

# Building Your Greenhouse

## *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, perlins 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 Anchor Stakes (foot print) & Starting The Frame Work**

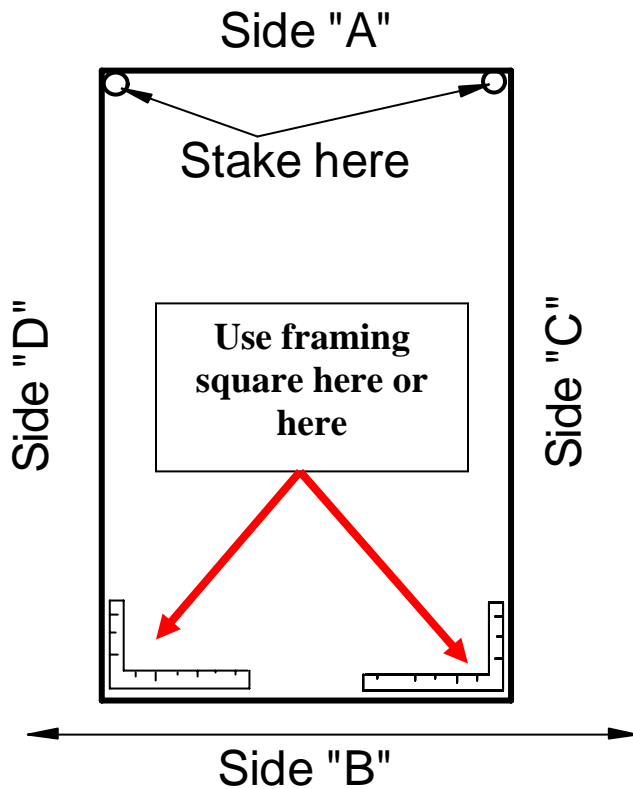
Smaller G/Hs up to a 12' X 16' are very easy to setup the stakes and baseboards using a measuring tape, hand level, saw, drill and sledge hammer (heavy mall).

When using this setup you need to use inside measurements. That is if your greenhouse is 10' X16' the box pictured below will measure 10 feet on the inside of the boards at the two ends and 16 feet on the inside of the two side boards. Inside dimensions for this type setup only. If your greenhouse is a 12 foot wide then the inside measurements on ends would be 12 feet.



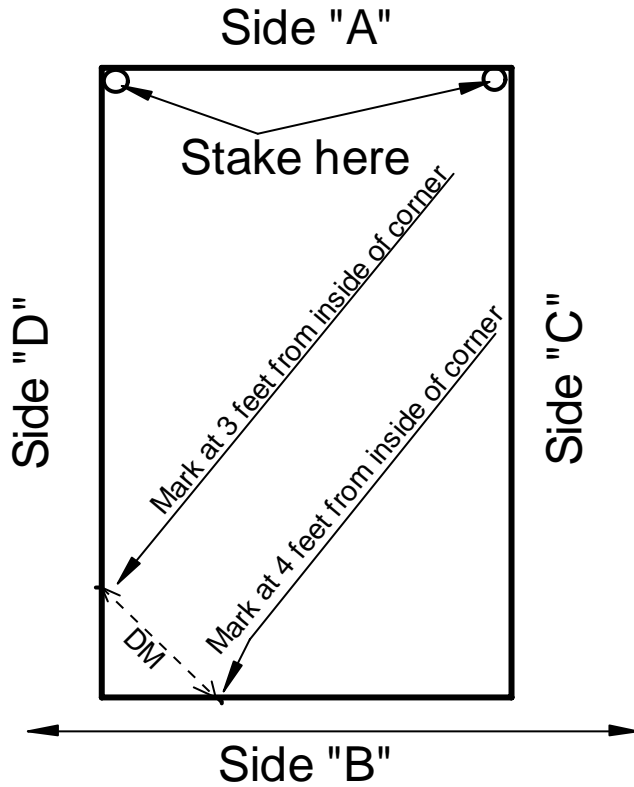
Here Shirley and I are setting up a 10' X 16' ground work.

