

What is the largest source of energy loss?

HOW POOLS LOSE HEAT

Pools lose energy in a variety of ways, but evaporation is by far the largest source of energy loss for swimming pools.

The reason evaporation has such an impact is that evaporating water requires tremendous amounts of energy. It only takes 1 Btu to raise 1 pound of water 1 degree, but each pound of 80 water that evaporates takes a whopping 1048 Btu's of heat out of the pool.

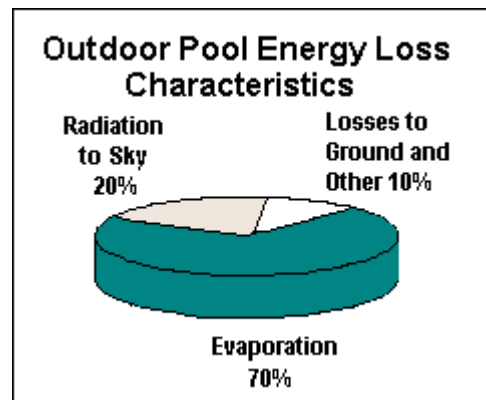
WHY POOL COVERS

Since evaporation is the major source of heat loss for all swimming pools, to minimize evaporation one must cover the pool. Covering the pool with a pool cover when it is not in use is the single most effective means of reducing pool heating costs. Savings of 50-70% are possible.

ENERGY LOSS

The diagram below illustrates the impact of evaporation on the total energy consumption of the outdoor pool.

The evaporation rate from an outdoor pool varies depending on the temperature of the pool, the temperature and humidity of the air, and the wind speed at the pool surface. The higher the pool temperature and wind speed and the lower the humidity, the greater the evaporation rate.



TYPES OF POOL COVERS

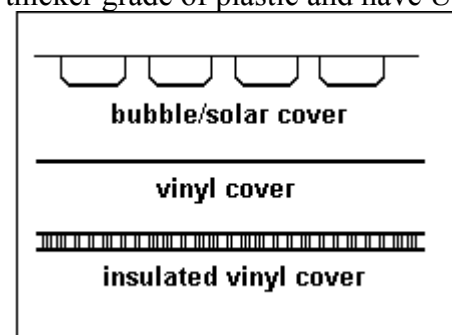
Technically, all you really need is a large sheet of plastic. Plastic meets the requirement of being a vapor barrier. But a large sheet of plastic that you get from the lumber store is probably not your best choice. It will be very difficult to handle and store, doesn't help heat your pool, it tears easily, and sunlight will deteriorate it rapidly. You can use it, but it will be very inconvenient and will only last 1 to 2 seasons max.

There are a number of manufacturers that produce covers designed specifically for swimming pools. They can be made of different materials, such as UV stabilized polyethylene, polypropylene, or vinyl. They can be transparent or opaque. They can be light colored or dark colored.

One of the lowest cost covers made specifically for swimming pools is the bubble cover (some call them solar covers). They are similar to bubble packing material except that they use a thicker grade of plastic and have UV inhibitors, etc.

Vinyl covers are a heavier material and have a longer life expectancy. You can also get insulated vinyl covers with a thin layer of flexible insulation sandwiched between two layers of vinyl.

Outdoor pools gain heat from the sun, absorbing 75-85% of the



solar energy striking the pool surface. This is an important contribution to the pool heating needs.

So when considering a pool cover, note that a pool cover will also decrease the solar gain contribution to the pool to some extent, depending on the type of pool cover used. A transparent bubble cover may reduce pool solar energy absorption by 5-15%, and a completely opaque cover by 20-40%.

METHODS OF USE

There are several ways of covering your pool. The simplest and lowest first cost method is to manually pull the cover on and off, fold it, and place it somewhere out of the way. If you are paying someone to do this, you need to consider that cost in your economic evaluation. You can also purchase a pool cover reel that can be used to manually roll the pool cover up. The reel, usually on wheels, can then be rolled out of the way.

Semi-automatic covers use a motor driven reel system. They use electrical power to roll and unroll the cover, but usually require someone to pull on the cover when unrolling, or guide the cover onto the reel when rolling the cover up. They can be built into the pool deck surrounding the pool, or can use reels on carts.

