

Arched Cabins 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 a dried in exterior for an Arched Cabin.

Please contact us at 832-930-ARCH if you have any questions about the process or during the build process.

Exterior Build Process

1. Gather all of the tools and materials to build the Arched Cabin.
2. Choose the location of the Arched Cabin. If this is a permanent installation, take care to choose the location wisely. Consider the views, the sun's path for lighting through the year, water runoff, topography of hill vs valley, soil conditions, etc.
3. 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.



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4. 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 and 24 foot 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.



5. Now that everything is marked out, it is time to either dig holes or level the ground for the blocks. The piers or blocks should never be spaced apart more than 10 feet, and when using lumber, we recommend no greater than 8 foot spans.

The holes 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 bellng 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.

(These pictures are for reference only, the soil sample and ground conditions determine the depth of the piers.)



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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 get the best possible mechanical connection 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.

6. Once the piers are set or the blocks are placed and level, use a transit to measure out each pier or block location and write down all the measurements on a basic sketch of the foundation. With a block and beam foundation, use this number to determine how much blocking is needed. With a pier and beam foundation, this will be the measurement for cutting the piers down to the same height for beam placement. All the blocks should measure the same through the transit, or all the posts should be cut to the same length for beam placement.

This image shows the string line and transit in the background on the left-hand side. Note that all the piers are different lengths at this point. Make an initial mark on all the piers, and using that mark, measure down to where you would like the lowest pier to be. Use that number to measure all the piers and cut them to height.



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7. 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.

The barge joist sits across all three beams, which are set evenly.



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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.

These two pictures show welding the steel pier to the I-beam and prepping the supports for the I-beams.



10. Once all the beams are in place, start building the deck and joist that the Arched Cabin will be directly secured to. All of our builds use 16 inches on centers as illustrated. 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 the same 2 inch x 8 inch x 16 feet joist, but they are cut down to 14' to utilize the drops for blocks, which are 14.5 +/- inches each. The remainder of the lumber will be used for the floor joist. If you anticipate higher loads or would like to build a more rigid foundation, you can use 2x10s or 2x12s in place of the 2x8s. Please reference span charts and make your calculations before building!

These pictures show the layout and fastening process. It is important to maintain the proper width across the Arched Cabin foundation before securing the floor joist.



11. After building the joist and 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.

These pictures show the process of measuring diagonally to confirm the foundation is square and the initial clips on the barge joist.



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 a 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.

These pictures show the blocking measurement, the blocking getting nailed into place, the clips getting welded in, and overall joist layout.



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 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.

These pictures show the first row being sheets cut in half and then the subfloor being continued all the way across the floor joist.



14. Next is raising the Arched Cabin kit! 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 on center of the last rib will be 2 inches closer together than the rest of the kit.

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. Then place the ridge beam close to the base plate without chains. You can secure the base plate without chains to the deck and joist, taking care to keep it even from front to back, using 5/16 inches lag bolts. Place the base plate with chains on the other side in position, but **DO NOT** secure it yet. Start by securing only the chains with 5/16 inches lag bolts into the subfloor, which will act as a pivot when raising the Arched Cabin kit. 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, working your way across like a zipper. Make sure to only place self-tapping screws on the inside of the front and back ribs so the metal sheathing on the end caps lays flat.

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These pictures show the process of placing the base plates correctly, placing the ridge beam, and installing ribs.



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15. With the first half of the Arched Cabin kit completely secured with self-tapping screws, place the cranes and prepare to lift the Arched Cabin kit. Using 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.

The pictures below show detail for crane placement, attachment, lifting sling, and a test lift before continuing.



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16. It is now time to raise the Arched Cabin kit to full height and start placing ribs in the opposite side.



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You have now successfully raised the Arched Cabin kit! 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.

17. Begin squaring and leveling out the end ribs on each side to begin building the end caps. Use a spreader bar (steel square tubing or a long 2x4 will work) and clamp it on 6 feet up or more from the deck across at least 3 ribs in the center of the building - more clamps will not hurt! Once multiple ribs through the center are clamped, go to the last rib and use a level off of the edge of the deck or plumb bob off the ridge to level and square the Arched Cabin kit. When it's all in place and level, use one more clamp per side and clamp the last rib securely to keep everything solid while building the end caps.



18. 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.

