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SHINGLE ROOF MANUAL ADDENDUM – SIDEWAYS

Running the fin tubes horizontally so the flow is left to right or right to left allows the system to be fitted to the roof. Manifolds at the left or right can be angled to match the roof space and fin tubes can bend around inside and outside corners.



STEP 1) PLAN THE LAYOUT

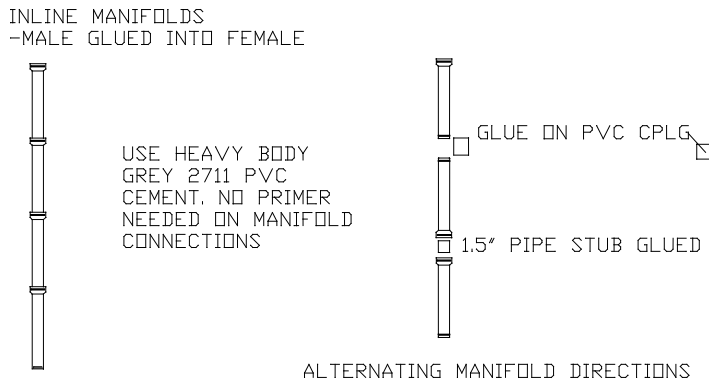
Remember that the fin tubes are 88 feet long so plan the job so your average lengths are 88, 44,29,22,18 feet etc so you don't waste too much material.

STEP 2) INSTALL UNISTRUT AT ONE END

The design idea this system is based on is that we want discrete proper flashed roof connections. Hot Sun roof brackets and roof flashings can take either two or one length of Unistrut. The manifolds are attached to these Unistrut so that they are supported and can freely move with temperature.

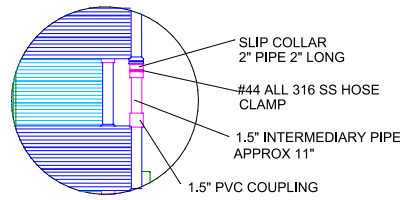


P4100 shallow slotted Unistrut is bolted to the flashed roof brackets. The roof brackets are located, then screwed into the roof with 4) #10 csk head ss screws each. These roof penetrations are sealed with a roof and flashing sealant. The flashing slides between shingles to flash over this roof bracket. You will have to break the seal between the shingles so you can slide the flashing between. This is done with a sharp thin piece of metal forced up between the shingles. Seal the hole in the flashing where the stud comes through as well.

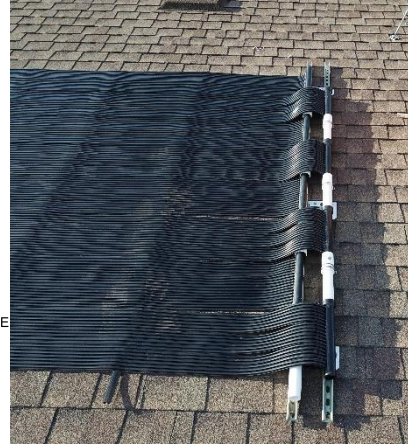


Usually sideways installations like these involve less than 12 manifolds in a row. We want to make best use of available roof space yet we still want to leave a little space between fin tubes to relieve air pressure and to allow the roof to breathe.

Because of these 2 factors we often glue the manifolds inline meaning the male end is glued into the female end and so on. Inline manifolds use up 12.5" each so 9 will fit on a single ten foot length of Unistrut. A ten foot length of Unistrut should be secured to the roof via flashed roof brackets at 3 places, one in the middle and the other two approximately one foot from the ends. If for example the Unistrut is 12 feet long you should use 2 pieces 6 feet long and 2 roof brackets per piece for a total of 4 roof connections. Unistruts can be joined together with Unistrut joiners which are just flat bars with 4 holes using 4 nut/bolts and 8 washers. Run a chalk line and screw the roof brackets into the roof and flash them. Bolt the Unistrut in place.



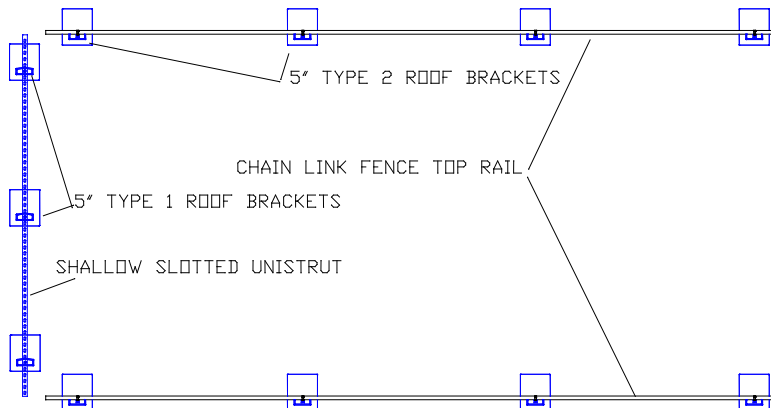
STAGGERED MANIFOLDS



Two rows of Unistrut can be mounted using the Hot Sun two bolt 7" roof bracket. The studs are spaced 5" to match staggered manifolds. Staggering the manifolds eliminates all the spaces between fin tubes except the small ones created by the space needed for the zip ties. Staggering also allows for higher flow through the manifolds as you are splitting the flow up between two sets of manifolds. This is advantageous if there are more than 12 manifolds per end. Hot Sun will do your calculations and recommend the appropriate option for your situation. Our go-to design for 12 or less manifolds is inline manifolds because there doesn't end up being much space between fin tube strips. When staggering manifolds, the intermediary pipe will be about 10" long but don't cut these in advance. The fin tubes won't be tight against each other due to the small space required for the nylon ties between fin tube strips. Install the fin tubes first!