Automatic covers have permanently mounted reels that automatically cover and uncover the pool at the push of a button. They are also the most expensive first cost option. But you have to weigh the cost of labor for the manual and semi-automatic covers to determine which route is best for your particular situation.

Some pool covers are fitted into tracks along the sides of the pool. This prevents anything or anybody from getting into the pool. They even support the weight of several people. If liability is a concern, these are a good option to explore. They can be run manually, semi-automatically, or automatically.

WHEN TO USE A POOL COVER

For pools which are open all day, a cover should be placed over the pool as soon as it closes, and taken off just before it opens for the day.

For pools which are not in use during daylight hours, the effectiveness of a pool cover will depend on whether the evaporation and other losses prevented by the cover exceed the solar gain reduction caused by the cover. This balance is affected by the type of cover and the climate. In dry and/or windy conditions the evaporation rate of the pool increases, and it is generally beneficial to have a transparent or bubble cover on during daylight hours. In warm, humid conditions the evaporation rate decreases, and it may be more beneficial to leave the cover off during the daytime.

OTHER BENEFITS

Pool covers also provide many other benefits beside the tremendous energy savings. They conserve water by reducing the amount of make-up water needed by 30-50%. They can reduce chemical consumption by 35-60%. They also cut cleaning time by keeping dirt and other debris out of the pool.

It is highly recommended that the first step to cutting pool energy loss be the evaluation of the economics of using a swimming pool cover.

(To clarify, we are not talking about pool covers that you use to cover the pool in the off season or mesh safety covers. Those do not save energy. We are talking about plastic or vinyl pool covers that you use during the swimming season when the pool is not in use.)

What is the best way to heat my pool?

SOLAR HEATING SYSTEMS

One of the most cost-effective uses of solar energy is to heat swimming pools. Swimming pools require low temperature heat, which is where solar collectors are most efficient.

The pool water is circulated directly through the collectors and the system does not require a storage tank. The pool serves as the storage tank.

Solar pool heating systems can provide up to 100% of your pool heating needs. They are also much simpler to install than are other forms of solar systems. The combination of a solar pool heating system and the use of a cover at night can greatly extend the length of your swimming season with minimal operating costs.

HIGH EFFICIENCY HEATERS

High efficiency gas heating systems are available with steady state efficiencies as high as 97%. Electric heat pump pool heaters are also available with coefficients of performance (COPs) in the 6.0-8.0 range when operated in warm weather. A COP of 6.0 is 600% more efficient than an electric resistance heater.

EFFICIENT OPERATION

Consider carefully the temperature that you keep the pool water. Each degree rise in the temperature can cost you an additional 10%. The National Swimming Pool Foundation recommends 78-80 for active swimming and 82-84 for general use.

It's a myth that it takes more energy to heat a pool up when you turn the temperature down than you save by lowering the temperature or by turning off the heater. Turn the temperature down, or turn off the heater whenever the pool will not be used for several days. Experiment to determine how long it takes to heat it back up. Lowering the temperature and raising it back up again always saves more energy than keeping it at a constant temperature.

Keep all the intake grates clear of foreign debris. Clogged drains require the pump to work harder.

Don't backwash your filter more frequently than necessary. Backwashing too frequently wastes water, while not backwashing wastes energy by requiring the pump to work harder.

Tune up your pool heater annually. A properly maintained pool heater is more efficient.

What should the temperature of a swimming pool be?

The decision on how warm to keep the pool is up to the individual owner. The pool temperature recommended by the American Red Cross for competitive swimming is 78 degrees F. However, this may be too cool for young children and the elderly who may require 80 degrees F or higher. The typical range is 78 - 82 degrees F.

How do I startup my pool?

