ROBERTS RANCH
HOOPHOUSES

16', 20', 24' WIDE GOTHIC HIGHTUNNEL

DIY Kit Assembly Instructions

www.rrhoophouses.com

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BACKYARD HIGHTUNNELS

DESIGNED BY GROWERS FOR GROWERS

We designed our Hightunnels with the needs of the grower and the plants in mind, as well as the problems created by extreme weather conditions.

Each of our structures include roll-up sides with a windrope system, an easy to use hand crank, and top vents. These allow for needed ventilation on hot summer days, yet close down securely in winter time to promote year round growing.

Our Hightunnels have consistently held in strong winds (75+ mph) and heavy snow loads. We are confident you will have the same results if you build your Hightunnel according to our instructions. Each step requires as much precision as possible. Be exact with your measurements and when joining the purlins to the ribs. Be sure to have plenty of help when pulling the canopy.

You will find our engineered Hightunnel plans for the width you are building in a separate email attachment. Length can vary without the need to change the basic plan. The end wall construction plans are recommended, but there is flexibility in the design. The vent can be framed above the door if preferred. Cover the vent with screening mesh and keep the plastic to seal it off in winter, or create a vent cover.

We have included pictures and video links to aid in constructing your Hightunnel. We have also included a reference page at the end of the instructions with a link to our YouTube channel, where we upload the most recent videos and hardware used. We are continually striving to stay up-to-date on the products we use for our structures.

To help you with your growing needs, we recommend Eliot Coleman's books on Winter Harvest and Organic Gardening. He is a master at growing in unheated Hightunnels and the information he shares will help you be a successful gardener.

WHAT YOU NEED

TOOLS NEEDED

- 1-2 measuring tapes (25'-100', depending on size of the Hightunnel)
- 2 hand levels – one approximately 4', one approximately 18"
- Skill saw
- Drill
- Hammer
- Sledge hammer (both a long handle and short handle, if possible)
- Pencil / marker
- Wooden stakes
- Sawzall or hacksaw
- String
- Staple gun
- Staples
- Long ropes (2 for a 16' long tunnel, add another rope for every additional 16' in length)
- 3-4 ladders
- 3-6 saw horses, depending on length of Hightunnel
- Hex-head drill bit for #14 - 3" self tapping screws
- Hex-head drill bit for 1" metal-to-wood screws
- Screw bit for grabber screws
- Duct tape
- Power cords
- Nail gun
- Nails
- Air compressor

MATERIALS TO PURCHASE

See Shopping List in Hightunnel Instruction email for detailed information on materials to purchase.

The door is not provided. You can purchase a storm door, exterior solid door, or make one yourself. The rough opening is 35-¾".

PARTS INCLUDED

See sections on following pages

PIPE

P2

P11

P7

P12

P8

P13A

P14A

P15

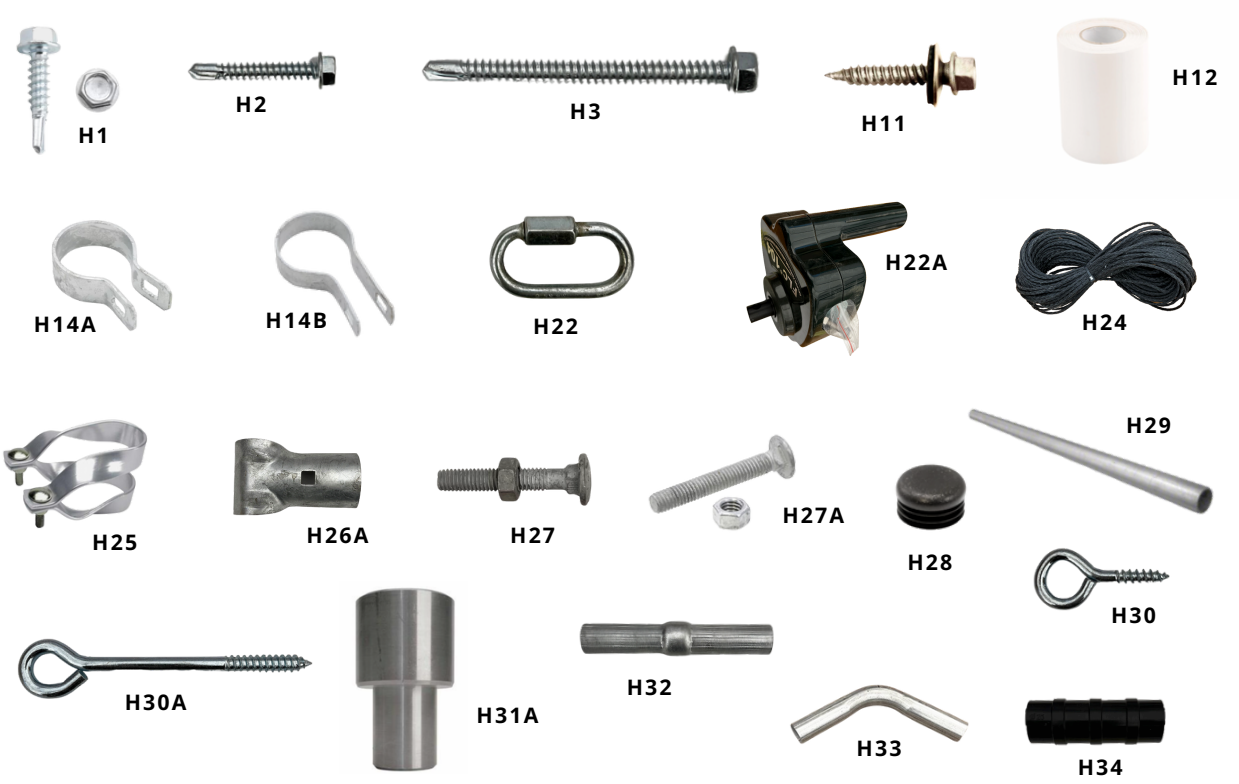
Part #	Name	Size	Notes
P2	Post Pipe	4' x 1 5/8"	
P7	Straight Purlin Pipe	10' 6" (1 3/8")	
P8	Swedged Post	1 7/8" x 2'	**Post only for steel end wall framing**
P11	Conduit Pipe	3/4"	
P12	Center Ridge End Purlins		2 Purlins with a flattened end to connect to first and last arch using a band clamp
P13A	Peak Piece	1 7/8"	
P14A	Bent Rib Pipe	1 5/8"	
P15	Straight Rib Pipe		

