) equals 5, this is the spaces required not the hoops required. You will require six (6) hoops to build a 10x20 using 4 ft. spacing.

Simply put; Number of hoops required equals the greenhouse length divided by the hoop spacing plus one (1 hoop). As each 10 ft. hoop requires two 10'6" lengths you would need twelve lengths of tubing, refer to the tube orientation page preceding this chapter for tube preparation before bending.

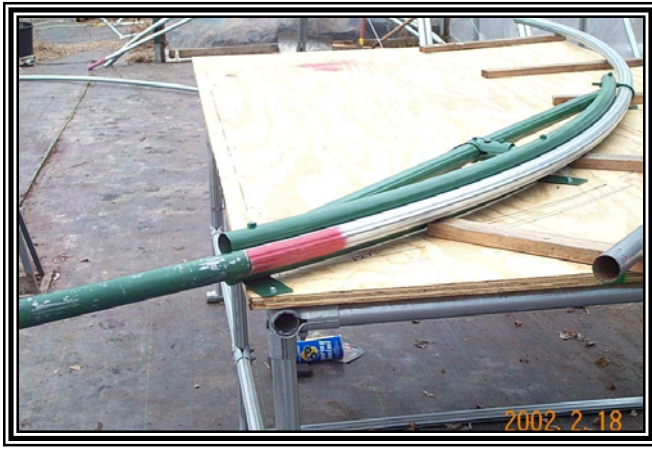
IMPORTANT:

During the manufacture of this tubing, one end is swaged (made smaller) sometimes the machines that perform this job causes the swaged end to cant (tilt) slightly to one side. By looking down the length of tubing while turning it slowly you will be able to determine if your tubing has this slight cant. If it does mark or note the direction of cant. Then when you begin the bending process make sure that the cant direction is pointed in the same direction as you are pulling (bending) the tube.

With the bender mounted, all tubes will have one painted end. Start bending by inserting the painted end into and through the holding strap 4" inches. Pull the tubing around the bender stopping about 5 or 6 inches before you reach the end of the bender, now push one half of the tubing you just bent through the holding strap then pull tubing again around the bender always stopping a few inches from the end of bender. Repeat this bend and push through adding the lever bar when needed until the very end (unpainted end) is aligned so it will contact the bender itself about 5 or 6 inches from the end of the bender, SEE an example of this on Page 15 left photo



Here I'm completing the final bend on one section for a 10 foot hoop section. Note the already bent tubing being supported at the opposite end with the 1"x2" wood strips



Here I've placed the end of the tubing about 4 inches and pulled the tube around the bender towards me. Making sure that the tube I'm bending stays in the groove formed by the twin tube bender body.



Here I've completed one of the 10'6" sections for a 10 foot wide hoop.

Choosing The Tubing For Your Hoops

Our benders are fixed radius (not adjustable) First a little information on the properties of this metal tubing you will be working with. RULE # 1...Metal like many materials will rebound (spring back) after being bent. This rebound is directly influenced by the hardness of the metal and to a lesser extent on its thickness and over all size. With this in mind we have built each of these benders to produce its designated hoop size provided that you are bending the gauge and diameter pipe size we recommend.

We are often ask, “will your bender bend smaller, larger, heavier or thinner tubing” The answer is yes it will bend many other gauges and even diameters, however if you do so then RULE #1 above applies and there is no way I can tell you what the finished radius of the material will be. EXAMPLE if you purchased a DY-10 bender which produces a 10 foot wide hoop using the tubing we recommend for that hoop, but you instead choose to bend 3/4 inch diameter EMT electrical tubing you may not get a 10 foot wide hoop. The rebound of the smaller thinner tubing affects the finished radius which in this case would produce a much smaller radius. So please, unless you just want to experiment, use the tubing we recommend for your bender and greenhouse.

Below are specifications for the required tubing for each hoop size regardless of bending it on our “DY” or “C” series benders.

The 10 foot wide hoops require two lengths of 18 or 17 gauge by 1 3/8” outside diameter chain link fence top rail tubing in 10 ft. 6 inch lengths, 21 foot lengths may be cut in half to get the correct lengths. The next page will show you how to mark tubes using precut 10’6” or cutting 21’ lengths in half yourself to get the 10’6” lengths.

Orientation of tubes for precut factory 10’ 6” lengths is shown as **“A”**
See next page
Orientation of tubes for factory 21 ft. lengths which must be cut in half is shown as **“B”**
See next page

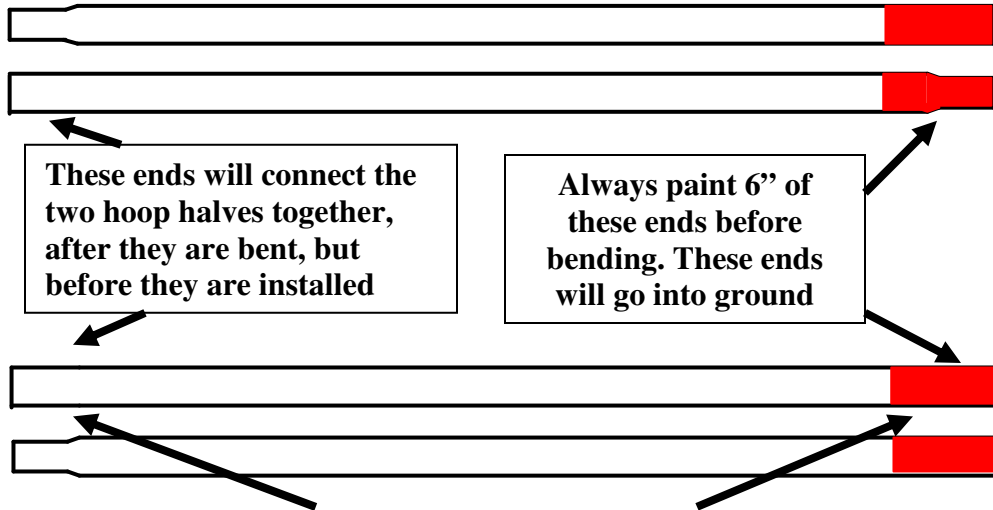
I’m often ask “Can I bend the 21 ft lengths without cutting them in half?” The answer is yes, but don’t try it. It seems that most people reason that it would be faster to skip the cutting in half and just bend the full 21 ft length. Controlling a 21 ft length while bending it is to say the least a nightmare and will 99% of the time end up in disaster and a very long wine bottle cork screw. Most factory made hoops are made using 10’ 6” or shorter lengths. Please take my word for this.

Pre-Bending Tube Orientation

Tube Orientation for 10 ft. Hoops

NOTICE: The swaged (small ends) on all 1 3/8" fence tubing

"A" Using factory pre-cut 10' 6" lengths, 1 3/8" 18 or 17 ga.



"B" Using factory 21 ft. lengths 1 3/8" 18 or 17 ga. cut in half.

Using C-10 or Dy-10 Benders

Bending tubing for a 10 foot wide greenhouse.

With the bender mounted to a stable platform described in mounting instructions. Determine the spacing of the hoops. Hoops are spaced 4, 5 or 6 feet apart, although you can space them closer if desired. 4 ft being used most often.