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



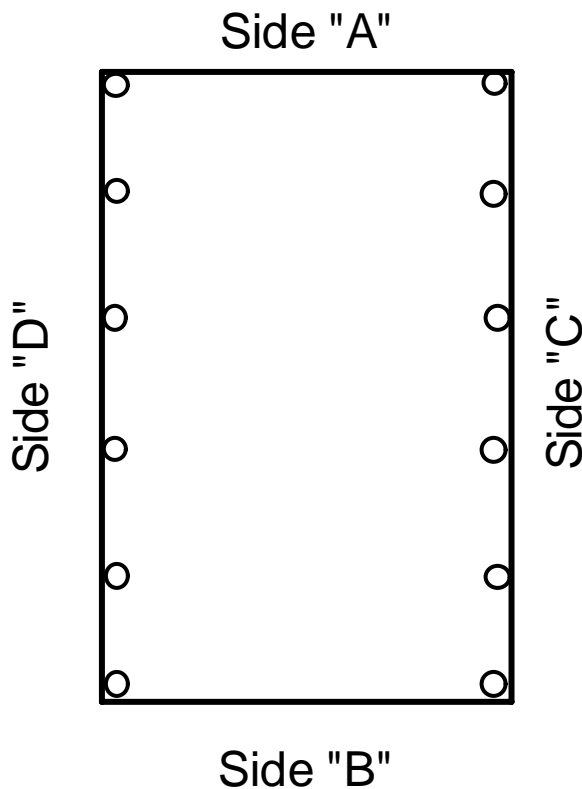
Side "A" is anchored with the two permanent 1 5/8" Tubing stakes, and then temporally fastened to the stakes.

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 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...**



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.

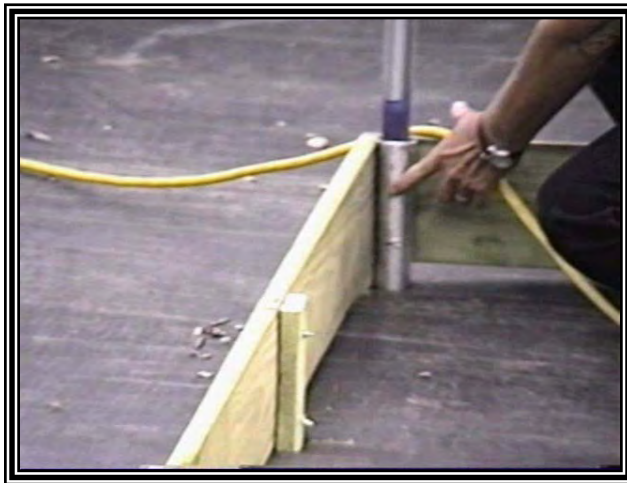


Wood stakes at end frame. both ends

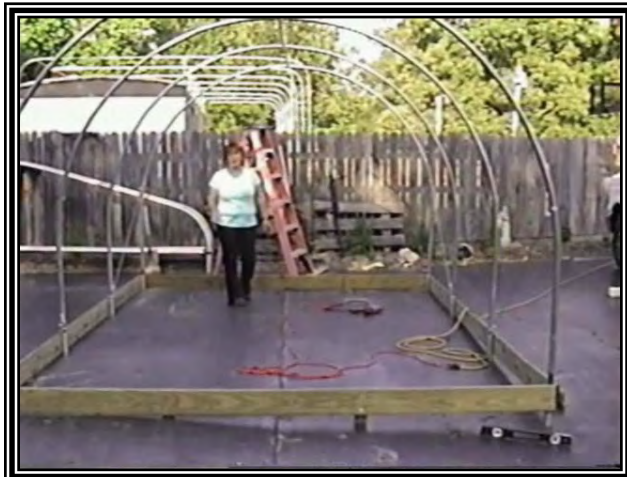
Installing the last hoop. Hoops should be inserted into the 1 5/8” ground stakes 6 inches, then a #10 by 1 1/2” long self drilling screw is run through the wood into the metal stake and hoop. This screw locks the frame in level position as well as connect the hoop to the stake. Two treated wood stakes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



**Install the self drilling (Tec) screws from outside wood into stake and hoop**



**Pushing the hoop down into the 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.**



**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 that 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 chainlink 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 punches in it. Or solid tubing braces can be used, cut the tubing to desire length flatten the ends and 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 snug up the band clamp at end hoop, leave some slack in cable for now.