PLASTIC

F1 & F2

Part #	Name	Size	Notes
F1	Endwall Plastic		
F2	Canopy Plastic		

HARDWARE



Part #	Name	Size	Notes
H1	Self-Drilling Screws	1"	
H2	Self-Drilling Screws	1-½”	
H3	Self-Drilling Screws	3"	
H11	Metal to Wood Screws	¾"	
H12	Repair Tape Roll	4"	
H14A	Band Clamps	1 5/8"	
H14B	Band Clamps	1 7/8"	
H22	Carabiner		
H22A	Hand Crank		
H24	Wind Rope		
H25	Cross Connector	1 5/8"	
H26A	T-end Clamp	1 5/8"	
H27	Bolt and Nut	Short	
H27A	Bolt and Nut	Long	
H28	Conduit End Caps		
H29	Roll-up Posts (Conduit Pipe)	5' x 3/4"	

Part #	Name	Size	Notes
H30	Eye Screw	Small	
H30A	Eye Screw	Large	
H31A	Post Pounder	1 5/8"	
H32	Conduit Sleeve		
H33	Peak Piece	1 7/8" x 16"	
H34	Fabric Clips		

U-CHANNEL

U1 - U7

Part #	Name	Size	Notes
U8	U-Channel		

WIGGLE WIRE

W1

Part #	Name	Size	Notes
W1	Wiggle Wire		

TERMINOLOGY

ARCH The term arch refers to the entire arch from post to post.

CANOPY The poly film plastic covering that protects plants inside from weather elements while allowing sunlight to pass through. It helps create a warmer, controlled environment for growing crops.

HIGHTUNNEL A structure used in agriculture to extend the growing season and provide a controlled environment for crops. We refer to the Gothic Style as a Hightunnel.

HOOPHOUSE A structure used in agriculture to extend the growing season. We refer to the Quonset Style as a Hoophouse.

PIPE The term pipe refers to galvanized steel pipe which may be straight or cut and bent into different lengths and shapes.

PLANS You will find our engineered Hightunnel plans on our website or included with the documents we email you. Length can vary without the need to change the basic plan. The end wall construction plans are recommended, but there is flexibility in the design. This is a DIY Kit, so there is room to customize your structure and make it the best version that works for you. Our plans are the basic version that has proven the test of time.

POSTS There are two types of posts. One is a ¾" conduit pipe that is used with the hand crank. The other is a 4" post that receives the ribs.

PURLIN Refers to the straight pipe used to hold ribs together.

RIB The term rib refers to half of the arch without the peak piece joining them together

ROLL UP BAR Refers to the ¾" EMT conduit pipe used to roll up the side walls.

ROLL-UP BOARD Roll-up board and wiggle board are interchangeable. It is the board the U-channel and wiggle wire are attached to.

Whenever you come across a play button within the instructions, click to watch a video corresponding to that specific step. All video URLs are provided at the end of the instructions for your reference. For additional updates and videos, you can also visit RR HOOPHOUSES YOUTUBE CHANNEL.

PART I

SELECTING LOCATION AND SETTING BASE FRAME

When selecting the location for your Hightunnel it is best to select an area that receives a maximum amount of sunlight throughout the day, especially in the winter months. If possible, orient the ends of your Hightunnel east-west, this will aid in maximizing sunlight exposure. The ground should be as level as possible. If soil is mostly clay, it may be necessary to create a slight slope to one side or to the back for proper drainage.

It is best to clear plenty of space for construction. Try to limit the amount of possible obstructions directly beneath the future Hightunnel and within a 10-foot perimeter. While this may seem tedious, the construction of the Hightunnel will be easier if there is more than enough room to work with long, bulky materials during assembly.

MATERIALS NEEDED

- Pressure-treated 2x4's
- Mend plates
- 3" grabber screws
- 4' steel posts
- Wooden stakes
- 3" self-tapping screws

TOOLS NEEDED

- Hammer/hand sledge
- Long handled sledge
- Post pounder
- String
- Tape measure
- Marker
- Drill
- Drill bits for 3" self-tapping screws and 3" grabber screws
- Metal pipe cutting tool (sawzall, hacksaw, bandsaw)

STEP 1

SET BASE FRAME

1. Line up pressure-treated 2x4s end to end until they reach the desired length for the sides of the Hightunnel. If pressure-treated 2x4s were purchased, according to the accompanying shopping list, no cutting will be necessary.
2. Center mend plates over each joint. Use a hammer or hand sledge to join the pieces together (see FIGURE 1).
3. Flip the assembled 2x4 length over and attach mending plates to the joints on the opposite side. This completes the front, back, and side lengths of the base frame.

It is easier to hammer in mending plates when the 2x4s are placed on a solid, flat surface. When flipping the long lengths of wood to secure the plates on the other side, be cautious not to bend at the joints and skew off the mend plates.

FIGURE 1

4 Align the mended 2x4 sections of the base frame so that the front and back lengths overlap the ends of the side lengths. Secure the corners of the base frame by fastening them with two 3" grabber screws at each corner.

