



ARCHED CABINS LLC

Arched Cabins LLC Build Manual

Thank you for your purchase of an Arched Cabin! We really appreciate your business!

This manual will walk you through the basic steps to building your Arched Cabin kit. If you are completely new to construction and have no knowledge of framing, electrical, plumbing etc. then we suggest filling in any gaps not covered herein by hiring contractors, consulting the internet, watching youtube videos, or draining the brain of local contractors over coffee. These can be valuable resources. We also suggest leaving the electrical and plumbing to a licensed professional.

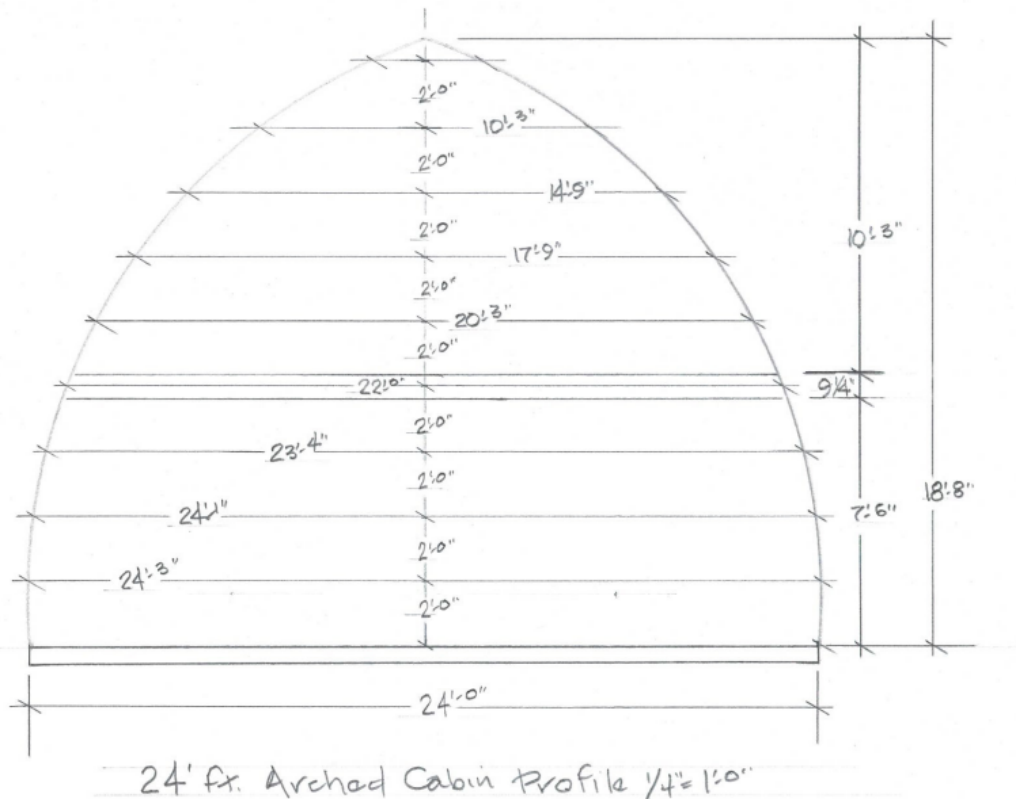
Please be careful and aware of your surroundings during your build. Arched Cabins LLC will not be held liable for any accident or injury resulting from the instructions in this manual. You should always follow engineered drawings when possible. This is meant as a guide to understanding the process of erecting the kit, not a step by step manual on exactly how to finish the home. Even contractors you hire should read this manual before erecting your kit to understand the steps. Feel free to also give them our phone number if they have questions.

DISCLAIMER: You must read this manual in its entirety BEFORE starting your build. Important information included herein may affect your decisions in build materials and budget. Furthermore, certain mistakes during your build could damage the quality and longevity of your home or cause expensive replacement costs. If ever in doubt please contact us at 832-930-ARCH if you have any questions. If help is needed after hours and you need an urgent response during your build, you may call/text Jeremy directly at 832-334-2352.



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TOOLS LIST FOR ERECTING YOUR KIT

Including but not limited to:

Drill Gun

Impact Drill Gun - for use with self tapping screws

Tape Measures

Drill bits 5/16 & 3/8 Hex Bits (These grow legs, buy EXTRA)

5/16 Lag Bolts(not included with kit) - for attaching the base plates to the foundation

#14 TEKS 2.5 inches self-tapping screws (for any attachments to steel frame or ribs)

Square

Levels

Ladders

Ladder Stabilizers: See [image at right](#) —>

Circular saw

Carpenters Pencils

Rope (for larger kits this will be used to hoist roof sheeting into place over the top of the cabin)

Gloves

Hard Hats

Safety glasses

Extension Cords

Generator if building before power is installed to property

String lines

Magnet, string and weight (optional - used during roof panel installation, hanging a string from ribs help mark where to install screws.