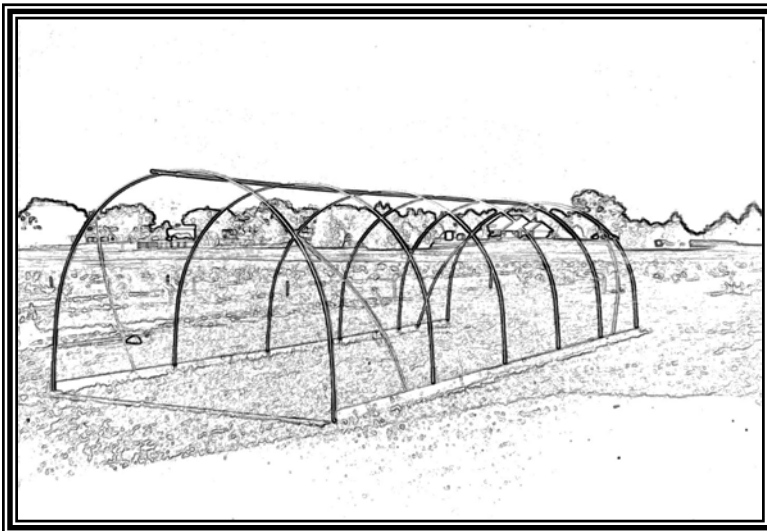
Perlin must be installed before proceeding in case you skipped that step. All four corner cables are installed and our frame is out of plumb (leaning) to Shirley's right. We have left slack in all cables. To pull the frame to Shirley's left (into a plumb position she taps the band clamp upwards until 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.

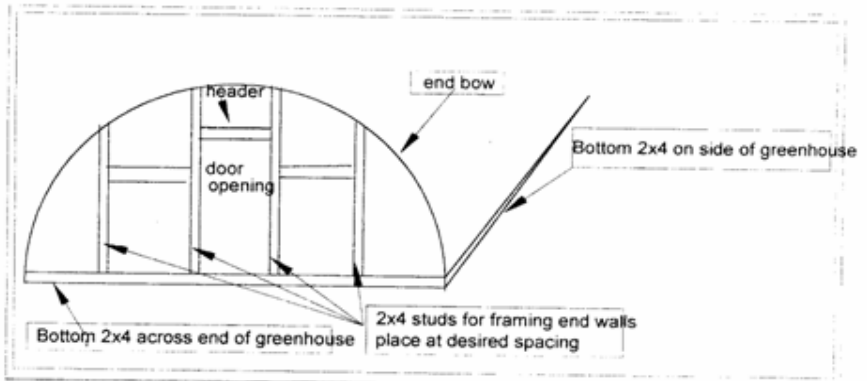
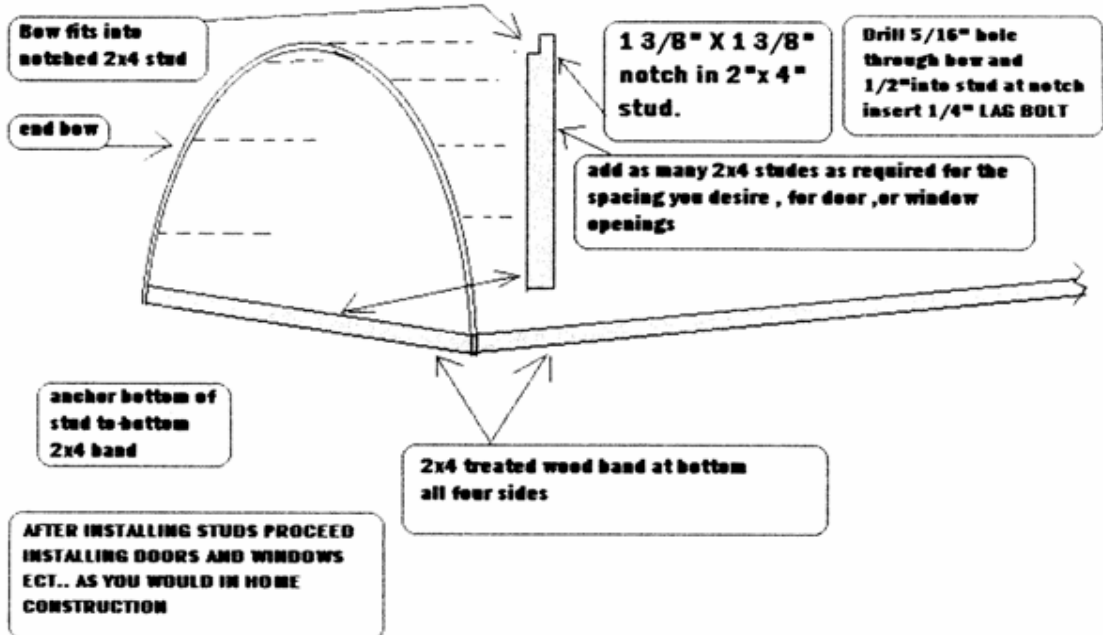