The inside length dimension will be the exact length of the Hightunnel. The width will be slightly narrower.

STEP 2

SQUARE BASE FRAME

1 Mark all 4’ galvanized steel posts at 12" (see FIGURE 2).

2 Drill a 3” grabber screw 2 inches into the top of each corner of the base frame, leaving 1 inch of the screw exposed (see FIGURE 3).

3 Tie the string very tightly to one screw and pull it from one screw to the other, around the entire frame. Pull the string as tight as possible, as it will help ensure that the wood is straight as the frame is squared and the base frame is leveled.

4 Use a long measuring tape to measure from the inside of one corner to the inside of the opposite diagonal corner. Repeat this on the other set of diagonal corners, adjusting the frame as needed until both diagonal measurements are within 1 inch of each other (see FIGURE 4).

5 Once the frame is squared, use the string as a guide to align the base frame centered underneath the string (see FIGURE 7). Use wooden stakes to pin the frame in this position around the entire base frame (see FIGURE 5).

6 Use a post pounder to drive 4' galvanized steel posts into two of the inside corners of the structure to pin it in place. Be sure the 12" length of the post is not going into the ground first. At this stage, drive the posts about a foot deep, rather than all the way to the 12" mark. These corners should either be on the same side or at the same end of the Hightunnel. Double-check that the frame is square, then set the remaining two corners by pounding in posts to pin those corners as well (see FIGURE 5).

FIGURE 2

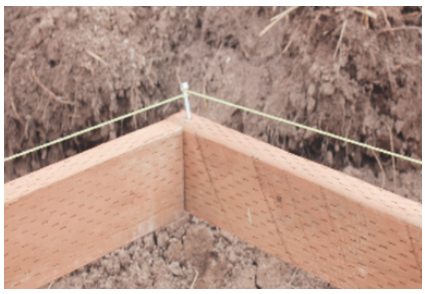


FIGURE 3

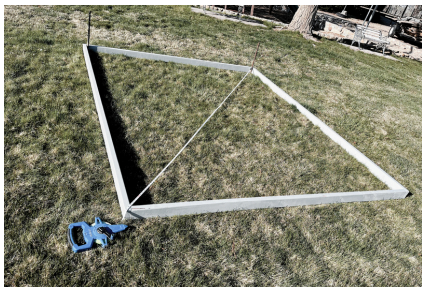


FIGURE 4

FIGURE 5

STEP 3

LEVEL FRAME AND SET POSTS

For this step, use a long level or a string to level the end walls. Utilize stakes to hold the frame at the proper height. Some areas may need to be excavated. The plot doesn't need to be perfectly level and can have a gentle gradient from the front wall to the back wall. It's only essential that the end baseboards of the Hightunnel be level, with some allowance for deviation along the sides. Keep in mind that each post should be as plumb as possible and aligned with the preceding post and those that follow, even if they are not at the same height.

1. Level End walls.
2. Finish driving 4-foot corner posts until the 12-inch mark aligns with the top of the base frame.
3. Secure base frame to the corner posts using two 3” self-tapping screws and washers for each post. The corner posts need to be attached to the side and end wall baseboad (see FIGURE 6).
4. Using the string around the top of the base frame, ensure there is a 1-inch gap between the string and the base frame along the length of the Hightunnel. The end walls of the base frame should be perfectly level (see FIGURE 7).
5. Secure the frame to each post with two 3” self-tapping screws and washers. Drive screws from the outside of the base frame into wood, then into post. Space screws 2” apart vertically.
6. Remove stakes along the sides of the Hightunnel.
7. Measure and mark 4' intervals from the front end wall on both sides of the base frame.
8. Drive the remaining 4-foot galvanized steel posts into the ground along the sides of the structure at 4-foot intervals until the 12” mark aligns with the top of the baseboard. As you pound in the posts, periodically check with a small level to ensure each post is plumb. The posts should be positioned so that the base frame is centered beneath the string when attached to the posts with screws (see FIGURE 8).

FIGURE 6

FIGURE 7

FIGURE 8

The importance of pounding in the posts as plumb as possible cannot be overstated. Additionally, the alignment of the posts to each other is critical. Both factors greatly impact the overall integrity and alignment of the Hightunnel. Depending on the type of soil, it may be extremely difficult to drive the posts a complete 30” into the ground. If such is the case, posts will need to be cemented into the ground, taking care not to bump or throw off the alignment of the frame in the process.

After all the posts are pounded in and secured to the frame, the tops may become slightly deformed due to tough soil. Use a metal cutting saw to trim the minimum amount from each post so they are all the same height. If needed, we recommend cutting them all to 10 inches above the top of the base frame (see FIGURES 9 & 10).

FIGURE 9

FIGURE 10

PART II

SETTING RIBS & PURLINS

Ribs are the bent pipe that create one side of the arch. Purlins run the length of the Hightunnel and secure the arches together; the arches and purlins serve as the skeleton of the Hightunnel.

MATERIALS NEEDED

- Bent rib pipe
- Straight rib pipe
- Peak pieces
- Purlin pipe
- 1” self-tapping screws
- Band clamps
- Cross connectors
- Nuts and bolts

TOOLS NEEDED

- Pencil or marker
- Measuring tape
- Metal cutting saw
- Drill
- Hex-head drill bit for 1” self-tapping screws
- 1-2 ladders

STEP 1

ASSEMBLING RIBS

Bent pipes are labeled as ribs. Also included are peak pieces that will be used to assemble the ribs into arches. Each arch contains 5 pipes: 2 bent pipes that connect to the base frame posts, 2 straight pipes that connect to the peak piece, and the peak piece.

