The Raised Bed Hoop House

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El Paso County Master Gardener Association

Educational Programs of the El Paso County Master Gardener Association & Texas A&M AgriLife Extension Service
A Forward to Construction

The constructions plan and instructions for this build of a raised bed hoop house, are based on those used by volunteer members of the El Paso County Master Gardener Association to build the raised bed hoop houses now in use at their AgriLife Vegetable & Market Garden. From their experience gained during that build and while using the raised bed hoop houses, minor changes in some construction materials and order of build steps were made to facilitate the build in this PDF. Please read and understand fully all steps before beginning to build. It is your responsibility if you choose to make changes in the construction process that better suit your skills, materials available and gardening situation.

The dimensions, i.e., the length, width and height of the raised bed hoop house that you decide to build, will determine the cuts needed for lumber lengths, to design the plywood ends walls width and hoop arch height, hoop wire installation, chain lengths, and the plastic installation. This is not rocket science where things must be perfectly accurate, but some attention to detail needs to be applied. Consider the surface your raised bed hoop house will be sitting on and how things settle. This could affect the hoop lid closure as time passes, year after year. In the off season, clean and store your raised bed hoop house in a protected area, out of the sun, up off the ground, sitting level and secured for safety.

Information has been provided to help you make choices on lumber and plastic sheeting for your gardening situation. Temporary hoop house structures, that can be completely dismantled for storage or reuse on another raised be do not require long lasting durable material selections, but wear and tear can occur if care is not exercised.

The inclusion of a temperature monitoring device mounted inside your raised bed hoop house; we will leave up to you. In those hoop houses now in use at the AgriLife Vegetable & Market Garden, wireless, indoor/outdoor thermometers were installed. The probe transmitters were hung by wire on the underside of the hoop arch’s, high enough to be away from irrigation spray.

Safety First: As with any building project, please exercise caution and proper safety procedures when using any tools that can puncture, scrape, cut or cause injury from impacts, while using hand operated or power tools, or materials that might cause allergic reactions or poisoning / burns while using paint, stains or sealers. Read and follow all recommended instructions for tool and materials use.

Mission Statement

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The Texas A&M University System, U.S. Department of Agriculture, and the County Commissioners Courts of Texas Cooperating

We request that you contact our office at (915) 771-2354 at least one week in advance to advise us of the auxiliary aid or service you will require.
The Build

The Materials Needed and Tools Needed listed below are our best recommendations, but not written in stone for your build. Your level of building experience, use of tools, confidence, material you may have on hand and your budget, will dictate the tools and materials that you choose to use in the construction of your own raised bed hoop house(s).

Material Needed:

- 2 x 10’s
- 2 x 4’s
- Reinforced Concrete Wire
- 1 - Sheet of ½” plywood
- 6-Mil Plastic or Greenhouse Spec Plastic (See Plastic Comparisons)
- 2.5” Deck Screws / Bolts / Fasteners
- Utility Wire
- Furring Strip Material
- Fence Steeples
- 7 - Metal Utility Handles
- 4 – 1.5” Chain Quick Links
- Self-Seal Pipe Insulation (optional)

Tools Needed:

- Circular/Skill Saw
- Saber Saw & Blades
- Small Hand Saw
- Hand Screwdriver(s)
- Power Drill & Drill Bits
- Screwdriver Attachments for Drill
- Wire & Bolt Cutters
- Construction Stapler
- Hammer
- 2 Sawhorses

- 3 to 4 - 4” Door Hinges
- ¼” Construction Staples
- 8 to 12 - Metal Corner Brackets
- 4 - Eye Bolts
- 6’ to 10’ - Small Link Chain
- 1 - Tube Caulking
- 1” Sticky-Backed Weather Stripping
- 2 - Temperature Actuated
- Foundation Vents
- Thompsons Water Seal or Stain/Sealer Combination

- Tape Measure
- Level
- Pencil / Marker
- String
- Scissors
- Framing Square
- Safety Glasses
- Gloves
- Paint Brush & Bucket
**Step 1**

**Lumber Cuts / Hoop House Base Frame & Hoop Lid Frame**

Determine the length & width of the hoop house you want to build. If this hoop house will sit on the soil inside the walls of the raised bed, adjust the length or width measurements accordingly. These measurements will also apply to the 2x4’s for the hoop lid frame.

**Hoop House Base Frame**
- 2 – 2 x 10’s cut for length
- 2 – 2 x 10’s cut for width

**Hoop Lid Frame**
- 2 – 2 x 4’s cut for length
- 2 – 2 x 4’s cut for width

**NOTE:** Pay attention to the corner placement of boards when measuring to cut lumber pieces. Always check corners with the framing square when assembling.