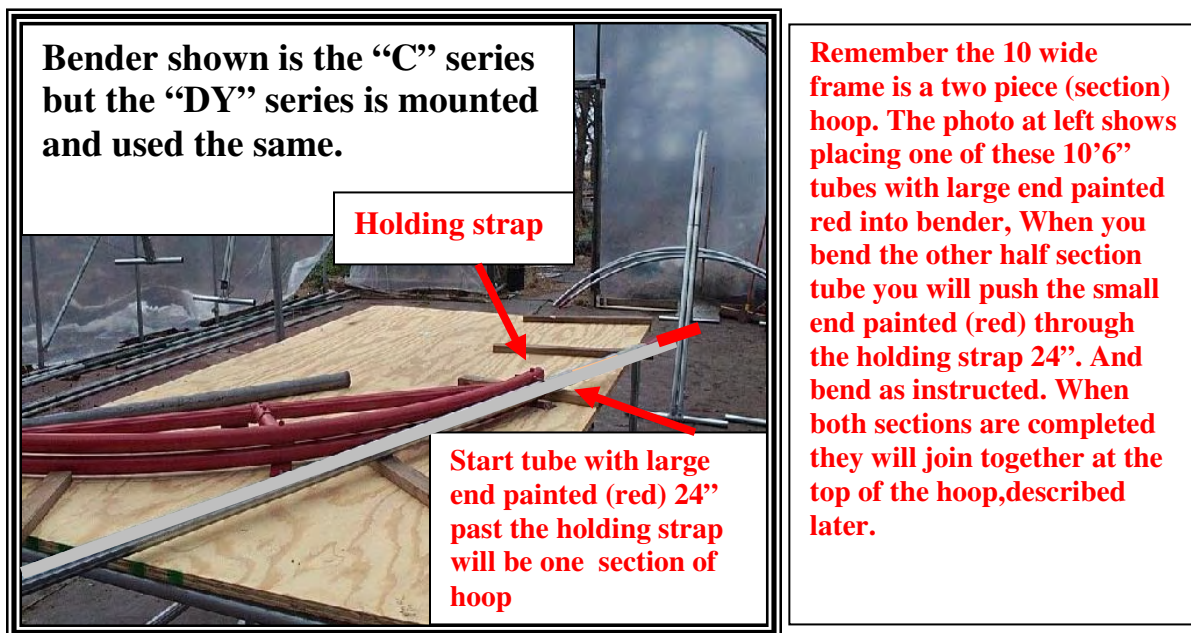
Example if you plan for a 10'x 20' greenhouse, then the best spacing is four feet apart so 20 ft. (the greenhouse length) divided by 4 ft. (the hoop spacing) equals 5, this is the spaces number of 4 ft spaces required, not the hoops required. So the total hoops required for a 10x20 is 6 hoops. Simply put; the number of hoops required equals the greenhouse length divided by the hoop spacing, in this case its 20 ft length divided by 4 ft spacing, plus one (1 hoop.). As each 10 ft. hoop requires two 10'6" lengths you would need 12 lengths of either 18 or 17 gage by 1/38" od chain link fence tubing top rail tubing, refer to the tube orientation page above for tube preparation before bending.

IMPORTANT:

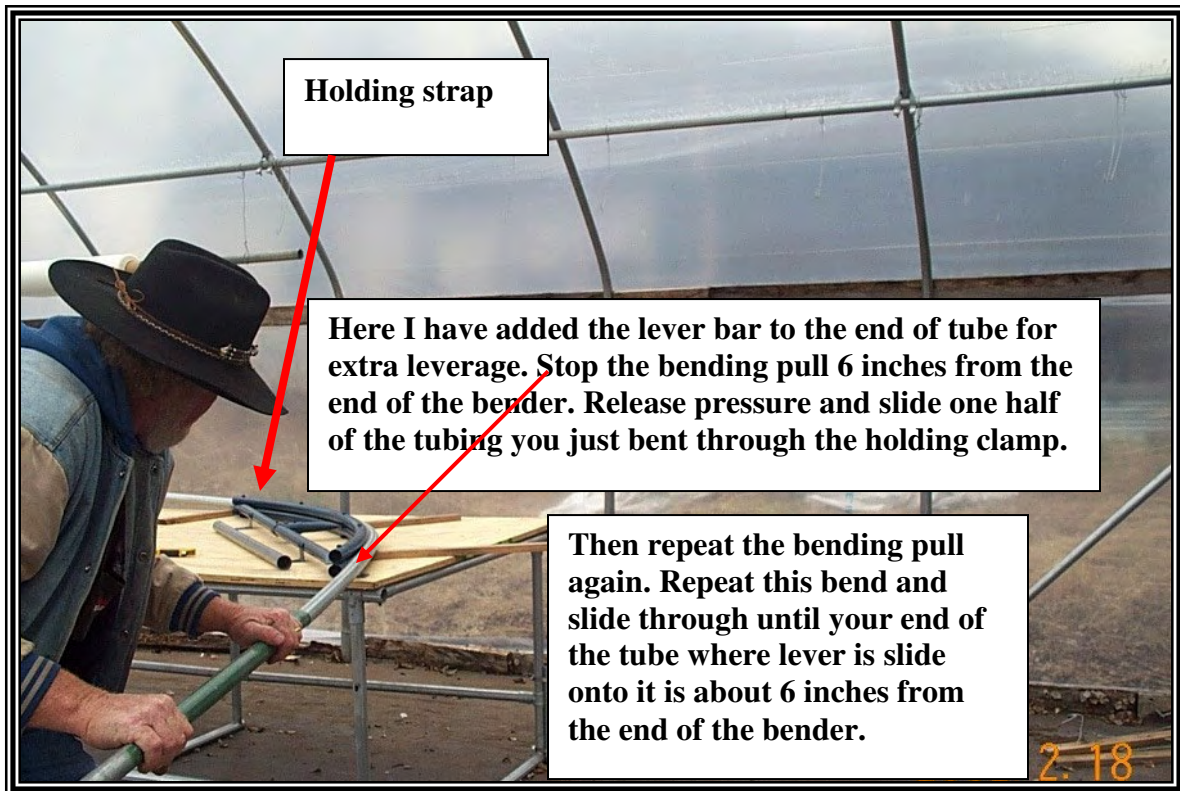
During the manufacture of this tubing, one end is swaged (made smaller) sometimes the machines that perform this job causes the swaged end to cant (tilt) slightly to one side. By looking down the length of tubing while turning it slowly you will be able to determine if your tubing has this slight cant. If it does mark or note the direction of cant. Then when you begin the bending process make sure that the cant direction is pointed in the same direction as you are pulling (bending) the tube.



Insert **about 24 inches** of the tube end indicated by red paint (see tube orientation page) through the holding strap of the bender.



Now pull the tubing around the bender.



Always start the bending with the painted ends of both sections inserted through the holding strap 24 inches. In the case of bending the. Never place the un-pained ends into holding strap first when bending these 10 ft hoop sections.

Let's start with one pipe section, pick one tube with a small end painted. Push through strap 24 inches. Pull the tubing around the bender, STOPPING about 5 inches before reaching the end of the bender, release pressure and slide one half (1/2) of the tubing you just bent through the holding strap, **CAREFUL never push more than one half of the previous bent portion thru the holding strap between strokes. Do in so will cause flat spots in your hoop.** As you began bending the first tube fasten 1x2 inch wood strips to the table as shown in most all photos under the end of the bent tubing after you slide it through the strap. Then repeat this bending and pushing through the strap, adding more 1x2 wood strips as needed each time you push more bent tubing through strap. Fasten each wood strip to the table as you install them.

These wood strips are only installed one time as the first tube is bent and they are very important. They hold the bent tubing in alignment to the bender, without them your hoop section will resemble a cork screw (not desirable for greenhouses) adding the small end lever bar into the tube when needed as you near the end of the tube being bend, (the last

12 to 16 inches), be sure that the last pull, at the connection point where the lever bar slides onto tubing makes contact with the bender it self about 5 inches from the end of bender. **A slight raised ridge can be felt or seen on the outside curve 3 ¼ “from the end, SEE Ridge on PAGE 15. You have just completed one half of the hoop. Some people may need a second person on the out put side to help insure the bent portion remains on the 1x2 wood strips between bending strokes.**

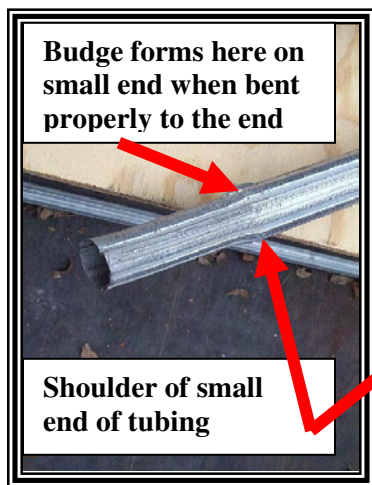
Now let's do the other half. Pick one tube that is painted on the large end. Look down the length of the tubing as you would when checking the straightness of a wood 2x4. Look as you rotate the tubing to see if the small (unpainted) end is canted to one side slightly (SEE NOTES ON CANT PAGE 15). Make a note of or mark the direction of this canted small end. Push the painted large end through the holding strap 4 inches. Then bend this tubing as you did for the first tubing. As you near the end of tubing (the last 12 to 16 inches), with large end of the lever bar slide over the small end of the tube, making sure that the connection junction of the tube and lever bar will contact bender about 5 inches from the end of the bender same as before. **HOWEVER AND THIS IS THE ONLY DIFFERENCE BETWEEN FINISHING OFF THE LARGE END AND FINISHING OFF THE SMALL END, AND IT IS VERY IMPORTANT THAT YOU FOLLOW THIS STEP.** Pull the lever bar steadily and slowly around the bender when finishing off the bending at the small ends. As the lever bar nears the bender on this last pull you will feel a slight give in the lever bar. STOP, release pressure. Slide the lever bar back off of the small end of tube using your thumb feel of the shoulder of the small end along the inside of the curve (SEE PAGE 19) You should feel a slight budge on the inside of the curve at the shoulder. If a slight budge is not present then slide lever back onto tube and bend a little more, always being on the alert and stopping when you feel any give in the tubing, stop and recheck for budge. When this budge is present you have bend the tubing as far as it can be bent, (It's Complete) do not bend more.