1 Put the arches together on flat ground, beveled ends of the bent pipe head down. They will slide into the posts. Slide open ends of each rib into the peak piece, completing the arch. Screw in the joints with a 1”self tapping screw. Make sure screws face the inside of the structure.

2 Slide the beveled end of the arches (the bottom) into the 4’ galvanized steel posts. Continue building the arches and installing them. When this step is finished, you will have a complete arch in the base frame posts for the entire length of the structure.

FIGURE 11

3 You may need to slightly rotate the peak piece to ensure the entire arch looks consistent from a side view. If necessary, use a pipe wrench to rotate each individual piece of the arch. This alignment is crucial for both the appearance and integrity of the structure. Align the arch from a side view. Once the arch is properly aligned, secure it by inserting a 1-inch self-tapping screw 2" below the top of the post (see FIGURE 11). Make sure to place the screws on the inside of the structure to avoid tearing the plastic.

STEP 2

ASSEMBLING PEAK PURLIN

1. Take the purlin pipes and lay them out inside the Hightunnel. Connect the joints together until there are two purlins that extend beyond the length of the Hightunnel. Cut off the swedged end. Both ends must be open.

2. Screw purlins together with 1" self-tapping screws. Ensure all screws are screwed in on the same side of the purlin for the full length.

3. Cut purlin pipes 1" shorter than the length between the two end arches so the purlin pipe is 2" shorter than the inside distance between the first and last arch.

4. Place purlin pipes next to the side base frame. The purlin pipes should sit 1" shorter than the arch posts on each end.

5. Using the 4' galvanized steel posts as a guide, mark the purlins at 4' increments. A marker works well on the pipes

FIGURE 12

FIGURE 13

6. Put the third purlin or peak purlin together by placing two flattened pieces on each end. We call these pinched purlins (see FIGURE 12). Cut an inner piece of pipe so the entire purlin is the same length as the other purlins. The flat pieces need to correspond to one another. Screw together with 1" self-tapping screws. Mark this purlin at 4' increments as well. Purlin pipes are now ready for installation (see FIGURE 13)

STEP 3

ATTACH PURLINS TO RIBS

It is helpful to have people hold the pipes in place until enough cross connectors can be attached to hold the pipe up. If assembled correctly, the marks made on the purlins should align with the joints of the ribs.

1. Lift the purlin pipes up to the rib joint and ensure that the 1" self tapping screws on the purlin pipes are facing down towards the inside of the high tunnel to avoid the plastic canopy catching on the screw heads.

2. Attach the ends of the side purlins to the endwall arches with T-end clamps. Slide the purlin pipes into the T-end clamps until the purlin pipe touches the bolt in the T-end clamp. Tighten nut. Then using 1" self tapping screw, fasten long part of T-end clamp to purlin pipe from the underside of clamp. Screw right through the T-end clamp and into the purlin about an inch away from the bolt (see FIGURE 14).

FIGURE 14

3 With two 1 ⅝" cross connectors and two bolts attach the purlins to the arches at the joint between the straight and bent pipe pieces of the arch. The marks on the purlins should cross the joint (see FIGURE 15).

4 The peak purlin is built a little differently. It is secured to the endwalls with band clamps instead of T-end clamps. The first and last section of the peak purlin needs to have pinched ends with a drilled hole. Place band clamp over end arch. Slide peak purlin into band clamp and fasten with nut and bolt (see FIGURE 16). Repeat 3 for the entire length of the peak purlin.

FIGURE 15

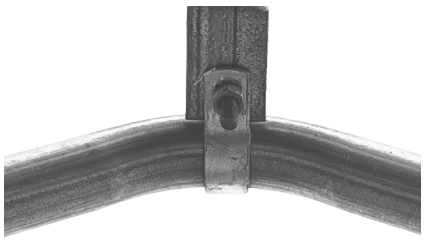


FIGURE 16

PART III FRAMING END WALLS

MATERIALS NEEDED

- Pine 2x4s
- 1-2 ladders
- Metal straps
- 1 5/8" grabber screws
- 3” grabber screws or #16 penny nails (recommended)
- Black screening for vent (optional)
- Tape (optional)

TOOLS NEEDED

- Hammer
- Drill
- Drill bits
- 18” level
- Pencil or marker
- Skill saw or hand saw
- Saw horses
- Nail gun and compressor (optional)

STEP 1

CHOOSING A PLAN

This kit includes an end wall framing diagram for your reference, or you can choose to customize your own design. Some customers make modifications to accommodate bay doors or additional storm doors.

STEP 2

FRAMING END WALLS & DOOR

1 Following the end wall framing diagram, mark the base frame where the vertical 2x4s will be positioned. Also, mark the rough opening for the door as per the instructions provided with the door (see FIGURE 17).

It is recommended to frame a vent at the top of the back wall and cover it with screening on the inside for ventilation unless there is a door there. Additionally, it’s advised to paint all framing pieces with high-quality exterior semi-gloss paint. Painting both the front and back of the wood will help extend the life of the Hightunnel (see FIGURE 18).

FIGURE 17

FIGURE 18

2 Place the appropriate length 2x4 on the mark on the base frame, allowing it to extend beyond the arch. Lean 2x4 against arch at the top. Using a level, ensure the 2x4 is plumb to the base frame. With the 2x4 in place, make the following marks:

1. Scribe a line on the 2x4 where the 2x4 meets the underside of the arch.
2. Scribe two more lines on the arch on each side of the 2x4. This is where the 2x4 will be attached after it is cut.
3. Place an “O” on the outside of the 2x4 in the center two inches from the top. This marks where a strap will be attached.

3 Cut on the scribed line.

4 After making the cut, place the 2x4 on the ground and loosely attach the metal strap to the “O” mark using a 1 5/8" grabber screw. Tighten the screw enough to secure the strap, but leave it loose enough to allow movement. Ensure the screw head goes straight down into the wood, so no sharp edges will be exposed to the plastic.