**These 4 photo's provided by one of our customers.**



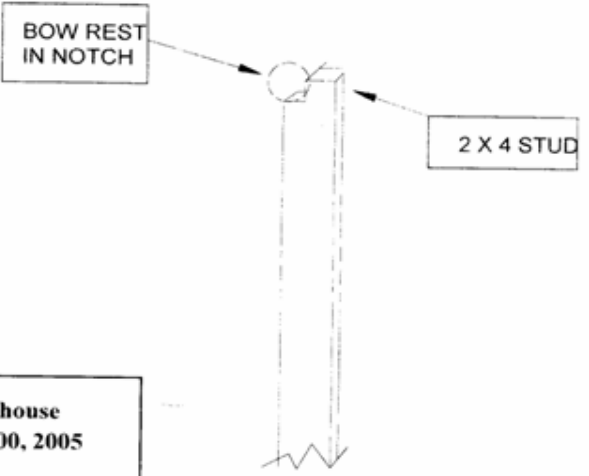
**The beginning of a really nice 12' X 30' with 24" inch elevated above ground anchor stakes (side wall) for extra vertical space. Note the clean straight alignment of ground stakes and the assembled hoops ready to install. This customer followed instructions to the letter. Note also the red painted ends on the hoops. One hoop has been temporarily 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***

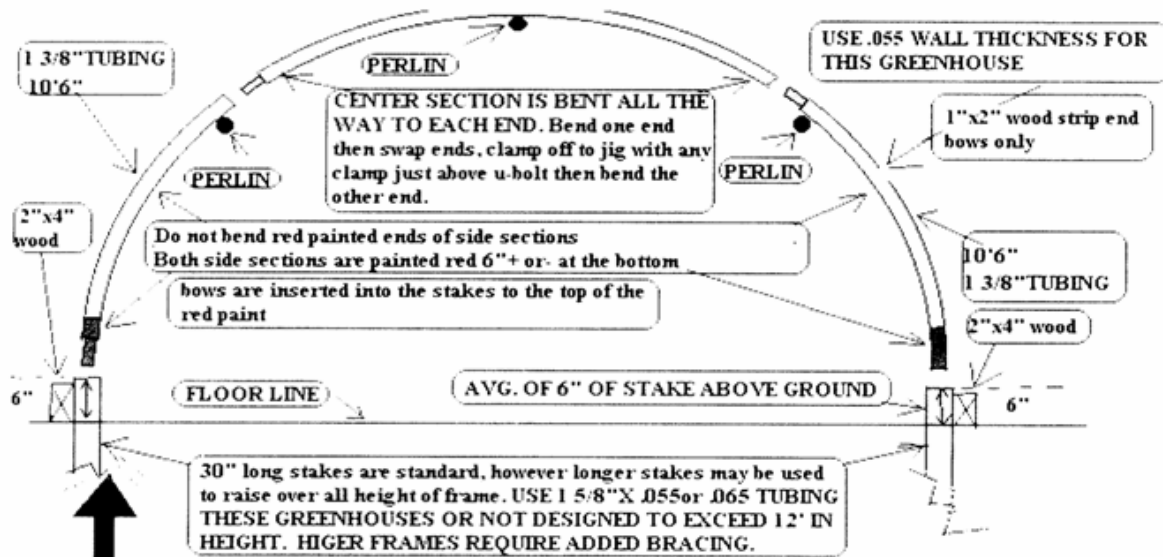


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## END WALL FRAMING USING TREATED WOOD