Transit Level or multiple string line levels



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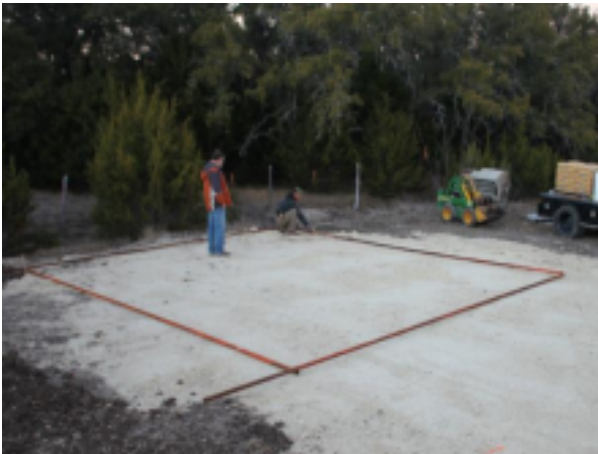
FOUNDATIONS

All foundations will need to be made to the exact size of the kit you order. Ea. For a 24ft x 40ft kit you will need exactly a 24ft x 40ft foundation.

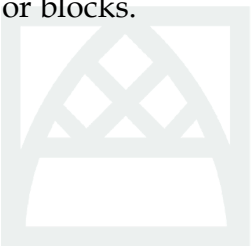
Pier and Beam/Block & Beam Foundation Process

You should always build according to plans made by a structural engineer when required. If you are not permitting your build, this is meant as a general outline of how we build foundations for our kits and is not intended as an exact method for use in all instances. The way your foundation is built will vary depending on soil quality/exact size of structure and permitting requirements. If you are not using an engineer, we suggest you do lots of research and take into account the specific needs of your lot. We show pictures below of building with steel piers and beams because that is our personal preference for our product.

1. Choose the location of the Arched Cabin. Take care to choose the location wisely. Consider the soil conditions, views, the sun's path for lighting through the year, water runoff, topography of hill vs. valley, etc.
2. Use either string lines with stakes or layout jigs to lay out the placement of the Arched Cabin. Determine the location of the blocks or piers, depending on the foundation type. Keeping everything measured out square and level now will make the rest of the process flow better and prevent possible maintenance issues in the future.



3. Use marking paint for the locations to dig for piers or level for blocks. We use two I-beams to support the deck and joist for up to 16 foot wide Arched Cabins. For 20 foot, 24 foot, and 30 ft wide Arched Cabins, we use three I-beams. The blocks or piers will be inset from the front, back, and sides, 12 inches to 18 inches and no longer than 10 ft apart. When using lumber, we recommend no greater than 8 foot spans between the piers or blocks.



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4. Now that everything is marked out, it is time to either dig holes or level the ground for the blocks.

The hole size and depth for the piers will vary depending on soil type, frost line, and the requirements of the local permitting agency. We recommend digging as deep as possible for most applications and bellling out the bottom of the holes to ensure the best possible foundation for the Arched Cabin. At the bottom of each hole, we place a cement block - typically 8 inches x 8 inches x 4 inches - to add stability while the cement cures for the piers. We recommend starting with the 4 corner piers, then using a string line to keep the piers in line, making the ensuing connections to the piers as secure as possible.

For concrete block and beam foundations, using a 16 inch x 16 inch x 4 inch block for the base and a torpedo level, go to each marked location and use a shovel to level out the base block to the ground. Be mindful of the marks and keep all the base blocks in line to make placement of the beams as smooth and easy as possible.

5. Once the piers are set or the blocks are placed and level, use a transit or string line level to ensure all posts or blocks are level. The transit or level will give the information needed to cut all piers to the same level. All the blocks should measure the same through the transit, or all the posts should be cut to the same level height for beam placement.



6. Take the I-beams and lay them on top of the blocks or piers. The I-beams should connect with the tops of the piers or blocks at each block or post. This is where careful measurement earlier pays off. With the two outermost beams placed, measure the front and back of the I-beam to even out the overhang on both ends. Measure the width at both the front and back of the foundation to make sure the I-beams are set parallel to each other. Using a long tape measure, measure diagonally from the front of one beam to the back of the other, and record the measurement. Measure in the other direction and record that measurement. The goal is to have the two numbers be within 1/8 inch to each other, closer if possible. This part can take some time. We have found that using a sledge hammer and tapping the beam is the best way to make adjustments until it's just right.