5 Once strap is attached, place 2x4 back on base frame mark. Make sure to align 2x4 between marks on the arch. Attach the base of the 2x4 stud to the base frame first. Secure to frame by using 3" grabber screws or nail gun and #16 penny nails.

6 Attach the 2x4 to the metal arch using metal strap and 1 5/8” grabber screws. Swing strap so it is perpendicular to the arch. The metal straps will bend over the arch more effectively if they are perpendicular to the arch, rather than aligned with the 2x4 (see FIGURE 19).

FIGURE 19

7 Secure as tightly as possible. Always start on the outside, keeping the screws flush with the board, then come to the inside, angling the screws to tighten the straps. Use duct tape to cover screws and metal straps on the outside. This step should be completed before attaching the u-channel to the rib.

8 Repeat steps 2-7 for all vertical 2x4s in your plan.

9 Frame in cross pieces and door header according to plans.

10 Attach to arch in the same manner as end wall 2x4s (see FIGURE 20).

FIGURE 20

11 Add a 4’ piece of pressure treated wood to the inside of the base frame where the door will be located. This will create a double plating at the door opening.

STEP 3

ATTACHING END WALLS TO GROUNDED POSTS

Four posts must be driven into the ground and anchored to the inside of the end walls of the Hightunnel. These posts will give the ends support and will firmly attach them to the ground.

1. Pick two studs on the inside of the front-end wall that are equal distance from the center to attach a 4’ post to. Typically this is around the door frame. Pound the 4' posts 2' into the ground.

2. Pound the remaining two galvanized steel posts along the inside of the studs on the opposite end wall. Ensure posts remain plumb as they are driven in (see FIGURE 21).

FIGURE 21

3. Use two 3" self-tapping screws for each post to secure them to the end wall. Attach from the outside of the Hightunnel, drilling through the frame first, then into the post. We recommend that one screw go through the baseboard and the other through a stud, making sure the screws are countersunk into the wood, so the heads will not tear the plastic.

PART IV

ATTACHING ROLL-UP BOARD & U-CHANNEL

The wiggle board, also known as the roll-up board, is where the canopy plastic is attached along the length of the Hightunnel. Plastic below the roll-up board is attached to a roll-up bar. The board is typically positioned 2 ½ to 3 ½ feet above the base frame, though placement can vary between the purlin and base frame.

MATERIALS NEEDED

- Mend plates
- U-channel
- Pine 1x4s
- 1 ½" self-tapping screws
- Metal-to-wood screws

TOOLS NEEDED

- Hammer
- Drill
- Drill bits
- Metal cutting saw
- Washers

STEP 1

CREATE ROLL-UP BOARD

1. Mend together lengths of 1x4s in the same way as previously done with the pressure-treated 2x4s to form the base frame (see Page 10). The pine 1x4s should match the total length of the structure. The ends will extend beyond the structure for now; they will be trimmed later with a metal saw.

2. Mark each rib at the desired height, indicating where the bottom of the roll-up board will be installed. The specific height can vary depending on the builder's preference, but ensure that all ribs are marked at the same level for uniformity.

STEP 2

MOUNT U-CHANNEL TO ROLL-UP BOARD, MOUNT ROLL-UP BOARD TO HIGHTUNNEL

This step typically requires a team of four or more people for Hightunnels that are 40' or longer. A helpful method is to use 1 ½" self-tapping screws to create temporary "shelves" for the roll-up board. Drive these screws into the ribs at the height where the bottom of the roll-up board is to be mounted, based on the marks you made earlier. You only need to place screws in every other arch. These screws will serve as temporary supports and can be removed once the board is securely attached.

1. Place the roll-up board on the ground and position the first u-channel piece 2" from the end of the wood, centered on the roll-up board (see FIGURE 22). Attach the u-channel to the wood using 1" metal-to-wood screws, spaced 12" apart. Ensure you place screws at both ends of each u-channel piece, about 1/2" from the edge. For now, do not install the last u-channel piece.

2 Carefully lift the roll-up board onto the screws that were previously attached to the arches, using them as a temporary shelf. Be extra cautious in handling full-length boards as the 1x4's can crack and break. Flush the end of the roll-up board with the face of the structure. This should be the same end that has the u-channel offset 2" from the end of the roll-up board. (see FIGURE 22).

FIGURE 22

3 The opposite end of the roll-up board will extend beyond the last arch of the Hightunnel and will need to be trimmed later

4 To fasten the roll-up board to the ribs, use 1 ½" self-tapping screws with washers. Place two screws per rib. The first screw should go through the center of the roll-up board/u-channel and into the rib pipe (no washer). The second screw, with a washer, should be drilled into the wood below the u-channel. To prevent the roll-up board from pulling away or cracking, ream out the wood until the screw threads no longer grip the wood. Then screw directly into the rib to ensure a secure fit (see FIGURE 23).

FIGURE 23

5 Trim the excess roll-up board so that it is flush with the outside face of the end wall arch using a saw.

6 To attach the remaining u-channel piece, position it next to the current end piece and mark 2" from the end of the roll-up board. Use a metal cutting saw to cut the piece at the mark. Once cut, attach the u-channel to the roll-up board using the same method as above.

STEP 3

MOUNTING U-CHANNEL TO END ARCHES

U-channel will be mounted to first and last arches only. Keep the u-channel centered on top of the arch butting one end up to the next. Attach u-channel using 1" self-tapping screws.

1 To begin, drill two holes in the first piece of u-channel, 1 inch apart and 1 inch from the bottom, using an 1/8" (3mm) drill bit. Align the u-channel with the bottom of the baseboard. The edge of the u-channel should also be flush with the front corner of the base frame at this point.