Now you have successfully completed one complete bending one complete hoop. So now let's put it together. Choose a level spot of ground and place the two hoop halves flat with the two painted end pointing away from you, slide the two un-painted ends together and using a #10 X ¾” tech (self drilling) screw secure the two halves together as shown below.

Here a wood block is used to support the two ends because the ground is un-level, it's not need if level ground is used.



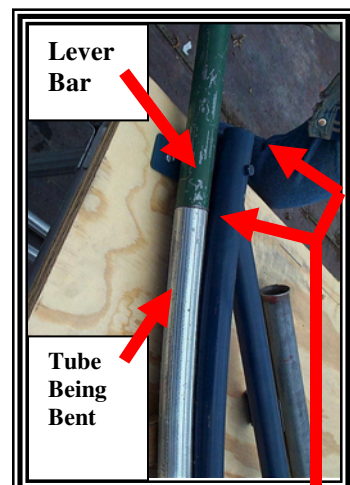
Build the number of hoops you require and then go to the Building your greenhouse section on page 19



Budge shown above, tubing shown is armadillo Brand tubing and is fluted tubing not smooth as is most.

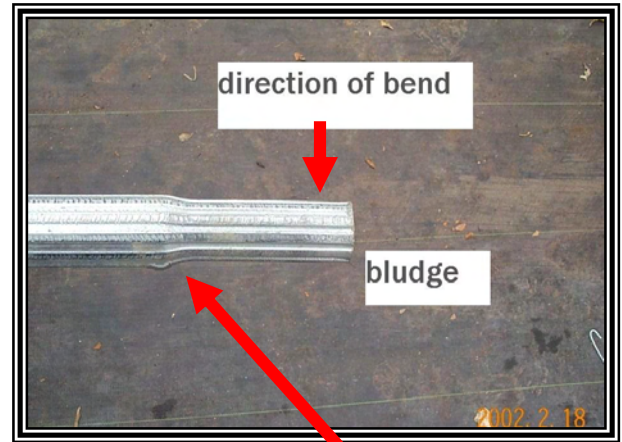
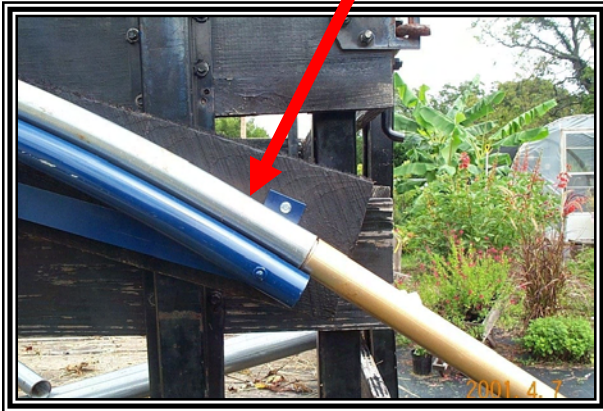


Lever bar show pulled back from small end of tube to better show the shoulder of small end



Every bending stroke should end about 5 inches from the end of the bender

Ridge forms here, **discussed on pg 17 first paragraph**, when finishing off the large end of tubing. It is created by the tip of small end of lever bar inserted into large end of tubing and bending pressure brings the two into contact with the bender body.



Budge forms on inside of curve when finishing off bending the small ends

In this photo the junction of the lever bar and tubing should have been here, another 4 inches further back onto the bender. However at all times the completion of a bend on any tube, the junction of the lever and tube being bent must end on the bender body not past the bender. The action in above photo will be ok but it's getting to close the end of bender.

Building Your Greenhouse

There are many different ways to setup a hoophouse. This is just one method. Larger greenhouses may require a different approach for installing the ground stakes and bottom wood bands.

Choosing the Location

It is always best to locate your greenhouse so that it can receive maximum sunlight at all times of the year especially in winter months. If Possible orient the long side towards the south (ends on an east/west axis). The ground should be near level, and elevated at least a few inches above surrounding earth however it should gently slope to one side or one end of greenhouse to allow water a path to exit the greenhouse, when watering plants.

There are as many ways to frame up a hoop frame greenhouse as there are people. Through out my fifteen years in this business I have seen countless ways to setup the layout, foundation stakes, baseboards, hoops, perlin and everything else. It seems that everyone has a little different method for this or that. Far too many to demonstrate them all, so I'll just show you my methods, but feel free to experiment if you prefer...

Laying Out The 1 5/8 in. od Anchor Stakes (foot print) & Starting The Frame Work

Use 1 5/8" OD by 16 or 17 gage fence post tubing for the anchor stakes. Typical anchor stakes are 30" long. However your soil conditions may require longer stakes.

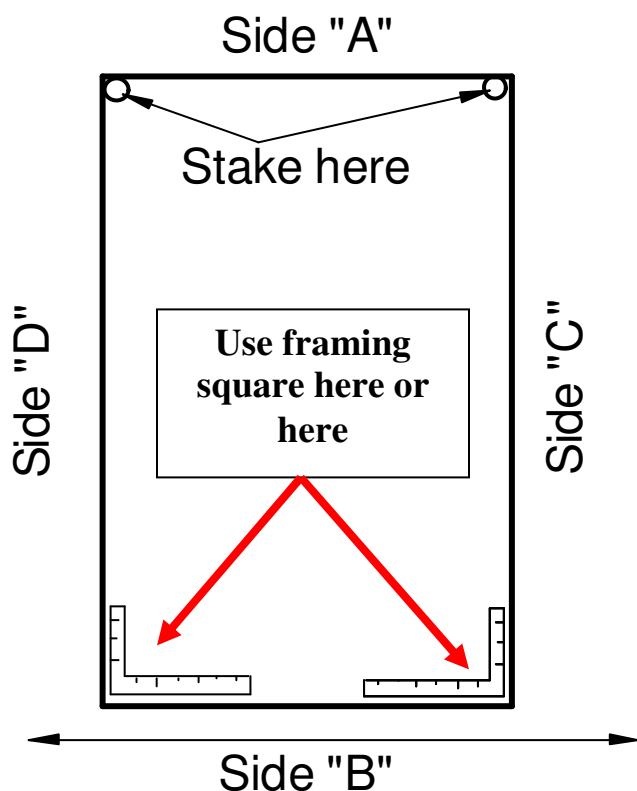
Smaller G/Hs up to a 12' X 24' are very easy to setup the stakes and baseboards using a measuring tape, hand level, saw, drill and sledge hammer (heavy mall). The following example is of a 10x 16, however it can be used for 12 ft wide also.

When using this setup you need to use inside measurements. That is if your greenhouse is 12' X24' the box pictured below will measure 12 feet on the inside of the boards at the two ends and 24 feet on the inside of the two side boards.