1. Fill pool to mid-skimmer level
2. Begin filtering pool water. When bubbles from return line cease, **immediately** add the proper amount of D.E. (diatomaceous earth). The size of your filter will determine the amount of D.E. needed for proper operation. The Sequel I requires 1 ½ lbs. while the sequel II requires 2 ½ lbs of D.E. Pour D.E. slowly into the thru-wall skimmer. D.E weighs ½ as much as coffee.
3. “Shock” the pool AFTER SUNDOWN using 1 gal. of liquid chlorine per each 5,000 gal. of pool water. “Shock” is liquid chlorine, the least expensive way to establish an acceptable chlorine level. It is an excellent disinfectant and effective in “bleaching out” water. Pour the required amount of “shock” (see attached chart) directly into the pool water, pouring slowly (be careful not to splash on clothing) around the perimeter of the pool while filter is running. Continue to circulate water at least two hours.
4. Using the test kit provided, test the pH of the pool water. If the test shows very pink (7.8 & above) lower the pH using approximately ½ cup *LO N SLO* (pH minus). If the water tests low (7.1 & below) the test will be very pale pink, clear or yellowish. Adjust this by adding approximately ½ cup *BALANCE PAK 200* (pH plus). It is suggested that you adjust pH with several small doses until you become accustomed to your pools needs. These chemicals may be broadcast over the water surface in its dry form. If the pH reads between 7.2 and 7.6, the water is in balance and no adjustment is necessary.
5. AFTER pool is clear, AND IF the filter has good pressure, (backwash if water pressure back to pool is diminished), turn on pump and slowly add 1 lb. *STABILIZER 100* directly into the thru-wall skimmer. Continue to run your filter for 24 hrs. and DO NOT backwash for at least 4 days. This chemical protects the chlorine from the sun and stabilizes the chlorine level. Be sure to check your cyanuric acid (stabilizer) levels each year.

BIO-GUARD ONCE-WEEK 3-STEP PROGRAM

Let's face it, you got a pool to use it, not CLEAN it. Nevertheless, you have to clean it sometime. Thanks to our 3-Step Pool Care Program, that's only once a week. From start to finish the program takes just minutes of your time. That's minutes instead of hours to keep your pool water crystal clear and brilliant.

1. **Sanitize** with *SMART STICKS*; Test the Cl (chlorine level). It should remain high for several days to a week after shocking your pool. When the chlorine level drops to approx. 2.0 on your test kit, place proper amount of *SMARTSTICKS* (see chart) into your skimmer basket. Top off with 1 or 2 sticks as sticks start to dissolve. Alternative: Chlorine tabs in a floating chlorinator.
2. **Oxidize** with *SMART SHOCK*; Add 1lb. *SMART SHOCK* for every 12,000 gallons **weekly**. Swimmers can re-enter the pool 15 minutes after treatment. Alternative: 1 Gallon pool shock for every 15,000 gallons; swimmers can re-enter pool once Chlorine drops to 5ppm (usually 6-10 hrs.)
3. **Algae Prevention** with *BACK UP*. Add 1 fl. Oz. *BACK UP* weekly, for every 5,000 gallons, to prevent algae before it starts. For pools with attached spas, fountains and other water features, *ALGAE ALL 60* is recommended.

POOL CARE HINTS

1. SUPER CHLORINATE pool water weekly, especially during the hot weather.
2. Never add more than one chemical at a time to the water allow one chemical to “disappear” before adding the next. Always add chemical to water, never water to chemicals.
3. Skim the pool of leaves, twigs, dust, and bugs periodically to reduce chlorine consumption. Filter an average of 12 hrs. per day, longer or continuously in very hot weather or when water is cloudy.

Use a *SKIMOR* (skimmer sock) in your skimmer basket to help keep debris out of your filter.