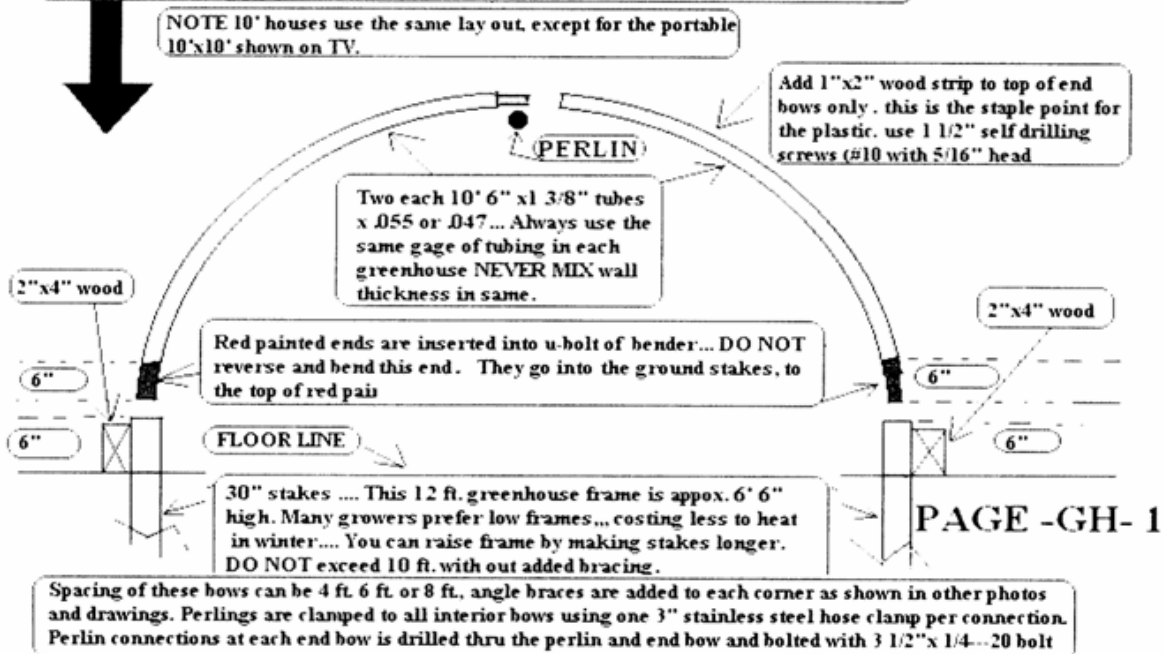


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## Basic 20 ft. coldframe/ greenhouse

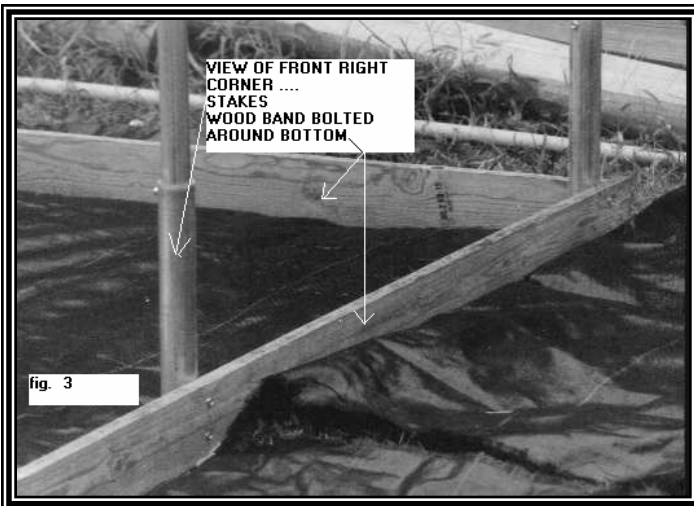
## Basic 10ft. and 12ft. coldframe greenhouse



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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 37 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”.



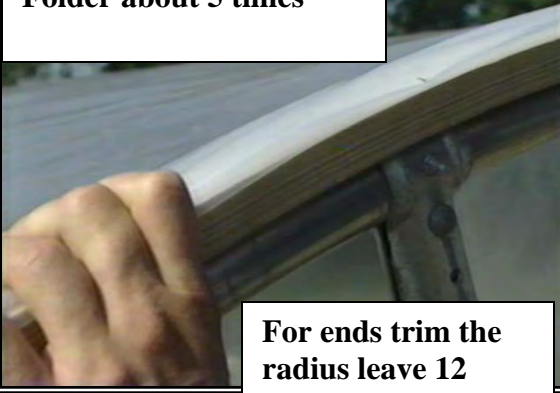
**Trim off any excess poly you need about 12 inches to fold several times.**