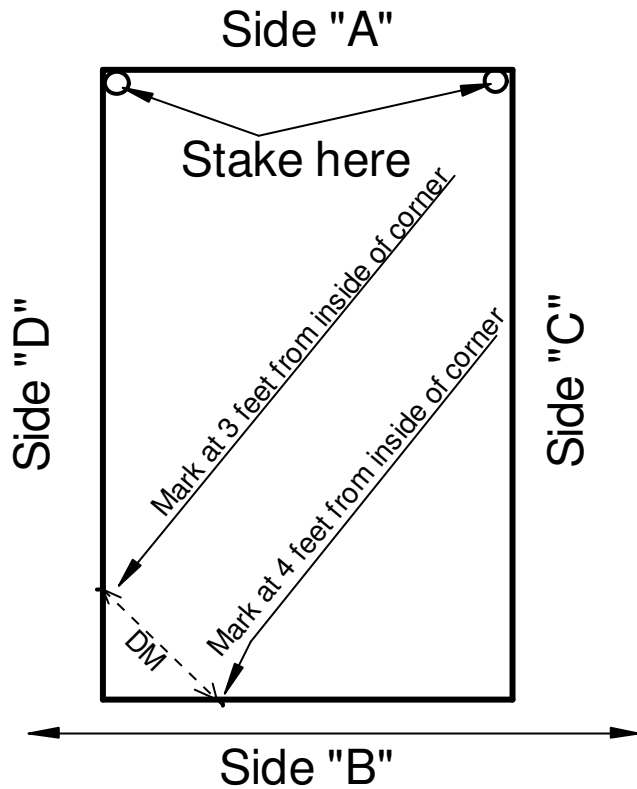
Here Shirley and I are setting up a 10' X 16' ground work.

The treated 2x4s are cut to length and ends are fasten together forming what is similar to a large sandbox for the kid's.



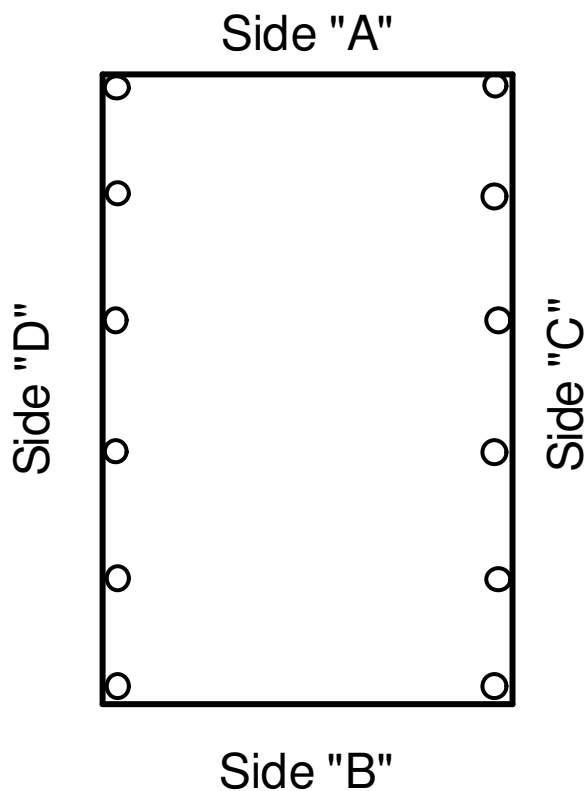
Side “A” is anchored with the two permanent 1 5/8” Tubing stakes, and then temporally fastened to the stakes.

Then side “B” is then shifted to the left or right while holding a framing square in either of the two corners of “B/D” or “B/C”. Shift “B” until B/D or B/C is square. Then drive stakes into corners B/D & B/C



Don't have a framing square? No problem. Measure from inside of corner B/D, making a mark at 3 feet on the top of "D" board on the inside edge of "D". Now measure from corner B/D along the top of "B" making a mark at four feet.

Now shift side "B" left or right until the diagonal measurement (DM) between the two marks reads 5 feet. The frame is now square.



Drive the two 1 5/8" stakes in corners B/D & B/C first after frame is squared. Make sure that sides C & D are straight then drive remaining stakes at the spacing you have chosen



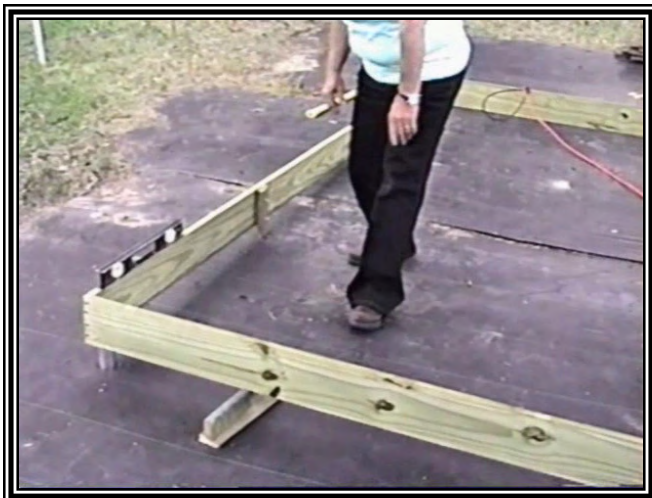
**Three feet and mark
inside top of board**



**Four feet and mark inside
top of board.**



**Shift side “B” left or right until
you get five feet between the
two marks on the diagonal
measurement. It’s then square,
Provided that you have cut all
four of the side boards to their
required length, if one board is
wrong then the frame will not
square up...**



Ground stakes are made of 1 5/8" fence post cut to 30 inch lengths. Loose soil may require longer stakes. As you can see we have already installed the ground cloth in a large area inside and out side of greenhouse. The ground is sloping towards this corner. After installing the 1 5/8 inch ground stakes I leveled the wood frame then blocked the frame up where needed to keep it level. Next step is to install the hoops.



Installing the last 1 5/8 " pipe stake corner stake.

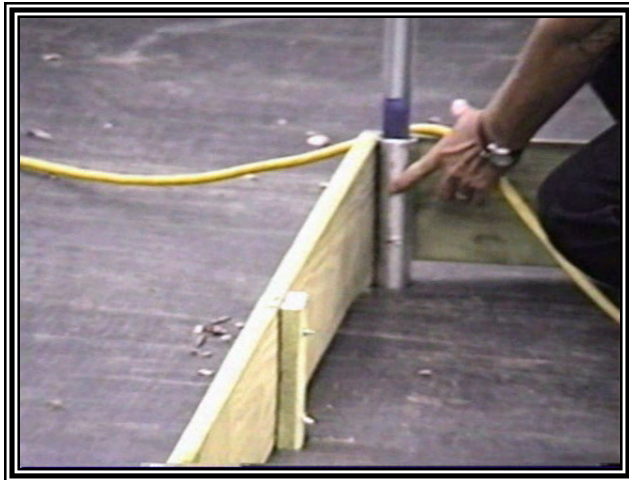


Wood stakes at end frame. both ends

Installing the last hoop. Hoops should be inserted into the 1 5/8" ground stakes 6 inches, then a #10 by 1 1/2" long self drilling screw is run through the wood into the 1 5/8" metal stake and hoop. This screw locks the frame in level position as well as connect the hoop to the stake. Two treated wood stakes at each end serve to stabilize the end frame boards. They are permanent so use treated wood.



Install the self drilling (Tech) screws from outside wood into the 1 5/8" stake and hoop



Pushing the hoop down into the 1 5/8" O.D ground stake. Here you can see the top of painted end. Top of paint is 6"



The gap at front right corner will be filled in with treated wood later, leaving a screened outlet hole for water to escape the greenhouse. On longer house you may want to install stakes using a string line and level then hoops and add the wood band last.



Attach the perlin at each end by flattening out the ends then bending the flat portion of tubing up about 30 degrees, drilling a 5/16 hole and using a band clamp made for 1 3/8" fence tubing. If you can not locate these fence clamps just make the perlin 1 3/8" longer on each end, flatten as shown, Holding the flat portion under the hoop and drill 5/16 hole thru the hoop and flatten end of perlin, then bolt with 2" X 5/16 bolt.



A simple stainless steel hose clamp is used to connect all hoops to the perlin except for each end hoop, which is bolted.