8. With the outer beams square, use a string line across the front or back and square the center beam between the two outer beams to keep them even. Double check the measurements, and get ready to secure the beams with a pier and beam foundation, or start building a deck and joist on a block and beam foundation.

9. If you are building a pier and beam foundation, secure all the beams to the piers now and then add bracing for extra stability. The bracing will vary depending on the height of the Arched Cabin.

10. Once all the beams are in place, start building the deck and joist. All of our builds use 16 inches on

centers. For up to 16 foot wide Arched Cabins, we use a single 2 inch x 8 inch x 16 foot joist with a double barge joist front and back. For 20 foot and 24 foot wide Arched Cabins, we use 2x10 or 2x12s. Drops created from cutting these down to size can be used for blocking in the floor joists. Please reference online span charts and make your calculations before building!



The barge joist is two joists nailed together and sits across all three beams, which are set evenly. See image at left.

11. Build the rim joist and barge joist to create the perimeter of the foundation and then add interior joist lumber. After building the perimeter, then carefully measuring to keep the width correct, attach the barge joist on one end to clips securing it to the I-beam. Using a long tape measure, measure diagonally as illustrated to ensure the deck and joist are square. If for any reason it is not square, make adjustments using the end that is not attached by moving it one way or the other until you are within 1/8 inch. Make sure to also use a string line down the sides to confirm the foundation is straight before securing the joist with clips.



The pictures above show the layout and fastening process. **It is important to ensure the outer boards are completely square before attaching joists.**

12. Now that the foundation is square, add in all the blocking. We recommend running single blocks down the center for up to 16 foot wide Arched Cabins, and double blocks where the joists overlap on the 20 foot and 24 foot wide Arched Cabins. With all the blocking in place, add in the clips. We add clips on every other joist, alternating for each side, and then every 3rd joist down the middle. This provides very secure mechanical connection directly to the beam, pier, and ground. On the block and



beam foundation, we recommend you pour piers or use large screw-in anchors to secure the beams to the ground to complete the mechanical connection. * Some permitted builds have required clips for every connection on all joists.

13. With all the clips secured to the beam and the joist with lag bolts, you can now start decking with the subfloor. Tongue and groove subfloor of 23/32 (3/4 inches) or thicker should be used.

When securing the subfloor to the joist, lay a bead of subfloor adhesive down for the sheet you will be securing. Using 2 3/8 inches nails or screws, secure the sheets in a row from front to back or back to front, then work your way across the foundation, taking care to keep the sheets square as you work. Due to the sheets being slightly smaller than 48 inches, we recommend splitting the first sheet in half lengthwise (ie. 24"x 96") for the entire first row. This gives you full material to work with on both sides. It will waste a few sheets, but provides a more solid subfloor to work with.



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ARCHED CABIN KIT ASSEMBLY

Next is raising the Arched Cabin kit! **Please use hard hats when standing under or around the arched wall frames when raising and securing. It is critical to take your time and be extremely careful during this process, as the risk of falling or having the Arched Cabin kit fall due to not taking the proper precautions can be very dangerous and can damage your kit.**

1. Start by placing the base plates and ridge beam all on the deck. Double check the ridge beam and base plates to make sure they are all oriented in the same direction in 2 foot increments. Starting from one side, **the measurement between ribs will be 22 inches on center with the exception of the last spacing which will be 20 inches.**
2. Once everything is oriented properly, take the base plate **with the chains on it** to one side of the foundation, and the base plate without chains to the other side. **The base plate with chains will be the first side you lift.** Make sure that if you're using equipment (ea. crane or other machinery) to raise this wall, then the area around this side of the structure has room for the equipment to maneuver safely.

For Concrete slabs, please call Jeremy at 832-334-2352 for instructions.

3. Then place the ridge beam close to the base plate **without chains.**
4. Using 5/16 inches lag bolts, secure the base plate without chains to the deck and joist, taking care to keep it even from front to back. Place the base plate with chains on the other side in position, but DO NOT secure it through the pre drilled holes yet. Start by securing only the chains using 5/16 inches lag bolts into the subfloor with wood backing/blocking or through bolts with washer and nuts. This will act as a pivot when raising the Arched Cabin kit.
5. Take the ribs one at a time and secure them with the self tapping drillers (longer screws) that are included in our kit to the ridge beam and base plate with chains. **You only need one driller screw at each end, or two per rib total. Make sure to only place self-tapping screws on the inside of the ribs so the sheeting on the end caps lays flat. Do not put screws onto the outside edge of ribs where you will be attaching the roof sheeting.**



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A. Secure the base plate through pre drilled holes