**Step 2**

**Hoop House Base Frame & Hoop Lid Frame Assembly**

Assemble the hoop house base frame and the hoop lid frame using deck screws. Although not done in the pictures here, it is recommended that you do the assembly on a solid, level surface. Pipe clamps can be used to help hold the cut lumber pieces in place while predrilling screw holes and installing the screws to assemble each frame. Check the square of each corner as you go.

When the hoop base frame is completed, assemble the hoop lid frame making sure that both frames are assembled the same way with corners matching and square.
Step 3

Installing Hinges to Base Frame & Hoop House Lid Frame

Set the hoop house base frame onto a solid, level surface. Then position the hoop house lid frame in place on top of the hoop base, making sure to align both to match. Check corners for square. Measure and determine placement for each of the hinges. Holding each hinge in place, mark each screw hole position. Predrill each screw hole, if needed. Install each hinge onto both frames using a power drill & screwdriver attachment or hand screwdriver. For a hoop house 6’ long, it is recommended that you use a minimum of 3 hinges for the hoop house lid; 3 to 4 hinges for 8’.

Step 4

Install the Metal Corner Brackets & Chains

Using the drill, install 1-2 metal corner brackets on each inner corner of the hoop base frame and 1 on each hoop lid frame corner. Predrill screw holes if needed. Check each frame for square before and as you install each bracket.

Holding the hoop lid frame open to at least 110 degrees, use the recommended mounting points seen in the pictures to measure for the length needed to cut the chain sections. Predrill screw holes, if needed, to install the eye screws. Then install the chain ends to the eye screws using the chain quick links. The chains hold the weight of the hoop lid when open.

Always use caution when opening the lid on windy days!
**Step 5**

**Plywood Cuts / Hoop Lid End Walls**
Determine the height and shape of the arch to cut the end walls of the hoop house lid from the 1/2 “plywood. The hoop arch radius is half of the length of the width of the hoop house.*

Use the string, pencil & half the width of the end of the hoop house & hoop lid frame, A *, to strike or scribe an arc outline on the plywood from a center point to form an arch.

Increase the height of the hoop lid end wall shown at B.

B This is also the length adjustment area needed to make sure hoop arch wire length is correct for steeple fastening to the wood.

**Step 6**

**Installing the Hoop Arch Wire**
The length of the arch *, from A to B, on the hoop lid end wall is the length you will need to cut the concrete reinforcing wire sections from the roll. When cutting sections of wire, do not leave any wire nibs that can potentially puncture the plastic.

Overlap each section of wire a few inches, wiring each section together, then secure the hoop wire to the 2x4 hoop frame with wire fence steeples. Once Step 6 is completed, make height adjustments needed & cut out the hoop lid end walls.

Measure over the hoop end wall arch following the arrows from each red point. *

Optional / Foam pipe insulation installed on each end of hoop wire arch.

Attach wire arch frame to hoop lid frame with fence steeples at horizontal cross wires.
Step 7

Cut-Outs for the Temperature Actuated Foundation Vents

An opening must be cut in each hoop lid end wall to accept a temperature actuated foundation vent.

**Step 1.** Position vent, face down, on hoop end wall, then outline the vent edge with a pencil or marker.

**Step 2.** Measure in from that outline and draw a new outline, the cut line, of the size that will allow the vent to installed easily without too much play.

**Step 3.** Drill a hole just inside a corner of the inner outline, cut line, large enough for a Saber saw blade to fit in. Cut out the opening for the vent. Position vent and check for fit.

Note: You can install the foundation vents now or see Step 10 Install Temperature Actuated Vents & Utility Handles.

Step 8

Install the Hoop Lid End Walls

With the hoop lid frame in the closed position on the hoop base frame, set a hoop end wall into place on the width of the hoop lid frame, as pictured, aligning the arch of the hoop wire with the arch of a hoop end wall. Using the horizontal wires, up and over the wire arch, as a spacing guide, drill a hole through the plywood $\frac{3}{4}$” in from the edge, all the way around each hoop end wall. Using cut pieces of utility wire and pliers, secure each hoop lid end wall to the hoop wire through each hole, making sure that the utility wire twisted ends are down inside the hoop structure, so as not to interfere with plastic installation.

Note: It is recommended to also secure the base of the hoop lid end wall to the hoop lid frame with 3 to 4 L brackets or angle iron of your choosing, not included in Materials Needed.