Here's a tip on installing perlins. Cut & flatten the perlins ends as shown above. Make sure that the length is equal to the length of the greenhouse measurement at ground level from the outside of the stake on one end to the outside of stake on other end. If you are using the 1 3/8" band clamps the perling will be equal to the ground level greenhouse length minus 2 3/4". Measure the perlin length after the ends have been flattened. If no clamps are available the direct bolt method is just as good however the perlin length will be equal to the greenhouse length "exactly". with the perlin sections together (if more than one) lay the perlin on the ground next to the stakes on one side, make sure the perlin reaches the end hoops correctly depending on which method used connecting ends. Now mark the perlin at the center of each ground stake except the end stakes won't need a mark. The marks quickly allow you to attach the perlin to the hoop at the exact location matching the position of the ground stake, thereby keeping all hoops in a plumb position.



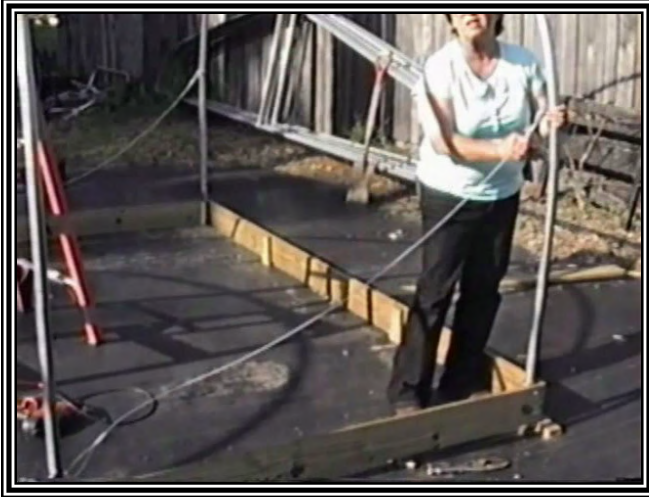
Here we have prepared the cable braces. Which are regular 1/8" steel cable from the lumberyard folded into a loop at each end and clamped with a 1/8" cable clamp also found at the lumberyard.



Here we are using those handy 1 3/8" fence band clamps. Any chain link fence supply can order these clamps if you can't find them. Also some success has been noted using heavy metal plumbers tape with holes punched in it. Or solid tubing braces can be used, cut the tubing to desired length flatten the ends and tech screw it to the inside of hoops at the four corners. In place of the cables



Here the cable brace has been clamped securely to the bottom of the first hoop back from each corner.



Here we are attaching cable to the end hoop at one corner. Tighten the band clamp securely on the lower cable end at left and just sung up the band clamp at end hoop, leave some slack it cable for now.



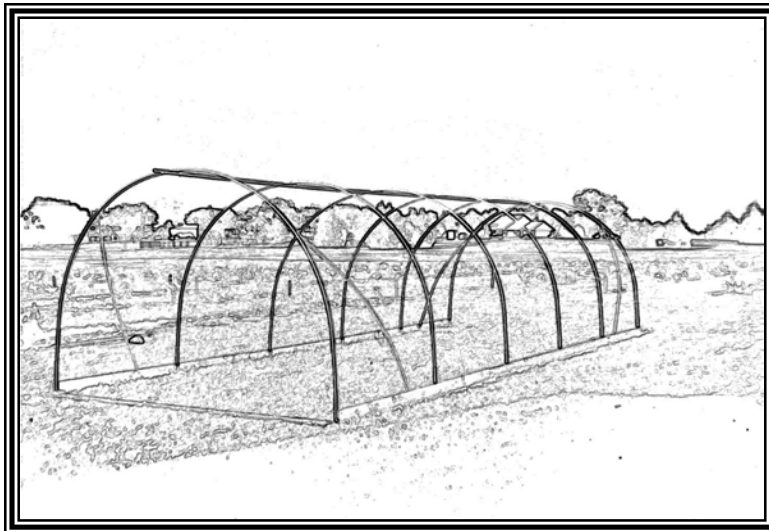
Perlin must be installed before proceeding in case you skipped that step. All four corner cables are installed and our frame is out of plumb (leaning) to Shirley's right. We have left slack in all cables. To pull the frame to Shirley's left (into a plumb position she taps the band clamp upwards until cables on this end become tight. Continue to tap both band clamps upward, this will pull the frame to Shirley left. Watch the cables on the other end as you do this and make sure they always have slack in them. Once the frame is plumbed tap the clamps up until cable is taught on the other end. **CAUTION DO NOT OVER TIGHTEN THE CABLES.** You can damage the end hoops. Just get the good and snug.



Tighten all band clamps tight



Another customer supplied photo. A great example of a very clean professional job preformed by the homeowner. Note the holes for twin exhaust fans in rear. He used tubing framing for end walls but bolted wood to front end wall for easier door installing.



Line drawing of the above GH.

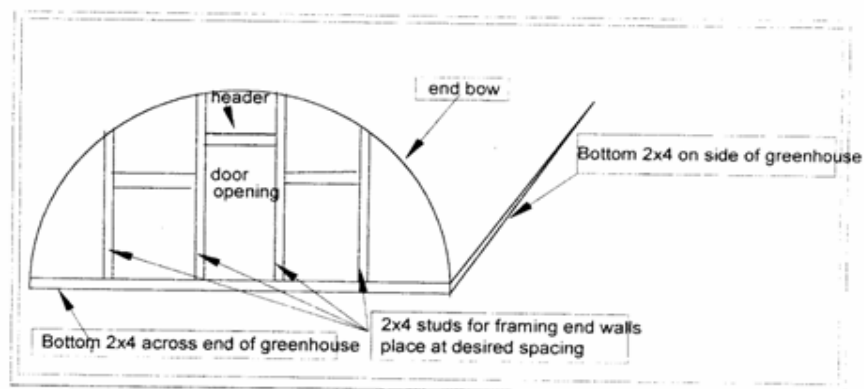
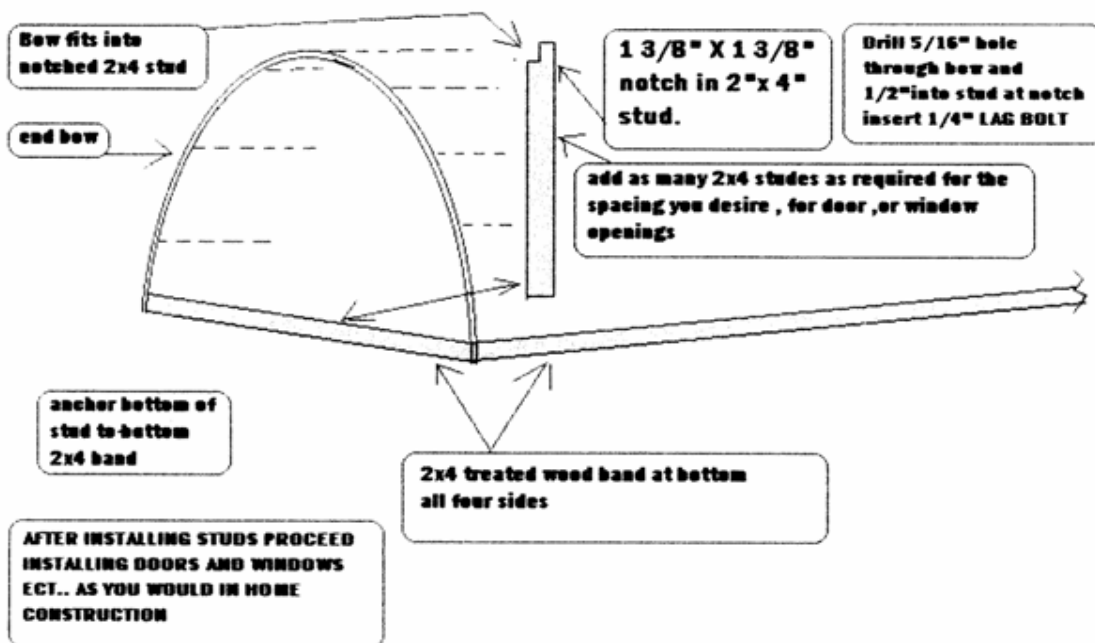


These 4 photo's provided by one of our customers.