B. Base plate with chains attached by chains only



C. Attach each rib to chained plate



D. Also secure each rib to ridge beam

6. With the first half of the Arched Cabin kit completely secured with self-tapping screws, it's time to lift the first arched wall into place. For smaller kits, you may feel comfortable lifting the wall into place by hand and walking it up ladders. Test the weight and consider how high you'll be lifting it before deciding how to proceed. For kits up to 24 ft long you can use one lifting point/sling. For kits longer than 24 ft you will need to use 2 lifting points/slides. Attach lifting slings around the ridge beam, lift the kit about 2 feet and check all the lifting points before proceeding. Also check all the lag bolts in the subfloor to confirm they are solid before continuing.
7. It is now time to raise the Arched Cabin kit to full height and start placing ribs on the opposite side. Be sure to attach the ribs on the second side the same way you did the first side, with one screw for each end of the rib placed on the inside edge.

8. You have now successfully raised the Arched Cabin kit!

9. Begin squaring and leveling out the end ribs on each side to begin building the end caps. Use a spreader bar (steel square tubing as long as the length of your kit or a long 2x4 will work, this can also be multiple pieces staggered as pictured to the right) and clamp it 6 feet and 6 inches up or more from the deck.

10. To keep everything solid while building the end caps, clamp every rib using a tape measure to make sure they are 24 inches on center spaced apart with the last one spaced at 22 inches on center.



11. When we build, we always strengthen the end caps with 3 inch x 3 inch steel square tubing. This can be accomplished with wood as well by building a full width header pack using 2 inch x 8 inch lumber with 7/16 inch OSB sandwiched between two pieces. To set the height of the brace or header pack, we prefer to use precut 92 5/8 inches studs with a simulated top and bottom plate.

The pictures at right show the 3 inch square tubing notched out to fit the rib. These are all welded into place. If you are using a header pack to brace the end cap, use TEKS #14 2.5 inch Self-Tapping metal screws.



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FRAMING THE END WALLS

The end caps are framed out **BEFORE** the metal roof sheeting is attached. This greatly decreases the amount and time and effort involved because you can scribe the plywood against the ribs to get a perfect match for the curve.

The steel 3x3 12 gauge support spreader bar is not required for kits 16 ft wide and under. **HOWEVER**, we believe that it is an important addition if you will be inhabiting your kit and have trees in the vicinity of your home or threat of other natural disasters.

1. Start framing the end caps to fit the doors and windows. It is helpful to mark out the floor plates before starting to frame to help visualize the space and help prevent mistakes later in the build. A lot of the framing on the top half of the building is more difficult, as you will be measuring each stud and cutting angles more frequently to attach the studs to ribs. Most of the angles are too steep to use a miter saw, so we typically use circular saws and cut the marked 2x4s on edge, then mark it again, flip it over, and cut from the other side. All the doors and windows should have headers and the spacing of the studs should never exceed 16 inches on center. All connections to the steel frame and ribs must use #14 TEKS 2.5 inches self-tapping screws.
2. When the end caps are framed and plywood is complete, attach the Tyvek building wrap to the exterior in order to waterproof the wood. Cut holes for the doors and windows and tape the tyvek to the inside of the door and window openings.

TIP FOR ATTACHING 2X4S TO RIBS:

Notch the board three times with a circular saw set to a depth of ## about every ## inches. Viola! It will now bend! Pre-drill the holes where you will then attach with self tappers to the ribs.



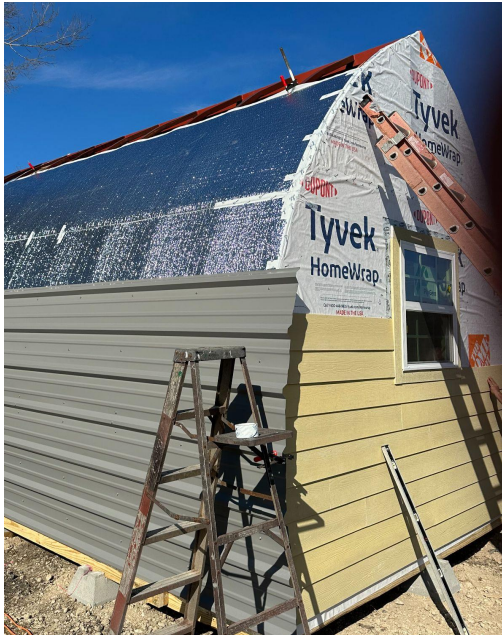
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INSTALLING THE EXTERIOR INSULATION LAYER

Please note that there will be two different types of insulation provided with your kit. The insulation you use on the exterior of the ribs will be the 4ft rolls and is a closed cell foam. Whereas, the insulation you will use on the interior of the ribs later on comes in 6 ft rolls and is a laminated fiberglass.