FIGURE 24

2 Once aligned, loosely attach the u-channel to the baseboard by inserting one 3" grabber screw into one of the pre-drilled holes. This allows for movement while aligning the u-channel with the wiggle board and arch (see FIGURE 24). The u-channel will be connected at the baseboard and the next connection point will be at the roll-up board.

2 Position the u-channel over the roll-up board so that the edge of the u-channel is flush with the end of the roll-up board. Using a 1 ½" self-tapping screw, attach the u-channel and roll-up board to the rib by driving the screw through the center of the u-channel and through the roll-up board.
Once secured, tighten the grabber screw at the baseboard. Then, insert and tighten the second screw (see FIGURE 25).

4 Be sure the roll-up board is still aligned with the line marked previously on the arch.

5 Once you are three-quarters of the way over the arch, begin from the baseboard on the opposite side. Repeat the attachment process in the same manner. Where the channels meet, cut the channel to the appropriate length and finish attachment.

Be sure to stay on top of the arch as you move across and over it with the u-channel. Keep each segment flush and in line with the adjoining segments (see FIGURE 26).

FIGURE 25

FIGURE 26

PART V ATTACHING PLASTIC

When dealing with plastic at any step, ensure that there is NO WIND. Any breeze can cause the plastic to catch the wind or on a sharp objects, leading to tears. If damage occurs, you can use the included roll of heavy-duty greenhouse plastic tape to make repairs.

MATERIALS NEEDED

- Plastic
- Wiggle wire
- Roll up bars (3/4" EMT Conduit pipe)
- Plastic tape
- 1” self-tapping screws
- Staples
- Fabric clips
- Furring strips
- 1 ⅝” grabber screws

TOOLS NEEDED

- Staple gun
- X-Acto knife or scissors
- 4-5 long ropes
- Drill
- Hex-head drill bits
- 2-4 ladders
- Hammer (optional)
- Sawhorses (optional)
- 2x4's (optional)

STEP 1

CUT & ATTACH PLASTIC TO END WALLS

We recommend attaching the end-wall plastic right into the u-channel with wiggle wire. Attach the canopy in the same u-channel using another set of wiggle wire. We attach the ends first because the plastic lasts much longer on the ends. The canopy will need to be replaced sooner, so for ease of canopy replacement, attach the canopy after end wall plastic.

1. The plastic is shipped in two rolls: one for the canopy and another for BOTH ends. Canopy and end wall rolls will be marked. The end wall plastic is shipped as one long piece that must be folded in half and cut. BE SURE the plastic is cut in the correct direction. Before cutting, double check that you will have 2’ more than the width of the Hightunnel on each side and 1-2’ more plastic than the height.

2. Stretch each piece of plastic over the end walls of the Hightunnel, making it as tight as possible to eliminate any bubbles and wrinkles. To aid in this process, use padded clamps to hold the plastic in place while you work. (see FIGURE 27).

FIGURE 27

3 Secure the plastic in the u-channel on the arch using the wiggle wire. Begin at the center and work down one side at a time maintaining a taut sheet. Stretch plastic over roll-up board and continue in u-channel below the roll-up board to the bottom of the base frame. (see FIGURE 28)

4 As you fasten the plastic onto the arch, ensure that the top edge remains parallel with the baseboard. Use a staple gun to secure the plastic to the 2x4 framing of the end wall and the wooden base frame. Aim for the center of each 2x4 as you are tacking the plastic in place (see FIGURE 29).

5 Trim off any excess using scissors or an X-Acto knife. Leave about 6 inches of excess plastic along the bottom, if possible, and 4-6 inches on the arch. The excess plastic at the bottom can be buried in the ground.

STEP 2

ATTACH FURRING STRIPS

1 Cut the furring strips to match the lengths of the framing studs and cross beams. These strips will secure the plastic in place. Around the door, place the furring strips on the outside edges of the door frame. (see FIGURES 30 & 31).

2 Attach the furring strips using 1 5/8” grabber screws. Make sure to space the screws about 1 foot apart to ensure the plastic is securely fastened and won't come loose. Putting a screw closer than 4" from the end of the furring strip will likely result in the furring strip splitting.

3 Using an X-Acto knife, carefully trim the plastic from the door opening by cutting it even with the inside edge of the 2x4 door frame, but not until the furring strips are secured around the door frame.

The cuts do not need to be perfect, as the goal is simply to cover the staples used to attach the plastic. After trimming, make sure to install furring strips over the base frame on the end walls as well. The purpose of the furring strip is to secure the plastic to the end wall framing, preventing wind damage.

FIGURE 28

FIGURE 29

FIGURE 30

FIGURE 31

STEP 3

ATTACH CANOPY

Installing the canopy is the most hazardous step in the assembly process, especially if there is any wind. It is critical that this step be performed with absolutely NO WIND to avoid the plastic billowing in the wind and becoming difficult to handle. A minimum team of six people is recommended for this step, and more helpers may be necessary for longer Hightunnels. Before proceeding, ensure everyone is familiar with the entire process by thoroughly reading through the instructions to avoid mistakes during installation.

1 Lay out and connect lengths of the ¾" conduit pipes by sliding connector sleeves in the ends and securing the joints with two 1" self-tapping screws.

2 Create two long pipes that are at least 1 foot longer than the total length of the Hightunnel. These will form the roll-up bars. We recommend covering the screws with duct tape.

3 Once the roll-up bars are prepared, carefully open the plastic canopy and roll it out on a smooth, soft surface like grass. Do not completely unfold the plastic. You will notice that the plastic has been folded so that the manufactured edges run down the middle (see FIGURE 32).