The beginning of a really nice 12' X 30' with 24" inch elevated above ground anchor stakes (side wall) for extra vertical space. Note the clean straight alignment of ground stakes and the assembled hoops ready to install. This customer followed instructions to the letter. Note also the red painted ends on the hoops. One hoop has been temporally placed just inside of the **1 5/8" OD ground stakes**, after this photo was taken all hoops were inserted into stakes to the top of the red paint then a tec-screw drilled through the stake into the hoop held the hoops in place.

Installing The Wood Framing

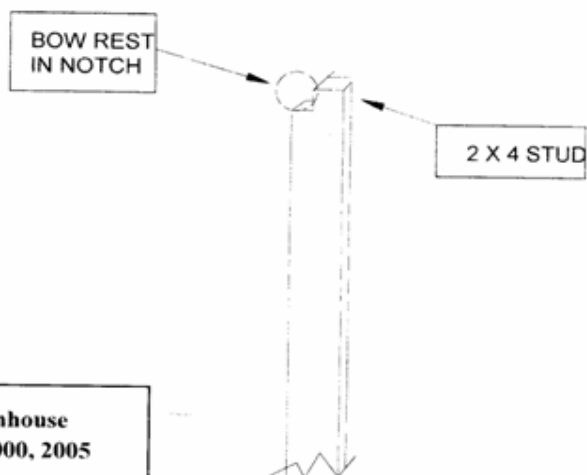
There are a number of different ways to attach wood end wall framing. The following is simply a basic outline. End hoops are usually drilled & wood fasten to it with large screws or bolts. **NOTE the reference to 20ft frames on page 32 does not apply to 12 ft instructions.**

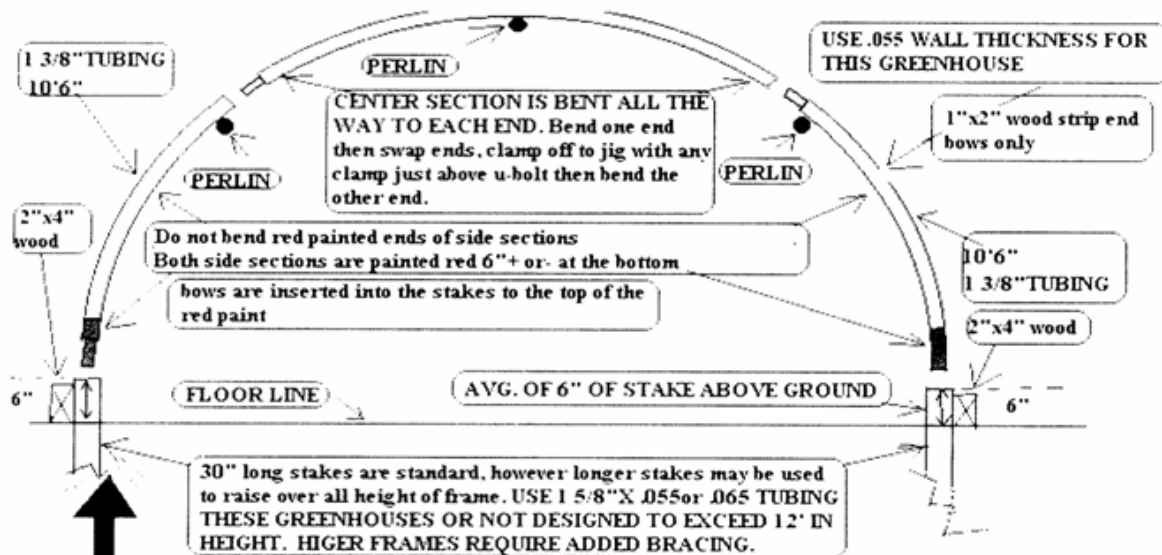


EW-1

END WALL FRAMING USING TREATED WOOD

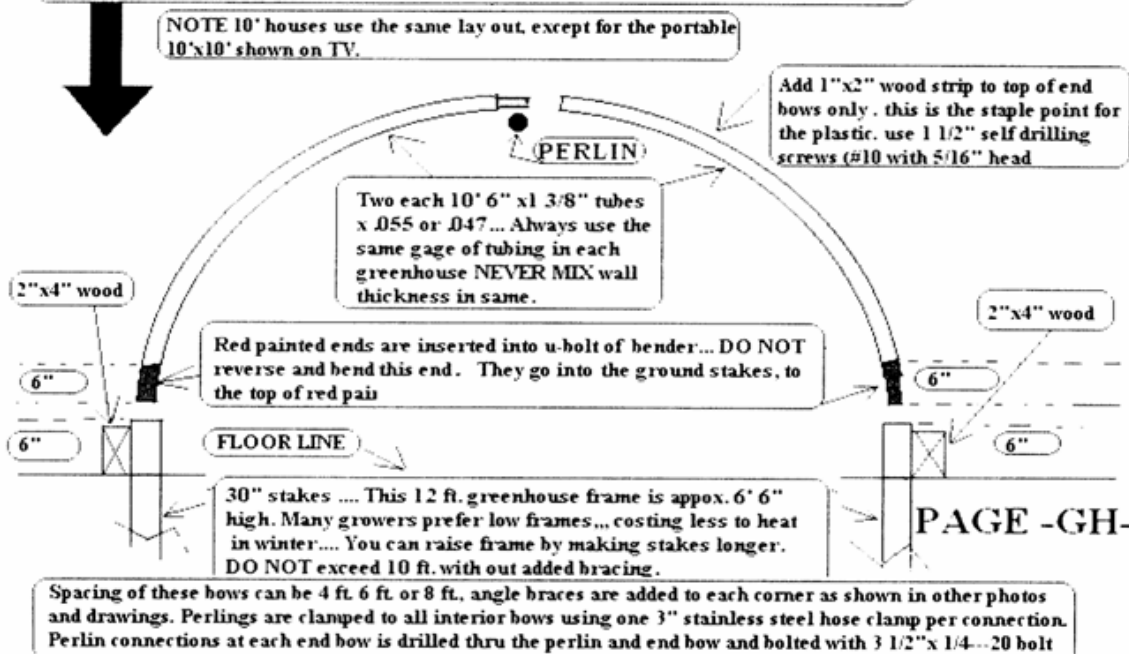
© Lost Creek Greenhouse
Systems, L.C.G.S., 2000, 2005





Basic 20 ft. coldframe/ greenhouse

Basic 10ft. and 12ft. coldframe greenhouse

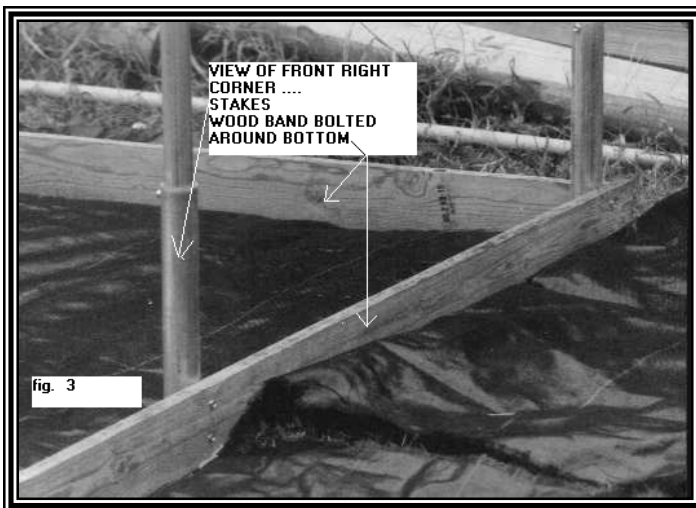


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This is such a good example of GH construction I had to add it again. Note also the earth grade work inside the frame work. Slightly raised above outside grade.



Close up of wood 2x4 band.



Clamps can be used to hold 1x2 wood strips as the are bent around the end hoops. Remember only the end hoops get the 1x2 strips. If wood is hard to bend, you can kerf the strip. This is simply cutting across the strip about 1/3 through every 1 to 2 inches.



Close up of bar clamp aiding installing strips. I soaked these strips in a nearby pond for several days before installing them so I did not need to kerf them.



Bending the strip all the way down to the 2x4 base board.