1. Then place 2x4 blocks down the foundation 4 inches below the top of the baseplate (see picture at right) to assist with insulation and metal

sheeting placement. It is also helpful at this point to use a square and mark the center of your ribs on the side plates of your foundation now. This will be used as a reference for screwing the sheet metal into the ribs. Roll out the thicker foam insulation and stretch across the outside of the ribs and secure temporarily to the ribs on the top edge with Tyvek Tape or an equivalent.



The picture on the left shows the insulation being stretched out along the ribs and taped/clamped to ribs and taped along the edge of end caps. **PLEASE DO NOT LEAVE MORE THAN 4 INCHES OF EXTRA ON EACH SIDE OR YOU MAY NOT HAVE ENOUGH INSULATION.**

2. When the arched wall insulation has been wrapped around the front and back end caps, all seams should be taped using Tyvek tape. The seam at the end caps should be taped onto the tyvek covering the end caps with Tyvek tape to secure it and make a tight envelope. The edge along the bottom should be taped to your foundation and any seam connecting the insulation to itself should also be completely taped.
3. The 2nd row of insulation should be done the same way and the bottom edge will be taped all the way across horizontally to the top of the first layer. The second row of insulation should be attached after the first row of metal roof sheeting is attached as outlined below. This will allow you to be able to place your ladder onto the roof sheeting and continue on. Alternate as needed with metal roof sheeting and insulation rows as you continue on.



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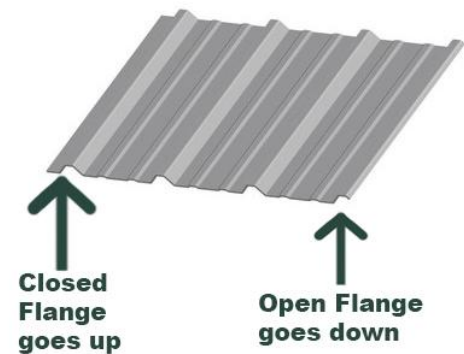
ATTACHING THE METAL ROOF SHEETING

There are two kinds of fasteners/screws provided with your kit. Shorter 7/8 " Lap TEK or what we call "Laps" and longer 1 1/4" drillers. The drillers will actually attach the sheet metal directly to the ribs and the Laps will tighten the overlap on the sheets so they do not leak.

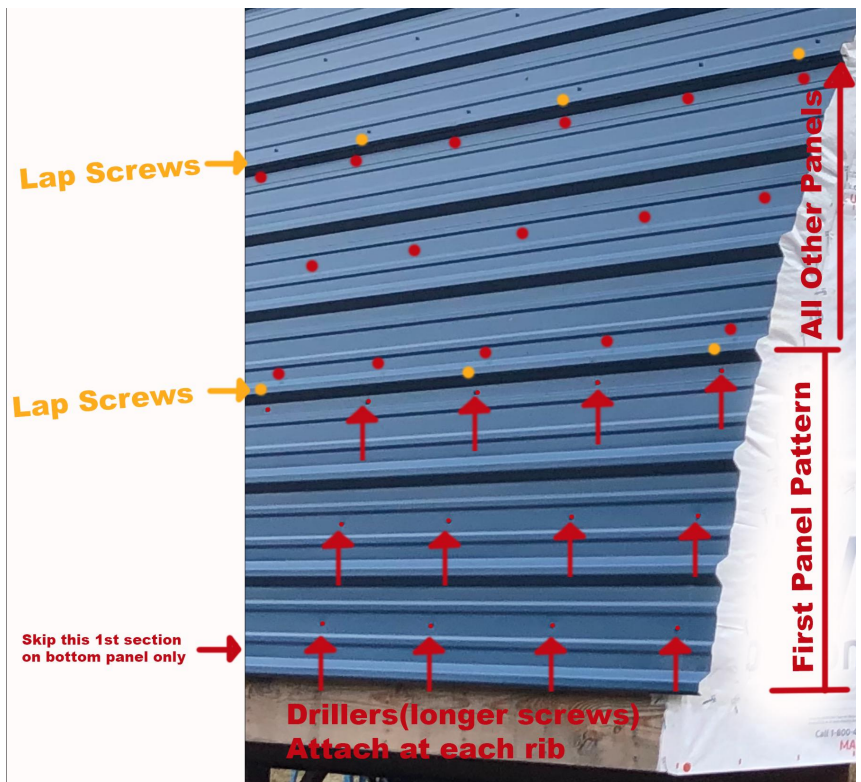
- **DO NOT over tighten either kind of fastener. You will know if you have done this because the rubber washer will split. If this happens, you must take out the screw and replace it with a new one.**
- **Please be careful not to miss the ribs when using the drillers. If you do, then you will need to pull out the driller, replace with a Lap screw with silicone on it to prevent leaks.**

1. Our next step is attaching the sheet metal. Use the blocks you placed earlier to help get the first sheet lined up properly. The sheeting is directional and should be placed with the closed flange on the top and the open or covering flange on the bottom. See picture at right as reference.

