Liquid Pool Covers Save Energy

Some years ago when this editor first heard of a "liquid pool cover" I was somewhat sceptical. OK, I just plain didn't believe it. Then when I heard that, originally, the Japanese came up with it, I began to pay attention. This innovative one-molecule-thick surfactant fluid was intended to be poured on miles of rice paddys in order to extend the growing season with the resultant warmer water. Distribution of the chemical over large areas was apparently a problem, requiring downwind dispersal and many introduction points. Still, it worked; they produced a *lot* more rice.

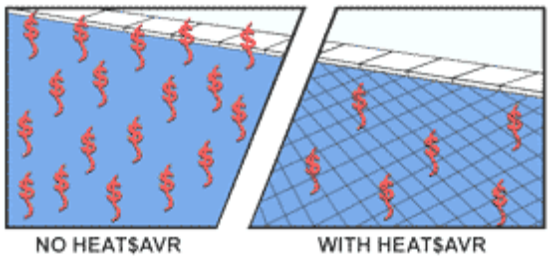
The new products as introduced to the pool industry, however, seemed to fizzle. That was ten years ago. I heard no more until a newly patented evaporation-retardant showed up on the market just this year with an infinitely better dispersion characteristic, and we at PPOA decided to run some tests. Let's see if this invisible layer, streaking over the top of our pool, will really stop those dreaded evaporative losses…

Before we get to the encouraging results of the product testing, however, we should review where those pool-blanket energy savings really come from. Were talking now about those physical (mechanical) pool covers discussed in PrP#15 and put forth in the Aquatic Facility Operator course as the "most energy-saving product ever to be used at a swimming pool" – bar one. This extremely important concept remains a highly significant yet little understood bit of science as pool owners consider the use of pool-blanket systems to save energy and to extend the swimming season.

In the simplest terms, swimming pool blankets *stop evaporation.* Its only incidental that some insulate to a small degree. Insulation, the property usually attributed to "blankets", contributes from one to three percent of the energy savings for pools. *Evaporation retardation* is overwhelmingly the larger contributor.

Without delving into the physics too deeply, a brief "scientific" explanation helps our pool operator to understand the significance of evaporation: Water, that master-standard chemical, requires just one calorie per millilitre (cubic centimetre) to raise its temperature exactly one degree Centigrade. Conversely, it loses one calorie as the temperature drops one degree. However, vastly increased amounts of energy are either given off or required to be "taken in" for changes of *state* – that's the transition between the *vapor, liquid* and *solid* states of water. For the shift from liquid to vapor, the energy required is called the "heat of vaporization " – and that value is 540 calories. *It takes five hundred forty times as much energy* to vaporize any quantity of water than it does simply to raise that same quantity of water than it does simply to raise that same quantity of water one degree Centigrade! That's a killer of a statement. Read it again…

Anything, including this safe magical liquid, which stops evaporation, can save you big, big money.



Obviously, wind and humidity as well as radiant energy and ground conduction affect the energy losses, but not enough to invalidate the concept. The point is this: a membrane stretched across the surface can halt evaporation entirely, thus saving a huge portion of heat energy which otherwise would be lost! And that membrane can be

anything; it could even be Visqueen or Saran Wrap! Something more substantial, removable and reusable has been the better idea, of course. This is until now, with a safe, liquid chemical one can simply pour on or feed with a small pump!

Here at the PPOA test pool, our experiments were empirical, attempting to minimize outside variables as much as possible but acknowledging that one day is never like the next. A modest quantity of the new chemical was provided for testing by the manufacturer just about the time that California started having very cool nights. For a ten-day test period we dribbled a little over one ounce of the liquid on a 480 square-foot pool most evenings. Results have been summarized in the table below, where the liquid made a dramatic improvement in the nightly losses. A "hard" cover has been used on this pool at night (often all day too) for years, so the losses and gains – with a solar-panel heat source – are very familiar. We wanted to see if the liquid system could come close to matching the blankets performance. We were pleased. And we didn't have to drag that heavy cover on the pool every evening after our first glass of wine!

Energy conservation with a pool blanket or a retardant is a complex subject, and accurate calculations are difficult. But the proof is in the puddin' (or the savings) and pool owners are finding that while eight hours of "cover time" a day can save up to one-half of their heating costs, 24 hours of a slightly less effective but infinitely easier evaporative retardant can do about the same thing, even while the swimmers are doing *their* thing. A hard cover can pay for itself (with a lot or work) in six months of use or less; the liquid, as the primary or as a supplement cover, can do so even faster – even though the cost per gallon of this alcohol-based stuff appears at first glance to be prohibitive.

The only question that hasn't been answered is this: If this long-chain organic molecular layer greatly limits the evolvement of water vapor, does it also impede the nitrogen and trihalomethange gassing off during breakpoint chlorination? It appears not to be a problem so far in field performance, however the science has yet to be explained.

PPOA gives this product a score of A-, a pretty high grade in the current world of aquatic snake oil. For information and much more scientific data on this product, call Flexible Solutions at **1.800.661.3560** check the website at www.flexiblesolutions.com.

Cover Type	Avg. Day Temp.	Avg. Night Temp.	Max. Water Temp.	Loss Overnight	Net Daily Results
No Cover	92	55	76	12 degrees F.	6 degrees loss
Hard Cover	92	55	84	4 degrees F.	8 degrees gain
Liquid Cover	92	55	82	6 degrees F.	6 degrees gain
Liquid Cover twice/day	92	55	83	5 degrees F.	7 degrees gain