See page 39 for a drawing of a kerfed 1x2 strip

Installing UV Poly Covering

There are basically two ways to install the UV (Ultra Violet) resistant poly covering on your greenhouse. About half of the commercial greenhouses use the simple fold it and staple it method and that is the method I will describe. However there are several different channel lock methods available, the most widely use of these is the “wobble wire” which is used by pulling the poly over a small channel which has been fasten to the wood bands then a zig zag shaped wire is worked into the channel, locking the poly securely in place. I don’t use any of these channel lock methods because #1 they cost more that the wood bands, which must be installed anyway for supporting the channel, #2 While channel locks provide quick installation they tend to damage the poly for more than acceptable, “in my view”.



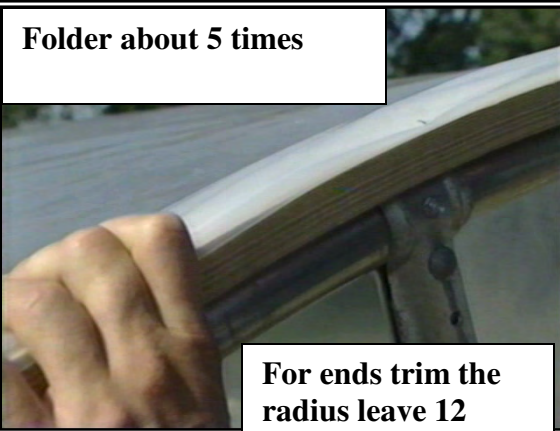
Trim off any excess poly you need about 12 inches to fold several times.



Fold and roll the poly as you pull it snug across top of GH, then staple.



Folder about 5 times

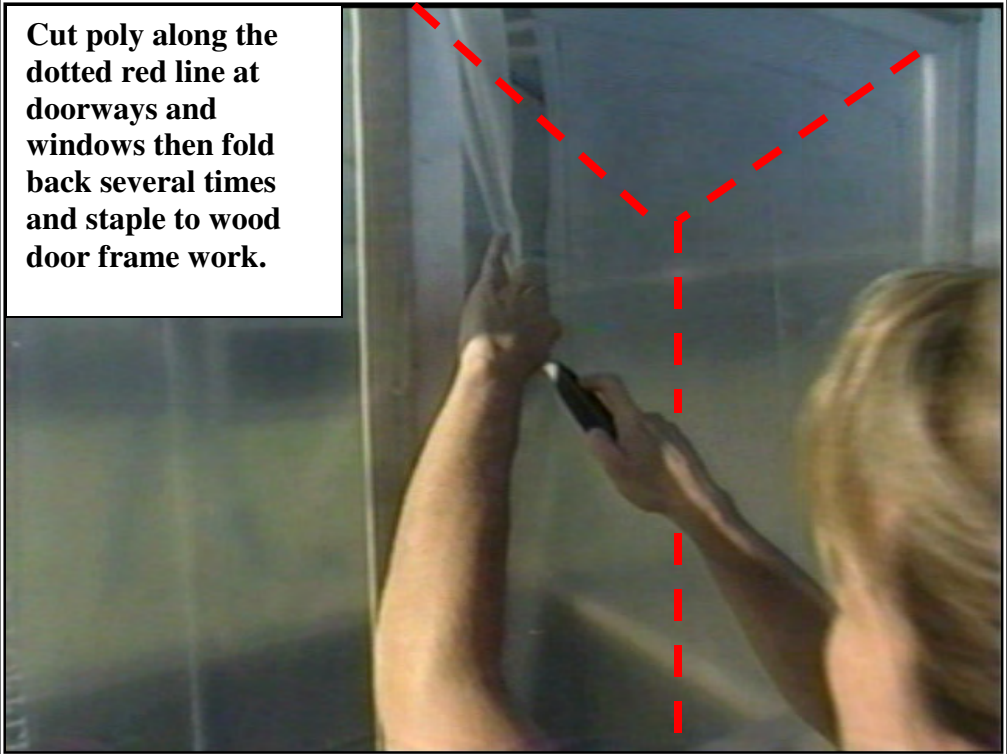


For ends trim the radius leave 12 inches extra to fold and staple onto the 1x2 strip right over the top plastic staples

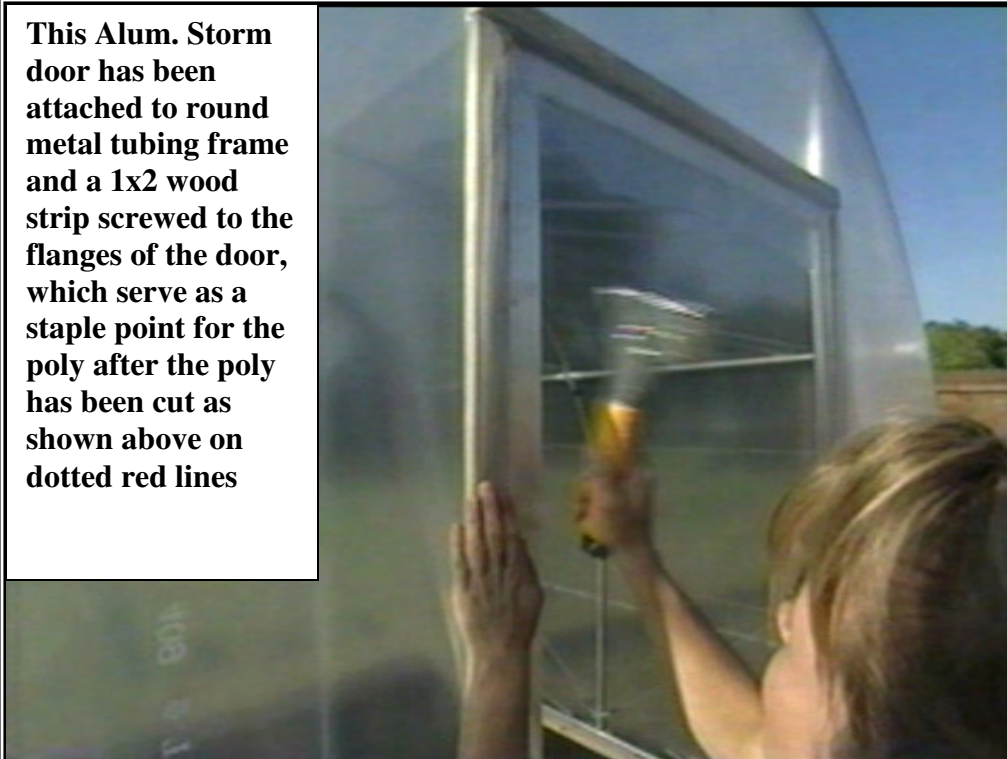
Staple every 3 inches using 1/2" long staples. Here we are using a hammer stapler.

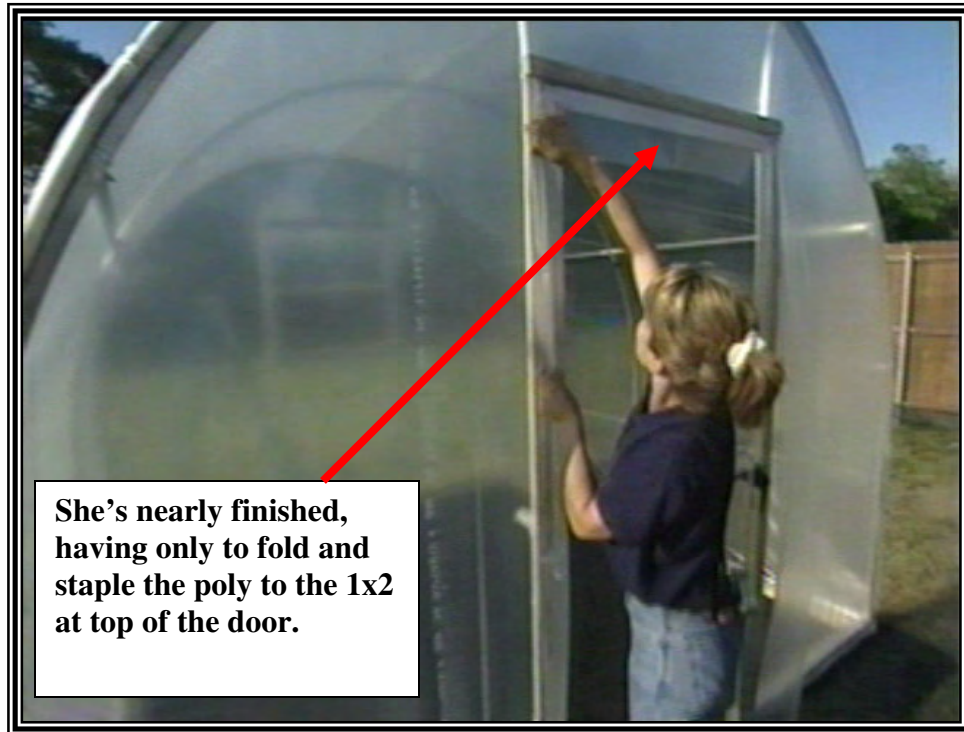


Cut poly along the dotted red line at doorways and windows then fold back several times and staple to wood door frame work.