When placing the sheet metal, have one person on each side and use two measuring tapes to even out the sheeting. There should be around 5 inches of sheet metal protrusion from each end cap.



2. Once the sheet is placed correctly, start screwing the sheet metal into the first rib on one corner while the other side of the sheet metal is still being supported. Use a level across the sheet metal to make sure it is exactly where it needs to be. It is very important to support the sheet metal in multiple places to ensure it does not fall or get damaged. See the bottom panel in the picture to the right for the first sheet's screw pattern.
3. Continue with the second sheet and use a clamp on the edge seam of the two sheets as a temporary support while you secure the sheets. Note the screw pattern changes for the second and all other panels as pictured at right.



4. Once the second sheet is placed and secured, remove the spreader bar and continue placing sheets all the way up to the peak.
5. For larger kits, the top sheets may be difficult to carry up a ladder to get into place. This is where the two long HEAVY DUTY ropes we suggest you have on hand come in handy. You need at least 4 people to do it this way. Two people will stand on one side and hoist up the panels(multiple people per rope if they feel the panels are too heavy), and on the other side two people will attach

the panels once they're in place.

- a. First throw both ropes over the entire cabin and have two people hold them on the side that you are not attaching the panels.
- b. Then, on the other side where you're attaching the panels, have the other 2 people tie the rope around the panels securely and spaced at about each third of the panels.
- c. Next, place some lumber against the arched walls in between the two ladders to protect the sheeting already in place from scratches and keep the panels you're raising from sagging in the middle and catching on anything.
- d. The two people on the ladders side will climb the ladders and assist with guiding the panels into place. Both of them should make sure they have their impact drills on a tool belt in order to secure the panel once it's in place.
- e. Call out loudly to the hoisters to begin once everyone is ready. It helps if both hoisters move in sync with each other and go slowly in case an issue arises on the other side. It also helps to shout how many feet or inches are left and get the panel placed exactly where you want to attach it.
- f. Once the panel is in place, the people on ladders can start securing the panel with drillers along the top edge first. Once enough screws are in place to temporarily secure it, remove the ropes and then finish placing drillers.

- g. **For a video of this process, click here:**

https://drive.google.com/file/d/1h8qg_nrf68ebUc54z8GOwSXnuo9kC-02/view?usp=sharing

6. When the first side is complete, move to the other side and repeat the process. Most sheets are dead even and will line up with the top of the Arched Cabin kit, but occasionally the sheets will be off by small amounts. If that happens to you, we recommend lining the front sheets up perfectly and leaving any discrepancies in length on the back.

7. The ridge cap is installed after all of the sheeting on both sides of the building are up and fully secured. Use the same lap screws used on the seams of the sheeting to secure the ridge cap. The ridge cap needs to lap at each seam, starting from the ends and working to the middle. The ridge cap should protrude 4 inches further than the sheet metal at the end cap, and each seam of the ridge cap should overlap a minimum of 6 inches. After the ridge cap is placed, finish sealing the end cap seams with Tyvek tape and install the doors and windows using flashing tape to keep everything weather tight.

INSTALLATION OF CLOSURE STRIPS

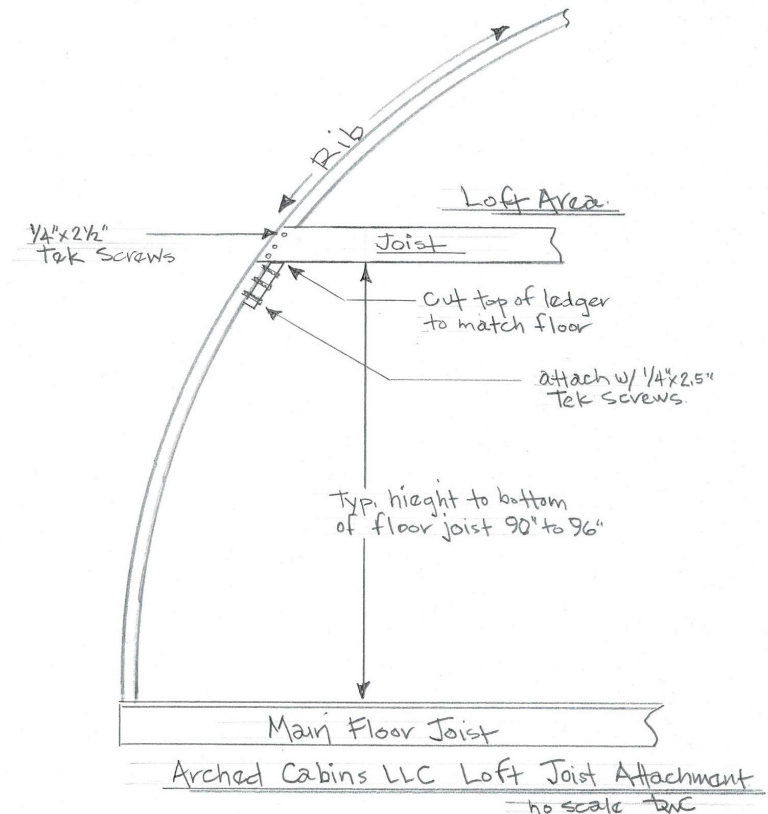
Closure strips are foam inserts that fill in the gaps created when the roof sheeting is up against the end cap materials. After the sheet metal is put up, loosen the sheet metal fasteners to allow you to have space enough to insert the foam strips. Then tighten fasteners down again.



