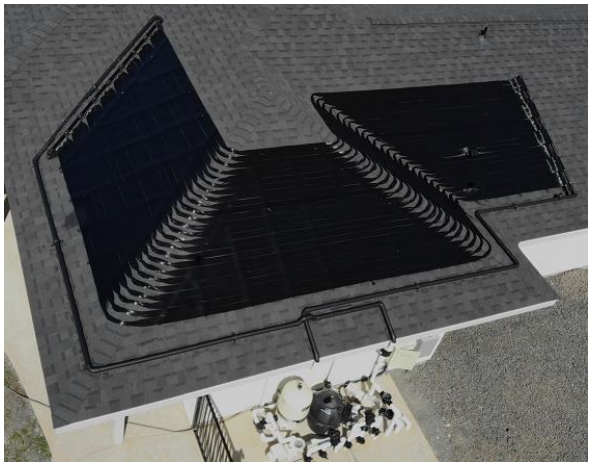
Distributed and serviced in the USA by
Hot Sun Industries Inc
1440 N Benson Ave Ste D,
Upland CA 91786
858-683 0800
e-mail: h2otsun.com@gmail.com
web site: http://www.h2otsun.com

SIDEWAYS ON SHINGLE ROOF MANUAL ADDENDUM

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.



To make these kinds of bends around corners simply strip out each 6 tube wide strip into 3 sets of 2 at the bend location. There is a tear seal between tubes allowing for easy separation. Flip the lowest set of 2 to the top, and the top set of 2 to the bottom to create the best turn.

1) OVERALL LAYOUT DECISIONS

Flow can go up the roof or side to side. Usually we will decide based on minimizing the number of headers pipes (manifolds). Sideways allows us to go around corners and angle the manifolds to use up valuable roof space. On the other hand a conventional flow up the roof design allows the fin tubes to hang with gravity meaning they don't need to be supported as much. If the flow will go up the roof refer to the Conventional Orientation Shingle Manual Addendum

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.

2) INSTALL BAR AT ONE END

The design idea this system is based on is that we want discrete proper flashed roof connections at least every 6 feet around the perimeter of the solar array



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 carefully forced up between the shingles. Seal the hole in the flashing where the stud comes through as well.

Chain link fence top rail (1-3/8" OD) is the framework. It is attached to the roof mounting blocks with a Hot Sun strap bracket and a #20 SS gear clamp. A SS nut and washer secure the strap bracket to the stud of the mounting block. The manifolds are attached to this frame with loose #32 gear clamps so that they are supported and can freely move with temperature.

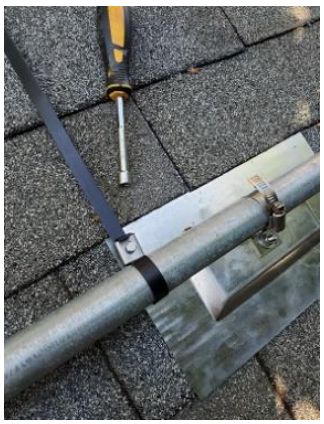
3) INSTALL BAR ALONG TOP AND HANG STRAPS

Install the chain link fence top rail along the top and hang pvc coated stainless steel strap every 2 feet. Secure with a strap clamp. Note the straps go under the fin tubes. Be sure to leave a gap between the end bar and the top bar to allow for plumbing to pass through the framework.

If the fin tube goes around corners the two foot maximum separation between straps can be achieved by angling the straps.