These pictures show the 3 inch square tubing notched out to fit the rib and supported by the simulated wall section, then double checked with a level. 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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19. 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. While these walls do add support, they are not traditional load bearing walls. 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.



20. When the end caps are complete and the Tyvek building wrap is on the exterior, it is time to level all the ribs using spreader bars placed 6' feet or more over the deck and start the insulation/metal sheeting process. Use a level and measure between the bottoms of the ribs and then up top where the spreader bar is. This keeps everything aligned properly. Take your time to measure and level each rib, confirming all measurements on the end caps. Use a bar clamp to secure each rib to the spreader bar when it is in the desired position. Then place 2x4 blocks down the foundation 4 inches below the top of the baseplate 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 reference for screwing the sheet metal into the ribs. Roll out the white/foil insulation with the white side out and use the seam tape to secure it to the baseplate. Secure it to the ribs on the top with Tyvek Tape or an equivalent.

This picture shows the 2x4 blocking 4 inches below the top of the base plates.



The picture on the next page shows the insulation being stretched out along the ribs approximately 3 inches over the end caps on each side.



This picture shows the insulation wrapped around the front and back of the building, the insulation taped into place on the top to the rib, and the height of the insulation just barely sitting on the blocks you set earlier. When the insulation has been wrapped around the front and back, the seam should be taped with Tyvek tape to secure it and make a tight envelope.



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21. Our next step is 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. 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 5.5 inches of sheet metal protrusion from each end cap. *Please ask a member of our team for the correct sheeting overlap with the foundation for your specific size of Arched Cabin*.

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. When using the drillers to set the first sheet, secure it on the very top of the top row in the middle row of the sheet and the middle of the lowest row on the sheet. The middle row can be done last after all the sheeting is on or while you place the sheeting.

The picture on the right-hand side shows the sheeting getting lined up while it is supported, and the left-hand side picture shows the orientation of the sheet and the screw placement.



22. 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. If you are using 6 foot insulation, you'll be able to place two sheets of metal per one row of insulation. Once the second sheet is placed and secured, remove the spreader bar and continue placing sheets all the way up to the peak.

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.

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When placing the second row of insulation, use the same method as stated above to secure the top to the ribs. Position the insulation by looking at the tape seam from the inside of the Arched Cabin to make sure you can seal both rows together properly. Once it's secure on top, peel the backing off of the tape and seal both sheets together.



23. 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 overlap at the end of the building should be 4 inches further than the sheet metal, and each seam of the ridge cap should overlap a minimum of 12 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.

The pictures below show the ridge cap protruding 4 inches further out than the end of the sheet metal, doors and windows are installed on the end caps, and the end cap seams taped.



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24. Now that the exterior build is complete, move to the interior to build the loft. Reference span charts and choose appropriate sized lumber for the span according to the size of the Arched Cabin. On larger 20 foot and 24 foot wide Arched Cabins, it is mandatory to have either a loft or a truss system built to meet the structural strength requirements.

Start the loft by determining the loft height and total length. Then make two wall ledgers that both individually match the total length of the loft and ensure the angle is correct to make sure the loft joists sit flat on the wall ledger.

On our larger buildings, choose between framing loft support walls on the first floor to meet the length span requirements, or set a loft support beam under the loft.

To secure the wall ledgers to the ribs, use #14 TEKS Self-Tapping screws.

Our loft framing is built 24 inches on center in line with the ribs. On our larger buildings, when using two joists overlapping each other, build a spacer out of joist material that matches the floor joist for the second floor with 7/16 inches OSB or plywood.

The pictures show the wall ledger in place and secured with #14 TEKS 2.5 inch Self-Tapping screws, the edge of the wall ledger, and the angle the wall ledger was ripped at to keep the loft joist flat.

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The picture below shows using an I-beam and supports for temporary loft support.



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The loft joists are installed and the blocking is going in. Each joist is secured to the rib using two #14 TEKS 2.5 inch Self-Tapping screws.



When the loft joists are complete, lay the same $\frac{3}{4}$ inch OSB subfloor over the loft joists and secure it to the joists with subfloor adhesive and (nails or screws).

Build a ladder or stairs to access the loft, frame your interior walls according to your floor plan, and your Arched Cabin is ready for plumbing and electrical!

If you purchased upgraded insulation from us that arrived in a foil/foil roll, install that insulation on the interior of the Arched Cabin over the ribs once the plumbing and electrical have been completed.