Angled manifold assemblies are usually done so there is an even space between the manifolds. This means the manifolds all face the same direction but there is a pvc coupling (glue on with PVC cement) glued to the male end then a short piece of 1.5" pvc pipe glued into the female end of the next manifold. To tighten up this spacing if necessary, you can alternate these manifolds and adjust the length of the 1.5" pipe stub between female ends to match the spacing required. Every situation is a little different so check your fin tube spacing and your manifold spacing before committing fin tubes to manifolds.

STEP 3) INSTALL THE TOP AND BOTTOM RAILS





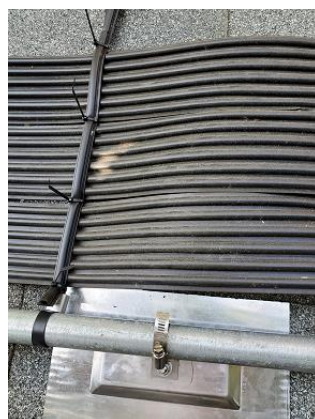
Just beyond the Unistrut plan the top and bottom rails. These frame the collector bank. The roof brackets used here are called 5" type 2 because they have a 1/4" stainless steel stud protruding to accept a strap bracket rather than a 3/8" hot dip galvanized one for Unistrut. Attach a strap bracket and a #20 – 316 ss hose clamp through the strap bracket and loosely around the top and bottom rails. The top and bottom rails are made of 1-3/8" OD chain link fence top rail. Leave the hose clamps loose for now as tightening them later will tighten the straps. Spacing should be less than 6 feet and about one foot from each end.

STEP 3) INSTALL THE VINYL COATED SS STRAPS



Next run vinyl coated ss strap every 2 feet vertically between the top rail and the bottom rail (1-3/8" OD chain link fence top rails). Secure with strap clamps. Note the lower strap brackets face up the roof and the upper ones face down the roof obviously. Don't forget to seal under the strap bracket with roof and flashing sealant.

You can attach the first manifold to the fin tubes first or just install all the fin tubing and then trim to match the manifolds. Secure the fin tube to the straps by placing a one tube wide piece of fin tubing material over the top and sandwiching the fin tubes using UV rated black zip ties.



Note that instead of the one tube wide strip over the top you could tack the fin tubes to the strap beneath using CA to position everything and finish by gluing with PL but we prefer the nylon tie method because it is forgiving. You can adjust positions as you try to keep the spaces between the fin tube strips even. With the inline manifold method you can achieve consistent even spacing between each fin tube strip. If you alternate the manifolds you will want to have a larger space every 3 fin tube strips because there is a bigger gap between manifold locations (every third fin tube strip).

STEP 4) ATTACH MANIFOLDS TO FIN TUBES ONE END

Once all the fin tubes are in position cut them to line up with the edge of the Unistrut using your anvil cutters. Then strip the fin tubes into 2 tube wide strips for ease of attachment to the manifolds. Don't glue the manifolds to each other or attach them to the Unistrut before gluing the fin tubes to the manifolds. You need to be able to handle and rotate the manifold to apply the CA evenly around each nipple. Refer to the general installation manual.



If you are staggering the manifolds remember to cut the outside fin tubes first and attach those manifolds, then flip them out of the way and cut the inside fin tubes and then attach those manifolds to avoid errors.

Next plumb the manifolds to each other and secure them to the Unistrut. Heavy body grey pvc cement is recommended on all manifold connections. Primer and PVC cement is recommended on all PVC to PVC connections.

STEP 5) COMPLETE THE BANK

Arrange all the fin tubing and make sure all the strips are even and straight. Check the spacing between the fin tubes so you are ready to cut the final lengths and attach the manifolds at the far end. Trim the fin tubes and build the other manifold assembly

STEP 6) PLUMBING

Make sure the weight is taken so the manifold assemblies don't creep down the roof. Perhaps the plumbing itself can support this weight or you can add an angle bracket to the Unistrut at the bottom of the row of manifolds. In most cases the vacuum breaker mounts vertically on the pipe entering the bank off a tee. Horizontal plumbing should be supported every 27". Hanging the plumbing off the lower rail with vinyl coated ss strap and a strap clamp is convenient and doesn't require additional roof penetrations. At elbows at the ends of long runs of PVC pipe remember the piping will expand and contract 1.5 inches over 15 feet so sometimes we use a piece of flexible pvc pipe to make that elbow and sometimes we simply don't secure plumbing that runs vertically allowing the horizontal PVC pipe to move.

Follow the general installation manual, the drawings, and consult with Hot Sun on the specifics for your unique situation. Don't forget to commission the system (check pressure positive and negative)