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



**Folder about 5 times**



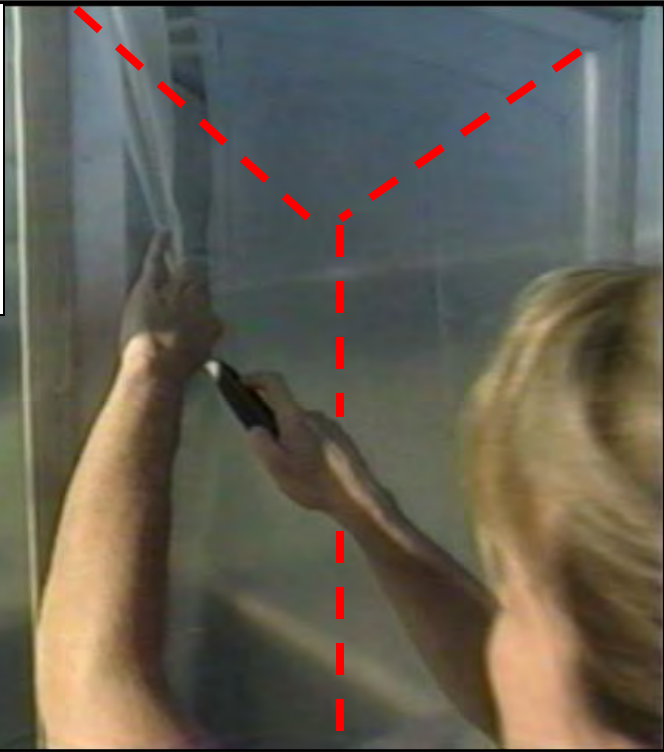
**For ends trim the radius leave 12 inches extra to fold and staple onto the 1x2 strip right over the top plastic staples**



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

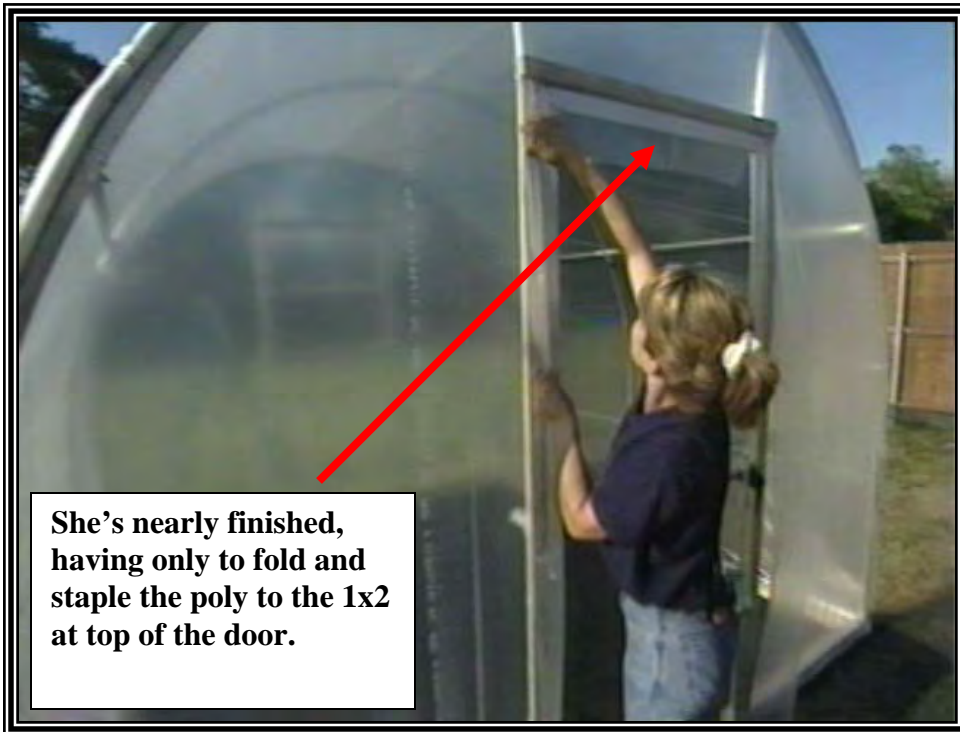


**Cut poly along the dotted red line at doorways and windows then fold back several times and staple to wood door frame work.**



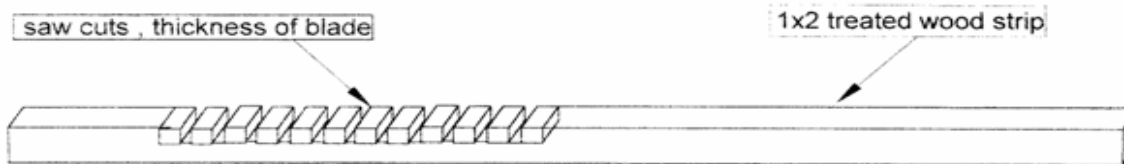
**This Alum. Storm door has been attached to round metal tubing frame and a 1x2 wood strip screwed to the flanges of the door, which serve as a staple point for the poly after the poly has been cut as shown above on dotted red lines**





### ***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 (curfing) will allow you to make near impossible bends easy. A little practice may be necessary.



1x2 treated wood strips can be curfied to allow bending around tighter curves of end hoop. To curf strips, make saw cuts across 1x2 strip about 3/8" deep every 1/2" to 1" inches apart. Curf 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.**