4. WINTERIZE in the fall. Call for instructions before you lower the water!!

START UP CHEMICAL CHART

		Gallons	<i>BACK UP</i> oz.	Liquid Shock	Conditioner
18'	Flat	6,700	8	1 gal.	2 lbs.
18'	Deep	8,800	9	2 gal.	3 lbs.
21'	Flat	9,160	10	2 gal.	3 lbs
21'	Deep	12,000	14	2 gal.	4 lbs
24'	Flat	12,150	16	2.5 gal.	4 lbs
24'	Deep	16,500	22	3 gal.	5 lbs
28'	Flat	16,500	22	3 gal.	5 lbs
28'	Deep	22,500	30	4.5 gal	7.5 lbs
32'	Flat	22,000	30	4.5 gal.	7 lbs
32'	Deep	30,000	32	6 gal.	9 lbs
16'X32'	Flat	12,250	16	2.5 gal.	4 lbs
16'X32'	Deep	14,625	18	3 gal.	5 lbs
18'X34'	Flat	14,625	18	3 gal	5 lbs
18'X34'	Deep	19,340	24	4 gal	6.5 lbs
18'X38'	Flat	16,200	20	3 gal	5.5 lbs
18'X38'	Deep	21,240	26	4 gal	7 lbs
21'X41'	Flat	20,325	24	4 gal	7 lbs
21'X41'	Deep	26,000	32	5 gal	9 lbs

BIO-GUARD ONCE-WEEK 3-STEP PROGRAM

		Gallons	<i>SMART STICKS</i>	Chlorine Tabs	<i>SMART SHOCK</i>	Liquid Shock	<i>BACK Up Algae</i>
18'	Flat	6,700	1	1	½ lb	1/3 gal	1 oz
18'	Deep	8,800	1	1	½ lb	½ gal	1 ½ oz

21'	Flat	9,160	2	2	1 lb	½ gal	2 oz
21'	Deep	12,000	2	2	1 lb	½ gal	2 oz
24'	Flat	12,150	2	2	1 lb	½ gal	2oz
24'	Deep	16,500	3	3	1 ½ lb	¾ gal	3 oz
28'	Flat	16,500	3	3	1 ½ lb	¾ gal	3 oz
28'	Deep	22,500	4	4	2lb	1 gal	4 ½ oz
32'	Flat	22,000	4	4	2lb	1 gal	4 ½ oz
32'	Deep	30,000	5	5	2 ½ lb	1.5 gal	6 oz
16'x32'	Flat	12,250	2	2	1 lb	½ gal	2 ½ oz
16'x32'	Deep	14,625	2	2	1 lb	¾ gal	3 oz
18''x34'	Flat	14,625	2	2	1 lb	¾ gal	3 oz
18'x34'	Deep	19,340	3	3	1 ½ lb	1 gal	4 oz
18'x38'	Flat	16,200	3	3	1 1/2	¾ gal	3 oz
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21'x41'	Flat	20,325	4	4	2lb	1 gal	4 oz
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How do I winterize my pool?

As the swimming season wanes, continue to keep the pool water clean and clear until the pool is either covered or freezes over. Winterizing is recommended at the end of September for covered pools, and about Halloween for uncovered pools.

The Pool and Spa Center has service technicians available to perform the winterizing of your pool.

Maintain a chlorine reading of 1.0 ppm at all times until it is time to shock the pool for winter. Remove debris from pool at least weekly and filter a minimum a four (4) hours per day. This will facilitate a considerably easier spring start-up.

1. Remove ladder (may be done as soon as you have stopped swimming)
2. Adjust pH if necessary
3. Vacuum pool well
4. Backwash filter Long
5. Lower water 6" to 10" below the return line (siphon with a garden hose, but don't forget it or you will drain the pool!)
6. "Shock" the pool and stir with hand skimmer (1 gal. Per 5,000 gals pool water)
7. Add algaecide according to maximum dose, Stir

8. Remove filter and pump from pool. Separate the top and bottom halves of the filter and rinse out any remaining D.E., cleaning the grids thoroughly. Store the pump and filter inside. If the filter grids appear clogged with oil or crusted with lime or calcium, soak grids for 24 hrs. in a filter cleaner. You may choose to use this product if water pressure to pool, after a backwash, is less than original pressure or if you have very hard water.
9. Cover pool (optional) Most covers are made to lay on the water.
10. Check chlorine level just before pool freezes; add shock to reach a 10ppm chlorine reading as close to freeze as possible. (Not normally necessary for covered pools. They should be shocked just before the cover is attached.)

Option: Uncovered pools can be drained down and filters removed in late Sept. or early Oct. DO NOT shock the pool at this time. Keep chlorine level at 1.0 or 1.5 and remove leaves periodically until pool is about to freeze. Shock the pool just before freeze. Stir with hand skimmer.

