RACK MOUNTING OF POWERSTRIP
SOLAR COLLECTORS

This manual addendum deals strictly with the actual rack structure itself. If you’re mounting the collectors “sideways glue down” then refer to the sideways glue down manual addendum for shingle roofs. Similarly if you’re strapping the system to the rack conventionally so the flow goes up the rack refer to the conventional shingle roof mounting schemes and instructions.

If the ground space is steep, and the location is desert like then consider a direct ground mount installation. See that manual addendum. This document covers how to build a structure for solar panels.

FOOTINGS:

Pier blocks or deck blocks are great. They save you the trouble of pouring concrete, forms, hassle etc.

If you are building a rack that won’t be far off the ground then maybe it doesn’t even need footings. Maybe the whole thing can just sit on the deck blocks. If you go that route then sheet the outside of the rack in to prevent wind lift. That’s not a bad idea anyway as wind will steal the heat off the back of the collector.

Always try to block the wind on a ground level installation because…you can!

If there is any wind lift potential at all then you need to properly anchor the structure. Concrete footings on sloped earth need to be deep enough to meet local codes. Check with your building department for local codes. Patio covers and decks are similar structures. The loading on something like this has little to do with
the solar panels and much to do with the wind load. 100 mph wind load requires a lot more structure than the 1-2 pounds per sq ft weight of solar panels full of water.

A major consideration with rack construction is to keep the solar heater from being too far under water. If the top of the rack is at pool level that’s fine as long as the pool pump isn’t too powerful and the pressure from the pool mechanical system isn’t too great. That in and of itself is an important consideration covered in other documents. If the bottom of the collectors is 20 feet below pool level then you just built 20 feet of head or 9 psi into the system before you turned the pump on. Instead of 30 foot collectors going down the hill you may instead want to use a wider footprint and less space up and down the slope. In that case you would want to use our sideways glue down configuration rather than our conventional orientation with flow going up the slope. Either way its best to sheet the rack surface with plywood and cover it with a roofing material same as any other roof like structure you would build outdoors. You can however save some money going with wood slats on the surface of your rack and spacing them with about a 6” gap between the slats but only if the collector orientation is conventional (flow up the slope).

As you can see from the photos above the basic rack surface structure is no different than standard wall construction. You can use pressure treated 2x4’s on 2’ centers with a header and a footer. This wall lays against beams that can be made of 2x6’s. These beams should be spaced no more than 8 feet apart. Attach the 2x4’s to the 2x6 beams with hurricane ties or other means.
Don’t use nails. Invest in deck screws. It’s worth the extra few dollars and it makes things so much stronger. The posts that support the beams should be treated 4x4 posts. They should be spaced every 6 feet along the beams. If you want to sheet the surface with plywood and avoid the wood slats shown above then space the 2x4’s carefully and add 2x4’s under any plywood sheet edge. If you use wood slats you can use low cost fir strapping and then stain or paint it afterwards. We always use redwood because in a contract installation time is where the dollars add up. Cedar is another wood that can be used untreated.

STEP BY STEP- FULLY SHEETED RACK

First run a string line where one of your beams will be placed. Every 6 feet either dig a footing or place a deck block. Make sure the ground is solid otherwise you need to dig down to a good base. If a 4x4 post is to be set in the dirt pour concrete around it to shed water. You don’t want water to puddle around a wood post. It will not rot if it can dry naturally.

The second beam is not shown above. Due to the ground slope it’ll be a tight fit and there will be a big cantilever involved. The beam will sit right on the deck blocks and footings.

Space the treated 2x4”rafters” using the actual sheets of plywood so you can make sure the edges of the plywood are centered along the 2x4’s edge.
On this example we are using the Powerstrip sideways glue down configuration with staggered headers. There will be no spaces between the fin tube sections. Each nominal one foot wide section will require 11.25”. See the shingle roof sideways glue down manual addendum for more detail on the collector mounting.

Obviously you need to build your rack to fit the solar panel arrangement. With Powerstrips you can make them any length but you want to optimize the use of material. 18”, 22”, 30” and 44” make good length choices because the raw material comes in rolls that are 4 inches (3.75” actual) by 88 feet long.

Next you roof over the plywood. You can use composition shingles but roll roofing is lowest cost. Follow the instructions for whatever roofing material you choose. Here we tarred the sheets down with a compound called “Henry’s”

A metal edging sold with the roofing material is used around the perimeter. You’re building a roof surface so go along with the standard roofing practice for whatever roofing material you choose. Note you could use metal roofing. You would have needed some wood slats to interface between our structure and the metal roofing. Note that in the sideways configuration we use glue strips every 2 feet. The glue strips glue down to metal roofs very effectively. The shingle or roof roofing material also adheres to the glue strip well using construction mastic but we use additional screws anyway. The screws can hit the rafters. The Powerstrip glues to the glue strip using construction mastic. The staggered headers are plumbed and secured to the surface the same as if this was a sideways shingle configuration. When running powerstrips sideways there does not need to be any slope. It doesn’t hurt as this will reduce puddling between the tubes. If this was a conventional orientation you’d want one end higher than the other because air has to be released. See Plumbing at www.h2otsun.com/PG5ht.html With that in mind it would make sense to not make the beams horizontal. Instead give them a slight slope from the feed side to the return side. Then the
collectors are oriented true to the rack and the rack itself achieves the slope we want for air release in the case of conventional and water run off in the case of sideways configurations.
CONVENTIONALLY ORIENTED COLLECTORS ON A RACK WITH WOOD SLATS

Same thing exactly but the collectors are strapped down same as in the case of a shingle roof conventionally mounted system. Instead of a plywood surface with roofing we just use wood slats. Its less expensive and its not as good because air moves through it.