



Can Apricus collectors be used for pool heating?

This is a question that is often asked by those interested in solar water heating, as heating swimming pools is very expensive, and solar would seem like the perfect way of reducing energy costs.

Evacuated tube solar collectors or flat plate collectors for that matter are NOT generally used for pool heating, the reason being that pools have a huge amount of water and even a 2-3°F/°C rise in temperature requires a massive amount of heat. This is why gas heaters and not electrical resistance heaters are normally used.

For pool heating the most widely used form of solar heating is using flexible rubber matting through which the pool water flows. This has both advantages and disadvantages, namely:

Advantages:

- Low cost
- Can cover entire roof space, so large absorber area
- Corrosion resistance (only PVC and rubber)
- Long lasting and maintenance free (see disadvantages)
- In good weather can produce large amount of heat

Disadvantages:

- Perform well only in warm ambient temperatures (ie. high heat loss rates)
- Can only extend the swimming season by 4-6 weeks either side of summer
- May be damaged by birds, in particular parrots (the rubber is soft)

So for pool heating this form of solar thermal collector is probably the best to use.

If it is a spa or hot-tub that needs to be heated, then Apricus solar collectors CAN be used, as the water volume is generally only about 1500-2000L. That being the case and given the need to only maintain water temp, not bring it up from cold to hot each day, the solar collector can do a good job. In fact this is ideal for a house that has a large system to provide some house heating, as the excess heat in the summer can be used to heat the spa/hottub.

Just so you understand the energy calculations (using metric, because it is so easy).

First a Swimming Pool:

10x20x5' pool is 1000ft³ or 92.9m³ = 92,000L of water (a lot!).

If the temp loss each day is say 3°C / 5.4°F then the heat input required is:

92,000 x 3 = 276000 kcal = 321kW of energy. That is a lot - you can imagine the bill if the pool was heated by electricity!!

321kW would require about 32 x 30tube solar collectors!! Too many in terms of both space and cost for most applications to consider.

If we look at a Spa however the figures are much better:

1500L of water maintained at 40°C / 104 °F with temp loss of 7°C / 12.7°F per day (higher heat loss than a pool as the delta-t with ambient temp is high).

1500L x 7 = 10500kcal = 12kW of energy - that can almost be provided by one 30tube collector in peak summer. If the house had 2 x 30tube collectors they would have enough heat for the domestic hot water and spa heating - with almost no need to any additional boosting in late Spring, Summer and early Fall/Autumn.

Summary:

1. Apricus solar collector are NOT recommended for Swimming Pools.
2. Apricus solar collectors are PERFECT for spas or hot-tubs.
3. Apricus solar collectors can be configured to provide both domestic hot water and spa heating via an external brazed plate 316SS heat exchanger (or equivalent) setup; drawing hot water from the storage tank, and exchanging with the spa water.
4. Apricus solar collectors can be used DIRECTLY to heat spas with the water flowing through the header.
5. Heating the pool with solar IS a good method of dealing with excess summer heat. Eg. When the tank temp reaches 65oC, a fresh hot water circulation pump and the pool pump come one circulating water in opposite directions through a heat exchanger – thus heating the pool.
6. Corrosion – If heating a spa directly with the collector, spa water chemistry must be well controlled (as with a gas pool/spa heaters). Alkalinity, pH and calcium hardness should be maintained as per the Langelier Saturation Index, and free chlorine no higher than 3ppm, otherwise the copper may be susceptible to corrosion. The warranty on the collector header does not cover leaking as a result of corrosion, so the consumer should be instructed to properly maintain their spa water.
7. Remember that the efficiency of the solar collector depends on three factors, the solar radiation level (insolation), water temperature and ambient temperature. Evacuated tube collector outperform other collectors in applications where there is a high Delta-T (water temp – ambient temp) such as domestic hot water or spa heating. They will perform well, but will not outperform plat plate collectors in low Delta-T applications like pool heating; but as explained, neither flat plate nor evacuated tube collectors are ideal for pool heating due simply to the cost per m2 of such collectors given the huge amounts of heating required.