SPRING

1. As soon as an uncovered pool thaws, "shock" the pool water with the usual 1 gal. "shock" per 5,000 gal. pool water. Maintain a chlorine reading of 1.0 ppm until swimming begins. This prevents algae from taking over your pool.
2. Add algaecide according to maximum dose, Stir
3. Remove large debris as soon as weather permits.
4. Refer to the Spring opening instructions.
5. HAPPY SWIMMING!!

What is the Bio-Guard Once-A-Week 3 Step Program?

Let's face it, you got a pool to use it, not CLEAN it. Nevertheless, you have to clean it sometime. Thanks to our 3-Step Pool Care Program, that's only once a week. From start to finish the program takes just minutes of your time. That's minutes instead of hours to keep your pool water crystal clear and brilliant.

1. **Sanitize** with *SMART STICKS*; Test the Cl (chlorine level). It should remain high for several days to a week after shocking your pool. When the chlorine level drops to approx. 2.0 on your test kit, place proper amount of *SMART STICKS* (see chart) into your skimmer basket. Top off with 1 or 2 sticks as sticks start to dissolve. Alternative: Chlorine tabs in a floating chlorinator.
2. **Oxidize** with *SMART SHOCK*; Add 1lb. *SMART SHOCK* for every 12,000 gallons **weekly**. Swimmers can re-enter the pool 15 minutes after treatment. Alternative; 1 Gallon pool shock for every 15,000 gallons; swimmers can re-enter pool once Chlorine drops to 5ppm (usually 6-

10 hrs.)

- Algae Prevention** with *BACK UP*. Add 1 fl. Oz. *BACK UP* weekly, for every 5,000 gallons, to prevent algae before it starts. For pools with attached spas, fountains and other water features, *ALGAE ALL 60* is recommended.

It's as easy as 1-2-3!

BIO-GUARD ONCE-WEEK 3-STEP PROGRAM

			<i>SMART STICKS</i>	Chlorine Tabs	<i>SMART SHOCK</i>	Liquid Shock	<i>BACK Up Algae</i>
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18'	Deep	8,800	1	1	½ lb	½ gal	1 ½ oz
21'	Flat	9,160	2	2	1 lb	½ gal	2 oz
21'	Deep	12,000	2	2	1 lb	½ gal	2 oz
24'	Flat	12,150	2	2	1 lb	½ gal	2oz
24'	Deep	16,500	3	3	1 ½ lb	¾ gal	3 oz
28'	Flat	16,500	3	3	1 ½ lb	¾ gal	3 oz
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16'x32'	Flat	12,250	2	2	1 lb	½ gal	2 ½ oz
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18'x38'	Deep	21,240	4	4	2 lb	1 gal	4 oz
21'x41'	Flat	20,325	4	4	2lb	1 gal	4 oz
21'x41'	Deep	26,000	4	4	2 ½ lb	1 ½ lb	5 oz

What is the suggested regular pool maintenance schedule?

Daily

- check water levels and fill to recommended level
- test water for pH and sanitizer levels
- empty skimmer baskets
- skim leaves and other debris off pool water
- circulate water for a minimum of 6 hours a day (preferably at two different intervals)

Weekly

- brush all pool walls and floor to avoid algae buildup
- vacuum bottom of pool
- shock treat in the evening
- sanitize, oxidize and prevent algae

- clean pool wall tile or vinyl

Monthly

- take a water sample to your local Pool Logic® Smart Store® dealer
- clean your filter
- test water for Total Alkalinity, Calcium Hardness and Stabilizer levels

What is the weekly chemical chart?

Pool Size	Flat or Deep	Gallons	Bioguard Smart Sticks®	Chlorine Tabs	Bioguard Smart Shock	Liquid Shock	BioGuard Back Up® Algae Preventative
18'	Flat	6,700	1	1	½ lb	1/3 gal	1 oz
18'	Deep	8,800	1	1	½ lb	½ gal	1 ½ oz
21'	Flat	9,160	2	2	1 lb	½ gal	2 oz
21'	Deep	12,000	2	2	1 lb	½ gal	2 oz
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