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## TILE ROOF INSTALLATION MANUAL ADDENDUM

Refer to the drawing "TILE1000"



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**WEAR EYE PROTECTION AND GLOVES WHEN WORKING WITH THE CA ADHESIVE. FOLLOW PROPER SAFETY PROCEDURES WORKING ON A ROOF. DO NOT ATTEMPT THIS WORK IF YOU ARE NOT TRAINED AND CERTIFIED IN FALL PROTECTION. REFER TO THE HOT SUN GENERAL INSTALLATION MANUAL.**

The biggest mistake people make is gluing the manifolds to each other (PVC CEMENT) and doing that plumbing before gluing the fin tubes to those manifolds. ALWAYS glue fin tubes to manifolds (using CA adhesive) before gluing or connecting manifolds to each other.

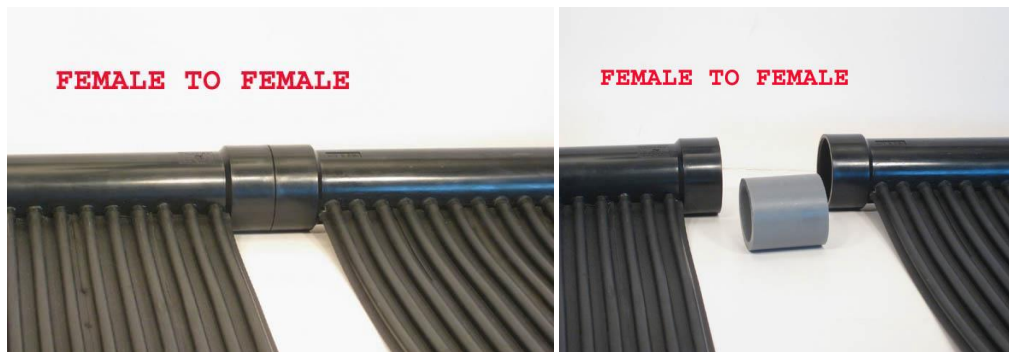
This manual only discusses the methods unique to tile roofs.



Tile roof installations can not be prefabbed. Take care gluing the fin tubes to the manifolds with the CA adhesive. It is important to fully wet the entire surface of the nipples before slipping the fin tubes on 2 tubes at a time. Strip the 6 tube wide fin tubes near the end so that you can work with 2 tubes at a time.

## OVERVIEW:

The fin tubing comes in 88 foot lengths, 3.75 inches in width, including 6 water flow tubes. Three of these strips of the fin tubing fit on one row of tile. A single manifold corresponds to the same one row of tile. A header manifold is 13.5 inches long. In most cases headers will alternate meaning the male ends are connected via couplings (PVC glue-on) and the female ends are connected via lengths of 1.5" pvc pipe. These lengths are determined by the tile row spacing.



REMOVABLE COUPLING SHOWN BUT WE ALMOST ALWAYS GLUE THEM WITH PVC COUPLINGS. Why? Because this way you can never empty the pool onto the roof!

If your tile spacing is tighter than 13.5" you can steal an extra inch by gluing the male end to the female end of two adjacent headers. Read the main installation manual for instructions on the use of PVC cement. We recommend heavy body grey PVC cement for the PVC pipe connections to the headers (no primer). See general installation manual. Apply pvc cement

evenly to female and male ends and slide together with ¼ rotation.

## STEP BY STEP

### 1.0 PLANNING:

You are working with 88 foot lengths so average them out to be less than ½, or 1/3 or 1/4 of 88' and you won't waste any material.

## 2.0 FIN TUBES TO ROOF:

Roll out the 3 fin tubing strips and begin gluing them to the roof starting with PL about a foot from that first manifold. Don't walk backwards on a roof! If you put the fin tubing on the manifold first you have less waste but it's a lot easier to install all the fin tubes first and then trim the fin tubes to match the exact manifold location. Gluing the fin tubing to the roof is done with Loctite (or Lepages) PL Premium 3x (PL). This mastic is runny and things may slide around while the mastic sets up. Depending on air temperature this can take days. If the roof is steep enough that gravity takes over and things won't stay in place alternate with beads of Loctite |Powergrab (we call it PG). Glue down every crest of every tile or every 12"-16" side to side. Use one single continuous bead. PG is tacky and sticks and holds things in place initially while the alternating bead of PL can set up. PG is poor structurally so think of it as the tack and PL as the structural. Let it dry a day before attaching the manifolds. It's a lot easier to control the smaller 12 oz cartridge size tubes and avoid runout between shots.

An alternate (and much easier) method is to stitch the fin tubes to the roof. Stitching allows you to avoid adhesive entirely or add the adhesive later. Florida hurricane code requires the use of PL every 8" side to side but this is overkill for non-hurricane zones. The stitching strip is made by separating one or two tubes of Powerstrip material. It tears along a perforation once started.



Cut fin tubes with an anvil style cutter. Be careful not to nick the tubing away from where you are cutting. You can cut all 6 tubes in one snip.