LOFT ATTACHMENT

Follow your engineered drawings if you have them. If your build did not require engineered drawings, and you don't have detailed drawings you need to adhere to, then continue reading this section.

1. Install ledger boards to ribs at desired height. *note: Floor joist for loft can be lowered or raised to increase usable loft floor space. Typical height is 90-96" to top of ledger board.
2. Cut ledger board to be parallel to the floor. (about 7-12 degrees) and varies per house size.
3. Attach ledger board to ribs using $\frac{1}{4}" \times 2\frac{1}{2}"$ TEKS self tapping screws. One for every 2.5" of ledge width. Ex. 2x8 requires 3 minimum TEKS screws to every rib. 2x6 uses 2 TEKS screws and 2x10 uses 4 TEKS screws.
4. Once the joist ledger is set, span over the ledger with the joists. Cut joist ends to match rib angle.
5. Attach joist ends to the ribs using 1 TEKS $\frac{1}{4}" \times 2\frac{1}{2}"$ per every 2.5" of width, same as above.



6. Center joist span supports are needed when the span exceeds rated span load, refer to joist span charts that can be found online.
7. Material, ie. floor joists, must be sized for the span and load per IRC and IBC code requirements.
8. Block between joist, not to exceed 10' between blocking and/or joist ends.
9. Put decking down over the joist with $\frac{3}{4}"$ tongue and groove subfloor decking. Use LP375 glue or equivalent to bond the floor deck to the joists.
10. Nail the deck to the floor joist not to exceed 6" in between nails.
11. It is preferred to use a double joist on the lead in (or front) of the loft. Use one on the front and rear of the rib with blocking in between the two. This creates a stiff connection for the attachment of stairs.

ELECTRICAL AND PLUMBING BASICS

Arched Cabins LLC is not responsible for any damages or injury from plumbing or electrical installation. Please use a licensed electrician and plumber and understand the risks of DIY. This information is solely intended to inform you of the process.

You want to run all your electrical and plumbing in the arched walls before you add your interior insulation that we provide. Electrical and plumbing are run very similarly to traditional structures in our kits. The differences lie mainly in the arched walls. You can run both the plumbing(if using PEX tubing) and electrical horizontally behind ribs in the channels of the metal roof sheeting wherever they occur.

Plumbing tips: We prefer using PEX tubing. It is a flexible tubing and very easy and fast to install. You can learn all about it on youtube. Another added benefit of PEX is that it also expands and contracts with temperatures better than traditional PVC plumbing so you run less risk of water line breakage.

INSTALLING INTERIOR INSULATION LAYER

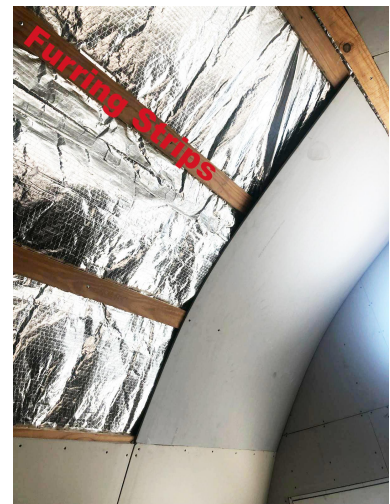
You must use furring strips to attach the insulation to the metal ribs, please make sure you recess your self tappers by screwing them in farther than the surface of the wood.

The interior insulation is the 6 ft rolls of laminated fiberglass. You can attach it with 1x4 inch lumber furring strips using pan head 1 ½ inch TEKS self tapping screws. You can choose to run the 1x4s vertically up the ribs or horizontally across them depending on what interior wall finishing materials you plan on using.

The insulation will go directly onto the ribs and then the furring strips will be placed onto them, securing the insulation to the ribs.