4) INSTALL BOTTOM BAR

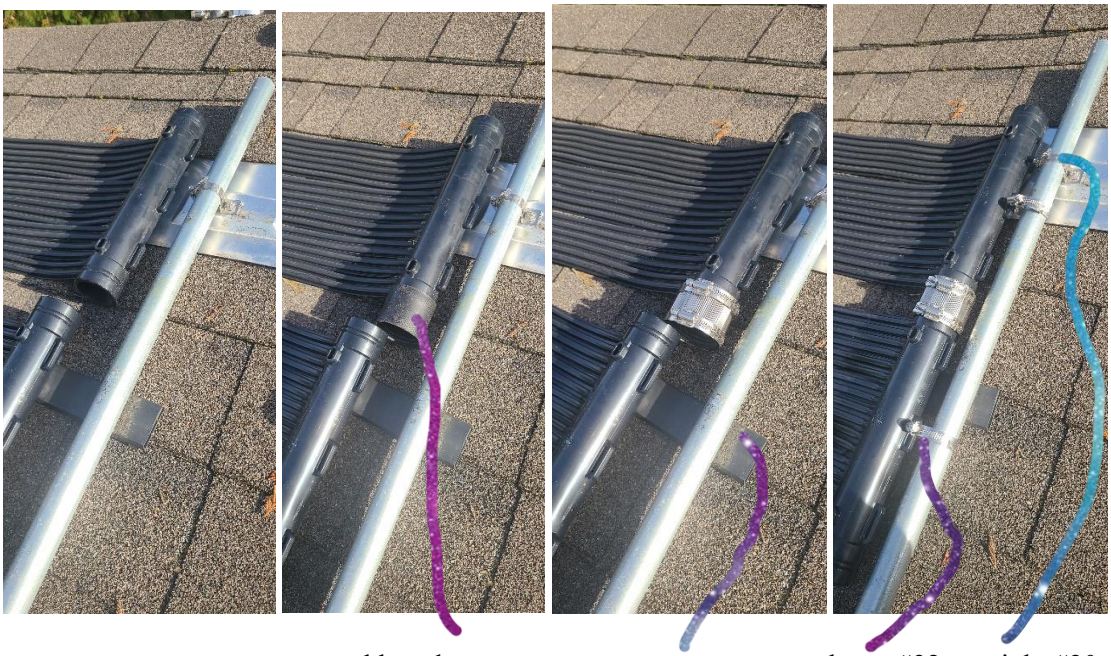
Once you know where the lowest fin tube will locate on the roof, install the lower bar. Note the strap bracket on top the mounting block will face up the roof. Pull the straps tight and secure to the bar with strap clamps.



5) INSTALL THE FIN TUBES

If you are going around corners or the collectors are longer than 30’ you’ll attach the fin tubes to the straps first. Think strategically about optimizing the use of the 88’ rolls. If the middle of the bank is a length that doesn’t waste material (44’, 30’, 22’, 18’) then start at the middle so that you can place shorter and longer cuts above and below without losing that average cut length ensuring no waste. Remember to leave a gap every 3 strips to accommodate the gap between manifolds if the manifolds are not angled relative to the fin tubes.

If the manifolds are pre-assembled to the fin tubes then install the manifolds at one end first to fix that position.



If the array is a rectangle or the manifolds are not angled relative to the fin tubes use removable 2" MJ couplings to join manifolds to each other. Put the rubber sleeve of the MJ coupling over one manifold. It snaps in place as the grooves in the manifold line up with the seals inside the rubber sleeve. Then put the stainless steel housing over the rubber sleeve with the screws of its hose clamps facing inward (toward the fin tubes). This way the ends of the stainless steel shroud will not cut into the fin tubes as you tighten. Next slip the adjacent manifold into the coupling and tighten the screws alternatively just snug (about 30 inch pounds). Make sure the manifolds are rotated correctly inside the coupling so the fin tubes line up.

To protect the roof from the movement of the manifolds with temperature use silicone or PL to secure a "spacer" under every second manifold or as needed.

Usually sideways installations like these involve less than 12 manifolds in a row. If more, install an additional bar horizontally so that there are no more than 12 one foot nominal width sections between bars.

Starting at one end tack the fin tubes to the strap using a dab CA adhesive. You have to hold it together for a few seconds to allow the bond to take. Note the strips will stack one above the other so where you have 3 strips together you usually only have to tack the lower strip. Glue every strip to strap using PL as the last step in the installation. If the sun is out it's nice to run the system so the surface you are crawling around on is cool.

Install the bar at the far end once you know the exact position of the manifolds at that end. If the manifolds are not pre-attached use a chalk line to mark the final cut of the fin tubes.

6 MANIFOLDS

If the manifolds are not preassembled to the fin tubes trim the fin tubes to the chalk line and attach to the manifolds before attaching the manifolds to each other or to the bars. The manifold's 18 nipples must be free to be fully wetted by the CA adhesive. Don't assemble all the manifolds together first and then try to glue the fin tubes on. That's a common mistake. Also you need to handle the manifold to see that you've fully wetted the nipples with the CA adhesive. Its very important you don't miss a spot. The seal requires the CA makes the seal. Its not just a stretch fit.

Be careful not to nick the fin tubing. Strip the 3.75" wide strip of 6 tubes into three two tube wide strips so you can glue 2 tubes at a time. Not over the whole length - just strip about eight inches. There is a perforated tear between fin tubes. Nick it with the anvil cutter to start the tear.

Simply apply the CA adhesive to the nipples all 18 at a time unless its really windy. Fully wet the entire surface of each nipple all the way around and then slide the tubing on two tubes at a time. You have lots of time to wet all 18 nipples fully before pushing 9 sets of 2 tubes on 18 nipples. Wear gloves and be careful you don't glue yourself to the manifold. Read the warnings on the bottle of CA adhesive.

Make sure the entire nipple surface area is fully wetted before sliding the tubing on. Use the supplied smaller bottle and applicator (dauber) brush. Two dips of this brush fully into the bottle (note the depth it dips is adjustable) is the recommended amount of adhesive for all 18 nipples on one header manifold. If the CA adhesive skins over or dries, reapply. Always wear eye protection and gloves. For small jobs use a Q tip instead of the dauber brush.