Examples of the utility wire attach point hole locations around the arch perimeter.
Step 9

Stain & Seal or Paint

Now is the best time in the build to apply a coat or two of paint or a stain/sealer to the wood parts of the hoop house structure, both inside and out.

It is also a good time to caulk around each of wire fastening holes on the hoop end walls or where imperfections in the wood might create wear on the plastic once installed.

Check fasteners and the square of both frames before installing the vents, plastic and utility handles.

Step 10

Install Temperature Actuated Vents & Utility Handles

Vent Install
Slide a foundation vent into its precut opening, carefully drill a hole into each corner of the vent frame and plywood, then secure with a small bolt, washer & nut in each hole. Caulking can be applied to the opening prior to securing the fasteners for a better seal.

Utility Handle Install
Using the tape measure, determine the position for each of the 3 carry handles on each long side of the hoop base frame and the hoop lid lifting handle, predrill screw holes, if needed. Install utility handles.

Carry Handles

Hoop Lid Handle
Step 11

The 6 Mil Plastic Install

Paint or stain & seal the furring strips prior to plastic installation. Allow to dry.

Unfold and drape the 6-mil plastic evenly over the closed hoop house. Trim to allow a 2 to 3-layer, 2” wide, fold-under of plastic, even with the bottom of the hoop lid frame.

Beginning on one long side, attach the folded plastic to the hoop lid frame through the furring strips using a carpenter’s stapler and ¾” staples, spaced 2” apart. Repeat on the other side, pulling the plastic tight over the hoop wire frame before fastening. Attach the plastic to the arches of the hoop end walls in a similar manner making sure to not cover the vents. Caulk as needed.

Step 12

Installing the Weather Stripping

Install 1” wide, sticky backed weather stripping, centered, all along the top of the 2x10 hoop house base frame, where the hoop lid frame rests when it is closed. Secure it to the wood frame every 4” to 6” with ¾” construction staples. See picture.

Setting the Raised Bed Hoop House

Once you have completed the construction of your raised bed hoop house, install it on the raised bed that you plan to use it on. Open and close the lid, check for lid clearance when open, check for level, and adjust as needed to eliminate rocking or tipping when the lid is open.

Safety First: Always use caution when opening the lid on windy days!
Choose the Right Plastic

Polyethylene film was first used to cover the wood frames of greenhouses in the early 1960s. Since then many improvements have been made with most films manufactured now as a coextrusion of 3 layers with different polymers and additives to improve quality and enhance performance.

Mil rating... What does “Mil” mean?
A mil is a measurement that equals one-thousandth of an inch, or 0.001 inch. Most human hair is one-thousandth of an inch, or 0.001 inch. The most common size in the thickness rating for plastic sheeting is 6 mil. This is 6-thousandths of an inch, or 0.006 inch.

Some things to consider when selecting a plastic for your project are:
- Film life / limited due to degradation processes induced by sunlight and heat
  - Copolymer, low cost, one season material
  - Good for seasonal greenhouses, overwintering & high tunnels
  - Avoid construction grade material
- Thickness
  - 1-year co-poly, 3, 4 & 6 mil
    - 3 & 4 mil, 1-year use, narrow tunnels & overwintering houses
  - Greenhouse grade, only 6 mil, multi-year applications
“Homeowners ask if it is safe to use treated lumber for garden beds. While there is scientific consensus that it is safe to use for garden beds... ...Safe practices for working with treated wood recommend treated wood not be used where it may come into direct or indirect contact with drinking water or a component of food, animal feed or beehives. The USDA prohibits treated lumber for soil contact use in their certified National Organic Program published in 2011. The updated draft dated September 5, 2018 states that CA and ACQ are not currently allowed because they are not included on the National List of allowed synthetic materials (7 CFR part 205, page 425).

Viance recommends for those who have concerns to line the interior walls only with heavy plastic sheeting. There have been no justified claims that today’s treated lumber causes any negative effects from leaching into the soil.”

See above website for more information and source links.
Questions?

Contact

El Paso County Master Gardener Help Desk

915-771-2354

http://txmg.org/elpaso

elpasomg@ag.tamu.edu

**Build & Use Disclaimer**: The El Paso County Master Gardener Association of El Paso, El Paso County (EPCMGA), Texas, is not responsible for injuries to yourself, others or damages to property, should an accident occur while you are building a raised bed hoop house following the build procedure provided in this document or while the constructed raised bed hoop house is in use, stored or being transported to another location. Nor will the EPCMGA accept responsibility for growing failures that might occur by plants grown in the raised bed hoop house you constructed from these instructions and then put into use.