INSTALLATION FOR DRYWALL/WOOD PANELING

You will run the furring strips horizontally for drywall or wood paneling. They will be spaced 16 inches on center from floor to peak. Run drywall or paneling vertically for ease of use with the arched wall. Drywall can be ½ inch thick and needs no special procedure or step to adhere to the arched walls. Wood paneling would be ¼ inch and panels should also run vertically.



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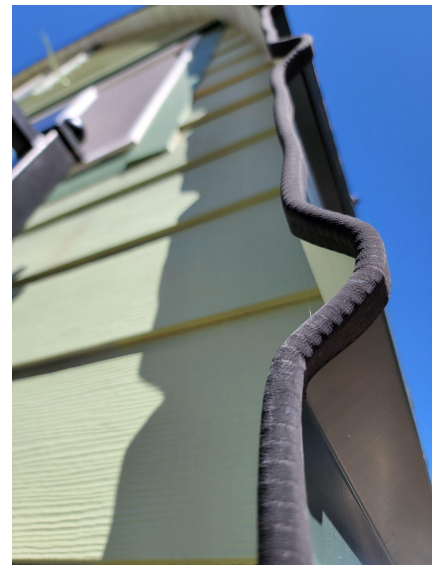
INSTALLATION FOR TONGUE AND GROOVE OR SHIPLAP



You will run the furring strips vertically for this application. The 1x4 furring strips will adhere to the curve without extra steps. If you need to use 2x4s then you will need to cut relief cuts into the boards every 12 inches or so on one side. See picture at right.

INSTALLATION OF EDGE GUARD

Edge guard is installed on the edge of the sheet metal to protect people from the sharp edges once the kit is set up. Just press it onto the edge starting at the bottom on one side and work your way up. Then repeat for the other side.



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Glossary of Terms:

Your kit measurements: We always list the width of the kit first and then length. **A 24x40 kit has a 24ft wide end wall(straight wall) and a 40 ft arched wall**

Base Plate - Two provided with each Arched Cabin Kit - These are angle iron that run the length of the arched walls and have welded stubs for the ribs slide onto.

Ridge Beam - 1 provided per kit - This runs the length of the kit at the peak, is rectangular tubing and has stubs welded to it on both sides for the ribs to attach to at the peak of the kit.

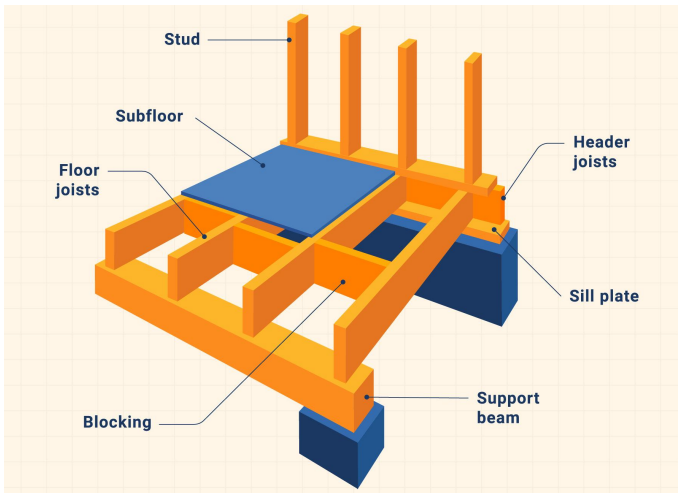
Ribs - These are the 2x2 inch square tubing that is curved. Each kit will have 2 more than the **length** of the kit you ordered. Ea. a 24x40 kit will have 42 ribs.

Joist - See image 1A, This lumber can range in size from 2x6 through 2x12 depending on the size of your structure. Structural engineering will state what size the lumber needs to be.

Barge Joist - Two joist nailed together

Ladder Stabilizer - to keep ladders stable and to keep them from scratching the roof sheeting.

Transit Level - an optical instrument, or a telescope, complete with a built-in spirit level that is mounted on a tripod. Transit levels are used mainly for surveying and building, but they can be used to determine the relative position of lines and objects as well. Transit levels are very precise. Pictured at right.



Pier & Beam Foundation - consist of, steel, brick, stone or concrete piers and wooden beams that support the weight of the home. Unlike slab foundations which sit directly on the ground, pier and beam foundations are elevated, usually about 24" off of the ground. See image of steel pier and beam at left ←

Block & Beam Foundation - Block and beam support runs perpendicular to the floor joist providing strength to the interior home. These piers are positioned 6 to 8 feet apart depending on timber sizing and the area to be supported. A Block and Beam support pier is arranged with a base pad, foundation blocks, and timber. See image above ^^^