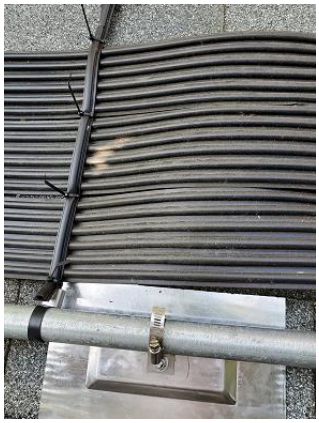
Pushing fin-tubing onto manifold 2 tubes at a time. CA adhesive

Work outdoors and keep your face upwind of the wet adhesive. The fumes sting your eyes. Eye protection is very helpful at keeping the fumes off your eyeballs. Push the tubing on 2 tubes at a time without hesitating because as soon as static contact is made, the bond occurs. Only apply the special adhesive to the nipple, not the inside of the fin tubing. The bond is instant when the CA bottle is fresh. Once its been exposed to air for a minute or two the adhesive is a lot easier to use. An aged bottle off gasses a lot less too however there is a short shelf life so keep it refrigerated and read the label.

Be careful not to glue over the open end of the nipples. That will block flow. Blow on it to open it up.

7 FINAL SECURE OF FIN TUBES

With the fin tubes tacked in place secure each strip to the straps with small dabs of PL. An alternate method is to place a one tube wide piece of fin tubing material over the top and sandwich the fin tubes using UV rated black zip ties or twists of pvc coated copper electrical wire. This alternate method is seldom used on new systems but as the fin tubing ages its ability to initially bond to adhesive diminishes.



7 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. Remember the manifolds lie the plumbing must be able to expand and contract with temperature as much as 1" over 10'. In most cases the vacuum breaker mounts vertically on the pipe entering the bank off a tee. Horizontal plumbing on the roof should be supported every 26" (2 manifolds). 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 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.

Gravity must allow the water to flow back down the feed pipe. Gravity must allow the water in the return piping to drain down as well. The return side manifolds will drain down through the fin

tubes to the feed piping. However the bottom of that row of manifolds will hold some water. To be safe we can either install a hose bib there but we'll have to go up there to winterize it. A good solution is to install a small diameter pipe (1/4") between that manifold and any plumbing. It will always be draining out through this tube but the volume is small and won't affect system performance. You can drill and tap right into pvc fittings. A 7/16" drill and a ¼" pipe tap allows threading in a ¼" compression fitting to ¼" od copper tube. Our preferred technique is a single tube of our fin tubing. Hot Sun can supply ¼" pvc rigid tubing to go between the fin tube and the PVC fitting. Drill into the pipe with a drill size just under ¼", use primer and pvc cement, sharpen the end of the PVC nipple with a pencil sharpener and glue it into the PVC fitting to automatically empty any spots where water is trapped in rigid piping or manifolds. Fin tubes can freeze full of water without issue.

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)

PARTS LIST:

HOT SUN SOLAR COLLECTOR:

PART #1283 The Hot Sun MODEL1283 collector 13" wide by any length up to 88'
PART# 2MJ 2" MJ couplings

COLLECTORS IN BULK




PART#88GEON 88’ long rolls of Hot Sun fin tube 3.75”wide.
PART#130MAN 2” Hot Sun manifolds
PART #AC Anvil cutter
PART# CA100 Turbofuse 4oz w 1 oz dauber bottle
PART# 2MJ 2” MJ couplings (1 per manifold)

SYSTEM



PART#N36 vacuum breaker (one per system)
PART# 2CPVC 2” CPVC adapters
PART#AS-2-10 roof solar sensor with outdoor wire attached to specified length
Locally source hose bibs, pvc fittings, caps, pvc pipe, pvc cement

GENERAL HARDWARE


PART#SSSTRAP PVC coated ss strap 100’ rolls
PART#SC Strap clamps (At the end of each strap or to create a loop pf strap)

SHINGLE ROOFS



PART# MB Mounting bracket with flashing and screws (Every 4 feet along top and bottom)
PART#SB Strap brackets (one per mounting bracket and to secure straps every 6 feet)




PART# 20GC #20 all ss gear clamp (one per mounting bracket)
PART# 32GC #32 all ss gear clamp (one per manifold loose connection to rail)
PART# SPAC Spacers (under every second manifold)
PART# SSSCREWS #10x2” csk head ss screws (for strap bracket to roof)

Locally source pvc pipe and fittings, PL construction mastic, PVC cement and primer or one part cement for plumbing. paint, 1-3/8”OD chain link fence top rail, 6” wide aluminum flashing, PL roof sealant.