FIGURE 32

4 Lay the roll-up bars along the middle of the length of the plastic. Center the roll-up bars lengthwise on the plastic. Place the bar under the manufactured edge of one side of the plastic until it wraps once around the roll-up bar.

5 Secure the plastic to the roll-up bar by clipping fabric clips over the bar pinching the plastic between the clip and the bar every 30 inches. Be sure clips are tight; if they are, fasten them with self-taping screws. Keep the clips oriented in the same way along the bar once attached for consistency (see FIGURE 33).

FIGURE 33

6 Once the bars are attached to the plastic, pick up the bars and move all the plastic to one side under the bar (see FIGURE 34).

7 With the roll-up bar positioned on top, carefully gather the plastic and carry it over to the Hightunnel. Set the entire length of the plastic on the 2x4s, which should be angled from the baseboard to the ground, or set them on horses or clean clear ground, or have people available to hold it. Any of these methods will work (see FIGURE 35). Be sure roll-up bar is on top of the plastic.

FIGURE 34

8 Tie the middle of long ropes to the roll-up bar equal distance apart and between the fabric clips.

9 Throw one side of the rope over the top of the high tunnel. This is the pulling end of the rope.

FIGURE 35

Tie as many ropes to the bars as needed to lift the length of the canopy. All lengths require two ropes, while a 90-foot Hightunnel requires at least 5 ropes. It is recommended that, depending on length, the ropes are tied onto the roll-up bar using the center of the rope. This allows those who are guiding the plastic to have access to the rope as well, helping control the speed of the roll-up bar as it moves across the arches. This will also help in case of a wind hazard where the ropes can be pulled to the Hightunnel to keep the plastic from billowing.

STEP 4
PULL CANOPY

There are three basic positions for the next step. These are detailed below:

GUIDING THE PLASTIC — This team is located on the side where the plastic starts. They guide the plastic as it unfolds, making sure it does not catch on any obstacles or sharp edges.

PULLING THE ROPES — This group is responsible for pulling the ropes in unison to lift the plastic over the top of the Hightunnel. They work slowly and carefully, coordinating their movements to ensure the plastic is evenly lifted without rushing.

INSIDE SUPPORT — These individuals, inside the Hightunnel, help guide and adjust the plastic from within using brooms. Their role is to gently lift, push and shift the plastic upwards if it snags and ensure it lies flat and even as it moves across the structure.

Each team plays a vital role in ensuring that the plastic is smoothly lifted and correctly positioned over the Hightunnel without damage or snags.

Once all positions are in place and ready, start pulling the plastic over the arches slowly. Communication is key during this step to ensure that everyone works in sync. Avoid rushing. All positions need to be watching out for any possible snags as the plastic is pulled into place.

1. Once the plastic is over the arches, ensure it is even on all sides. The roll-up bar should extend 4-8" beyond the end with the hand cranks and at least 2" past on the opposite end. They can extend further, but not less.

2. Begin securing the plastic to one end of the Hightunnel using the wiggle wire. Start at the top middle of the end arch. Two teams of two will be required for this.

FIGURE 36

3 Starting at the center of both end walls, two teams will pull the canopy tight, pulling against each other to create tension. Once the canopy is as tight as possible, both teams will work down the same side securing the canopy to the end wall using the U-channel and wiggle wire, pulling away from the team on the opposite side as they go to maintain tension.

4 A foot of plastic minimum needs to be extended past the front and back of the Hightunnel (this may vary).

5 Teams of two work best; one pulls plastic while the other fastens the plastic into the u-channel using the wiggle wire. People along the side will be holding the plastic in place to prevent it from being picked up by wind gusts.

6 Finally, secure the sides of the plastic into the u-channel along the sides. (see FIGURE 37).

The best way to do this is to roll the roll-up bars up a few rotations, and use them to push down and make the canopy tight. Make sure roll-up bar stays level while pulling down and attaching the canopy, otherwise, it will not roll up level. Pulling down on the roll-up bar will help remove any wrinkles or bubbles in the canopy. It is best to work in teams of two for this step (see FIGURE 38). Plastic tends to stretch more in the middle, this often results in the roll-up bar being lower in the middle than at the ends. To even the roll-up bar, when you are done attached the canopy using the wiggle wire and u-channel, take the roll-up bar off and then re-attach so that it makes a straight line from end to end of the Hoophouse.

It is not unusual to have to re-pull one of the ends or a portion of the side to get the plastic tight.

Two layers of plastic and two sets of wiggle wire are in the same u-channel on the front and back ribs once the canopy and end walls are finished.

FIGURE 37

FIGURE 38

PART VI

ROLL-UP BARS, HAND CRANKS, & WIND ROPES

MATERIALS NEEDED

- 5' conduit pipe
- Hand cranks
- End caps

TOOLS NEEDED

- Drill
- Hex-head drill bit for 1” self-tapping screws

STEP 1

FINISH ROLL-UP BAR

1 At the end of the roll-up bars extending 2” beyond the Hightunnel, attach an end cap. On the opposite end, attach a hand crank. For a detailed installation guide, refer to the video demonstration linked below.

2 Drive a 5’ long ¾” conduit pipe into the ground so the hand crank casing can ride up and down on the conduit as the sides are rolled up and down (see FIGURE 39).

FIGURE 39

HAND CRANK

See Youtube video:
Jiggly Greenhouse® MRUP300 Sidewall Ventilation Hand Crank Installation
https://www.youtube.com/watch?v=NcFBvlu8Tqs

WIND DAMAGE TIPS

In high winds the Hightunnel sides will be more stable with a bit of tension on the plastic – especially for longer Hightunnels. Simply roll the bar up a couple of turns so the side plastic has some weight. When the roll-up bar is just sitting on the ground, the plastic is more easily whipped back and forth by high winds damaging the eye bolts that hold the windropes in place.

