



DISCUSSION ON SOLAR POWERED SWIMMING POOL PUMPING

THE LORENTZ PS600 BADU TOP 12

uses environmentally friendly solar-electric (PV) power to pump and circulate water through the filtration system of swimming pools. A conventional pool pump is often one of the largest electrical loads in a home, possibly consuming more electricity than the electric geyser. A solar powered pump is practical and complements seasonal requirements, because the need for filtration is greatest during summer and sunny weather. It also complements pumping through solar heat collectors because the circulation requirement corresponds with solar intensity.

Performance estimates are conservative because our precision pump sizing results in lower pressure losses than in conventional systems in which the pump is usually oversized..

Power requirements:

Typically, circulation of the pool volume equivalent every 1 to 1.5 days is sufficient, and systems can be sized accordingly.

Many, if not most conventional pool pump systems are over designed, and commonly use a 1HP (750W) or even bigger motors. A 1HP pool pump operates at about at about 150LPM / 40GPM, resulting in a backpressure of the filter and piping of about 0,8-1 bar (11-14 PSI). Such pumps draw at least 1kW power from the grid.

The solar pool pump uses the inverse quadratic relationship between flow rate, back pressure and power to its advantage.

Thus a reasonable flow reduction of 30% compared to conventional pumps (mostly oversized) would reduce pressure drop to 49% and the power requirement to 34%. If a pump is selected that is efficient at this reduced range, then a substantial saving can be realized. If the pump is more efficient than the original pump, then the saving will be even greater.

This is the case with the Lorentz PS600 Badu Top12 system. The pump side (Badu Top12) is selected for efficiency at reduced flow, plus the specialized Lorentz pump motor has 90% efficiency and is well matched to the pump. The result is a 40% more efficient pump/motor unit than a conventional AC arrangement.

This optimization means that PS600 Badu Top12 with a 350-400Wp solar array will be sufficient for a 50-60cum pool in most inland areas of South Africa, to assure clean water conditions.

AC Backup

In case of retrofits, it is recommended that the existing AC pump remains in place with the solar pump connected(plumbed) in parallel. Alternatively an optional AC/DC power supply (Power Pack) is available to operate the PS600 Badu Top12 system from 230Vac mains. The pump can draw from the solar array and the Power Pack simultaneously, drawing solar power as priority.

Pool sweeping / cleaning

For hand sweepers the pump is generally strong enough around the midday sun hours.

In the case of automatic pool cleaners (Kreepy Krauly, Barracuda etc) initial experience indicates that the modern efficient types can operate effectively provided that the solar array size is >400Wp, and provided other system variables are optimized (unlogged filter, minimum piping and bends, pump not installed above water level etc) Alternatively the existing AC pump(if in place) or the AC Power Pack could be used from time to time for this purpose

Solar tracking option

Trackers are available which move the solar array, tracking the sun during the course of the day. Solar tracking can increase the daily flow throughput substantially, and may be consideration particularly for larger systems. However it needs to be ascertained whether a tracker is cost effective as well as practical and feasible – for example, tracker arrangements are normally not suitable where the solar panels are to be roof mounted.



SELECTED SWIMMING POOL SYSTEMS						
TOTAL DYNAMIC HEAD m	or BACK PRESSURE kpa *	SOLAR ARRAY peak watts	Performance Fixed Array			
			cum per day approx	max. pool volume**		
2	20	300	55	75		
		480	90	120		
		600	105	150		
4	40*	300	30	40		
		480	65	90		
		600	80	110		
6	60	375	26	35		
		480	44	60		
		600	61	85		
7.5	75	480	24	35		
		600	39	55		

* 40kpa is typical back pressure in a system that is sized according to this selection table. Low-friction (2") piping and a large filter can reduce it further. ** Max. pool volume is based on a turnover of 70% of pool volume per day. For faster turnover, choose a higher volume system. Daily performance is based on solar irradiation of 6 peak sun hours on a tilted surface per day and 17% degradation of the array output due to heat, dirt, and manufacturer's tolerances.

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