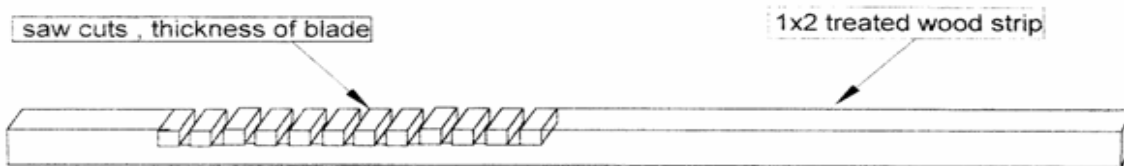
This Alum. Storm door has been attached to round metal tubing frame and a 1x2 wood strip screwed to the flanges of the door, which serve as a staple point for the poly after the poly has been cut as shown above on dotted red lines





Bending the wood strips

Soaking 1x2 strips in water for a day or two will help with bending and screwing wood to hoop. However some curves and wood will need a little help. Making saw cuts (curffing) will allow you to make near impossible bends easy. A little practice may be necessary.



1x2 treated wood strips can be curffed to allow bending around tighter curves of end hoop. To curff strips, make saw cuts across 1x2 strip about 3/8" deep every 1/2" to 1" inches apart. Curff the strip only where it is necessary for assisting the bending, follow greenhouse instructions to attach strips to hoop with 1 1/2" #10 self drilling tec screws. As all wood is not the same you may need to adjust the depth and spacing of the cuts for the wood you are using. Install cut side of strip towards tubing of hoop.

The kerfing spacing will vary from wood to wood types and densities, cross cuts 1/3 of the way through about every 1 to 2 inches along the entire length when using regular treated pine 1x2 works fine. Be sure to purchase 1x2s with out knots if possible, if this is a problem purchase a 12 foot long 2x8 treated board (one with as few knots as possible then rip 3/4 inch thick slices from it, to produce your own 1x2s. Many times this is better because starting with a good board you can discard any sections having knots. Be sure if you kerf the strips to kerf it from end to end at uniform spacing and depth. NOTE pre-drill holes every 12 inches through the strips before starting the self drilling screws, you only pre-drill the wood not the metal frame, if you don't the screw head will bottom out against the wood before it has a chance to drill itself into the frame.

Install the kerfed cuts down onto the metal hoops attach with #10 by 1 1/2" tech screws

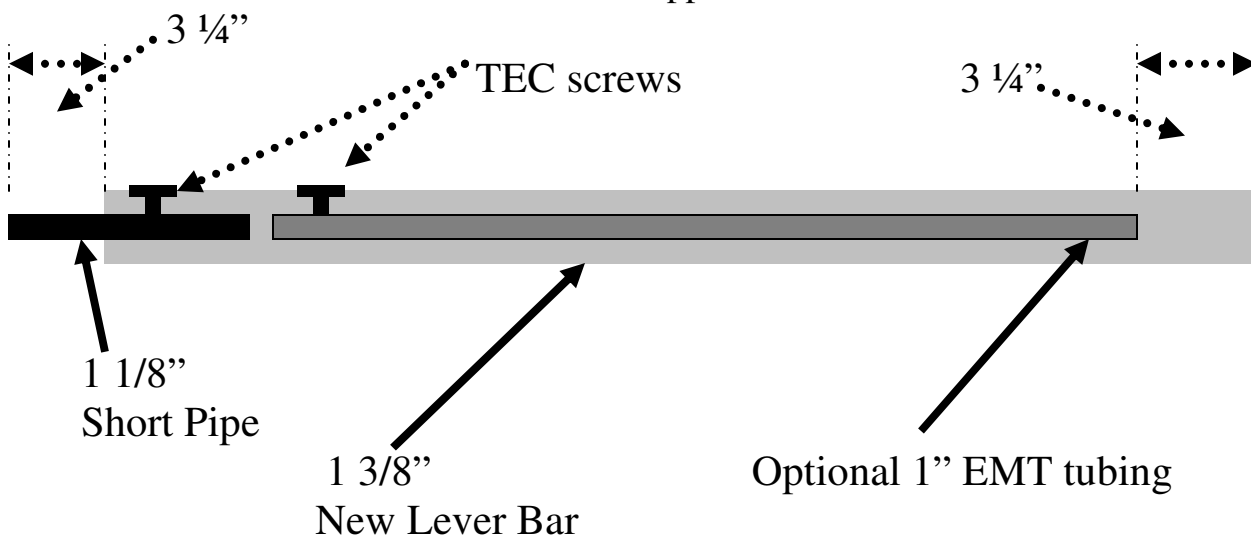
Lever Bar

Lever bar's will wear and bend and will need to be replaced from time to time depending on the hardness of the tubing being bent. This is very simple to do. Just use the desired length of new 1 3/8" OD tubing 17 to 18 gage thicknesses. It can be longer than the one shipped with this bender if desired.

Cut new lever bar the desired length, remove the short, small 1 1/8" OD pipe from the end of the old lever bar and slide it into one end of the new lever bar tube. Attach the two together with a single tec screw in the same manner as the old lever bar. Be sure to leave the smaller pipe protruding from the lever bar 3 1/4"

You can also quickly strengthen the lever bar even more by adding a short section of one inch O.D. EMT tubing (electrical metal tubing) found at any hardware stores. This should be inserted into the other end of the lever bar opposite end of the smaller short pipe.

The EMT should be recessed into the opposite end of lever bar 3 1/4"



DO'S—DO NOT'S—WHY'S

Shirley and I are dedicated to helping you enjoy your new greenhouse, so please contact us with any questions you may have.

#1

Many new greenhouse owners wrongfully believe that a greenhouse requires a system or automatic sprinkler or misting system. Fact is that an automatic misting/sprinkler system will kill most of your plants. The reason for this is most hobby g/h's contain many different kinds of plants in many different size pots. Not all of these plants will need watering at the same time; automatic systems do not know this and will over water plants in larger pots. Hand watering is still the best method unless every plant is the same kind and in the same size pot.

#2

A simple water bed heater placed under a cheap single (beach type) air mattress filled half full of water makes a great seed and cutting propagation table, you get four times the surface area of those expensive electric seed starting mats for about half the cost. Just set the control to the desired temperature and wait, these heaters are by their very nature safe around water. Many times you can find them at garage sales very cheap. **NEVER EVER use a medicinal heating pad to start seeds, they are very dangerous, DON'T USE THEM.**

FAQ

Can I bend 21 foot lengths? Yes if the bender is table mounted, however you will have to build a 21 foot long table in a curve and level with the bending plane of the bender. That's a lot of extra work & cost and the results are seldom good.

Can I build my greenhouse with straight sides? Typical hoop houses do not have straight sides. The reasons for this are structural design issues. Straights side can be added however this increases the wind side loading and extra heavy anchor post are required as well as internal cross bracing of the hoops. It is best to use hoop house designs as they were intended arch frame. If you must add straight sides contact me for assistance and recommendations.

Can I bend other types of tubing with these benders? Yes you can bend just about any tubing that will fit into the holding strap, even concrete rebar, and 1/2 thur 1 1/2 inch EMT tubing. However keep in mind that all different tubing other than recommended for the greenhouse size will have smaller or larger rebound effect (different size arch) depending on the size and hardness of the metal..

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