PART VII INSTALLATION OF WIND ROPES

Because wind is one of the greatest threats, the use of wind ropes is essential.

MATERIALS NEEDED

- Wind rope (provided)
- Small eye bolts (alternatively z-clips)
- Large eye bolts (alternatively z-clips)

TOOLS NEEDED

- Drill
- 1” size socket
- 5/16 metal drill bit
- Socket head attachment for drill
- Crescent wrench (optional)

STEP 1

ATTACHING EYE SCREWS

1. Attach a short eye screw to the wiggle board an inch or so to the side of the first rib by drilling a hole through the center of the u-channel and wiggle board. A short eye screw should be attached in the same manner every other rib along the length of the Hightunnel. Also, place an additional eye screw at the last rib. To make the installation easier, it’s recommended to use a drill to create starter holes for the eye screws.
2. Attach a long eye screw to the baseboard an inch to the side of where the posts intersect with the baseboard, pre-drilling a hole as done above. Twist them in with a screwdriver or drill and socket combination. The long eye screws will alternate along the length of the Hightunnel with the short eye screws attached to the wiggle board above creating a zigzag pattern. Be sure to place a long eye screw on both the first and last ribs as well.

STEP 2

THREADING THE WINDROPE

1. Thread the windrope through the short eye screw on the first rib, then down through the long eye screw on the same rib. Continue by threading the rope back up through the short eye screw on the next rib, and then down through the long eye screw on that rib. Repeat this process, creating a zigzag pattern between the ribs, until you reach the end. Make sure the rope goes straight up and down on the first and last ribs. Once all the eye screws are threaded, pull the rope tight and secure it (see FIGURE 40)

FIGURE 40

IMPORTANT HIGHTUNNEL CARE

WIND, SNOW LOADS, MAINTENANCE

WIND & SNOW LOADS

Although our Hightunnels will withstand strong winds and heavy snow loads, they will experience wear and tear during severe weather events. It is important to repair, replace, and regularly maintain the Hightunnel in order to ensure long life of the structure.

Our Hightunnels are engineered to withstand 30psf and no more. They will not hold more than 2’ of snow on the top. Clear snow from the sides in order to allow the snow to shed.

Always install windropes on roll-up sides. Do not leave your Hightunnel with the canopy on, but no wind ropes unless you do not have roll-up sides. You are not finished with canopy installation until the wind ropes have been installed. If you live in an area of high winds, we highly recommend you anchor the corner posts and every 4th post with earth anchors.

Your Hightunnel is finished! Enjoy seasons of fruits and veggies as you harvest year-round from your own backyard.

RESOURCES

VIDEOS

RR HOOPHOUSES YOUTUBE CHANNEL
https://www.youtube.com/@rrhoophouses6783

Base Plate #1
https://www.youtube.com/watch?v=eOEv1fqM_cc&list=PLGlzL9eY51H3cpC8Ftpf3VatWnbwyL-R_&index=1

Base Plate #2
https://www.youtube.com/watch?v=79lc6keOBKs&list=PLGlzL9eY51H3cpC8Ftpf3VatWnbwyL-R_&index=2

Post Installation
https://www.youtube.com/watch?v=bnP4xli-crg&list=PLGlzL9eY51H3cpC8Ftpf3VatWnbwyL-R_&index=3

Rib Installation
https://www.youtube.com/watch?v=IqO6RFZsJQA&list=PLGlzL9eY51H3cpC8Ftpf3VatWnbwyL-R_&index=4

Perlin Assembly and Installation
https://www.youtube.com/watch?v=vmmDZh54o4I&list=PLGlzL9eY51H3cpC8Ftpf3VatWnbwyL-R_&index=5

Framing Endwall on a Roberts Ranch Hoophouse DIY Kit
https://www.youtube.com/watch?v=4oDh2ss3Msg&list=PLGlzL9eY51H3cpC8Ftpf3VatWnbwyL-R_&index=6

Roll Up Board Instructions for Roberts Ranch Hoophouse DIY Kits
https://www.youtube.com/watch?v=CeKvj_kvFCM&list=PLGlzL9eY51H3cpC8Ftpf3VatWnbwyL-R_&index=7

Endwall Framing Tips for Roberts Ranch DIY Hoophouse Kit Installation
https://www.youtube.com/watch?v=N340N91xEaQ&list=PLGlzL9eY51H3cpC8Ftpf3VatWnbwyL-R_&index=8

Instructions on Pulling Canopy Plastic for a Roberts Ranch Hoophouse DIY Kit
https://www.youtube.com/watch?v=O3SlgxeLsII&list=PLGlzL9eY51H3cpC8Ftpf3VatWnbwyL-R_&index=9

Vents, Roll Up Bar, Wiggle Wire, and Wind Factor - Important Information
https://www.youtube.com/watch?v=ZM7__wgbYds&list=PLGlzL9eY51H3cpC8Ftpf3VatWnbwyL-R_&index=10

Bay Door Construction
https://www.youtube.com/watch?v=RBxBqV4YJoQ&list=PLGlzL9eY51H3cpC8Ftpf3VatWnbwyL-R_&index=11

Bay Door Installation
https://www.youtube.com/watch?v=AiQ6hdGl9YM&list=PLGlzL9eY51H3cpC8Ftpf3VatWnbwyL-R_&index=12

Jiggly Greenhouse® MRUP300 Sidewall Ventilation Hand Crank Installation
https://youtu.be/NcFBvlu8Tqs?si=TdWyJNDD8EeEYIuC

BOOKS "The Winter Harvest Handbook: Year Round Vegetable Production Using Deep-Organic Techniques and Unheated Greenhouses" by Eliot Coleman

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