Use regular solid black vinyl coated electrical wire (12 gage). Cut pieces about 8" long, bend one end 90 degrees, lift tile with a screwdriver, slide the bent end between tiles until you can rotate the wire 90 degrees so it grabs the top of the tile below. This wire can secure the one or two tube wide strip. Use needle nose pliers to bend the wire. This positions and secures all the fin tubing. You can glue it all down later for best

wind resistance. Stitch vertically every row of tiles and horizontally at least every second trough. If you stitch every trough you will get a more consistent wave matching the tiles.

### MANIFOLDS

Know exactly where your manifolds are going before trimming the fin tube and gluing it to the manifolds (using CA). This row of manifolds will sit in a trough. Its very important that the fin tubes come off the manifolds at the same angle and that the fin tubes don't touch the roof next to the manifolds. The manifold assembly will expand and contract with temperature and this movement against the tile will wear the fin tubing and a leak will develop if the fin tube is in contact with the tile. The manifolds and plumbing can rub on the tiles without concern.

It is important to attach fin tubes to headers before connecting manifolds together. You have to inspect the wetted nipples from all angles and you can't do that if the header is glued in place first.

Take the weight of the headers. If the plumbing is secured properly and close to the solar panel array that will often support the weight of the manifolds themselves so they don't creep down the roof.

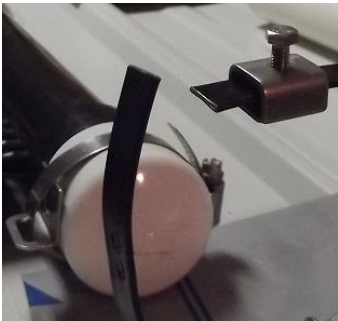


If necessary another method is to slip vinyl coated ss strap through a strap bracket as shown above left. Then just slip it between tiles (lift tiles with a screwdriver) so it catches in the space above the tile.

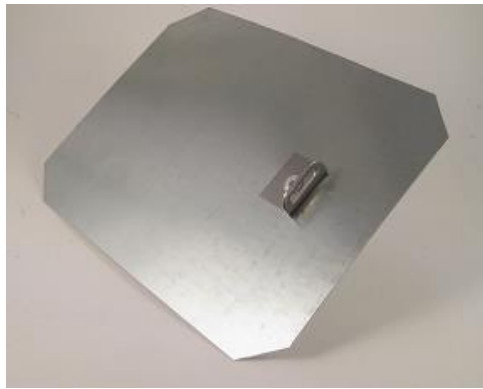
There is wood under the ridge caps that can be used to secure a vinyl coated ss strap (shown above)

A strap bracket riveted to a plate (same hardware to secure the manifolds) glued between tiles using PL can be used as well. A loop of vinyl coated ss strap goes around the manifold and the loop is completed with a strap clamp. Use a strap bracket attached to the

manifold with a hose clamp to secure the strap connection point.



Secure every second manifold to the roof using the same strap bracket riveted to a stainless steel or painted galvanized steel. Also secure at ends of manifold assemblies. If not gluing the plates between tiles (PL) roughen the surface of the metal with sandpaper for better adhesion. If the vinyl coated ss strap position is not perpendicular to the manifold connection secure it with a strap bracket and hose clamp.



### ANGLED MANIFOLDS

Separating into individual tubes at the ends and attaching each tube individually to the header allows you to angle the headers. The headers do not need to be perpendicular to the flow!



If the manifolds are angled it means there is more space between manifolds. You`ll need a glue-on PVC coupling for each male end to PVC pipe or you can alternate the directions where male ends are connected via pvc couplings and female ends are glued together via varying lengths of pvc pipe to line manifolds up so they correspond to the fin tubes row by tile row. For more on corners and angled headers refer to the general installation manual. SEE drawing TILE1000

## FINISHING



Assemble the manifolds at the other end to the fin tubes first, then to each other and secure to the roof using the same methods described. It's very important you don't try to glue the headers to each other first. . A chalk line can be helpful. Pay close attention that the fin tube doesn't shift. The glue (PL and PG) take a while to dry.

Complete the stitching to the roof or the gluing with alternating beads of PL and PG as described earlier (or both). The straps go every trough which is approximately every foot and stitch to the roof at every single row of tiles. Its one stitch for every square foot. You might want to complete the plumbing first and run water thru the system to keep the surface cool as you crawl around on it. Hot Sun collectors can be very hot in hot sun.

## PLUMBING

Always paint any piping exposed to the sun. We recommend paint that comes in a can as opposed to spray paint. Acrylic based paint is best for pvc. Painting the manifolds further protects them from the sun. Make sure all the PVC cement is dry before painting.



The vacuum breaker should be teed off the pipe entering the bottom corner of the bank of collectors. Use Teflon tape on the 1/2" threaded connection. Wrap the Teflon tape around the threads 5 times clockwise. The vacuum breaker sits vertically.

Provide a means to drain the bottom dead corner. See drawing TILE1000

Refer to the general installation instructions for plumbing and start up.