RSPEC! Reduce Swimming Pool Energy Costs!

Energy Smart Management

HIGH EFFICIENCY GAS POOL HEATERS

OVERVIEW

Swimming pools are big energy consumers. Pool owner/ operators spend billions of dollars annually to heat the nation's pools. Much of this energy is often wasted and can be saved with proper management. Wasting energy also contributes to our growing air quality problem.

RSPEC is a national program that asks you to consider measures to **R**educe **S**wimming **P**ool **E**nergy **C**osts.

POOL HEATING BASICS

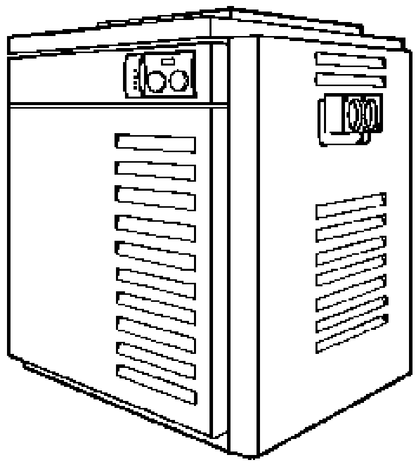
Why do pools cost so much to heat? Pools lose energy in a variety of ways, but evaporation is by far the largest source of energy loss for swimming pools. When compared to evaporation, all other losses are small.

The reason evaporation has such an impact is that evaporating water requires tremendous amounts of energy. For every gallon of water that evaporates out of a pool, it takes with it over 8500 Btus, and a typical pool loses 1 to 1½ inches of water a week. For a 1000 square foot pool, an inch of water equals 625 gallons or over 50 therms of natural gas every week. (A therm is equal to 100,000 Btus. Because of all the energy required to evaporate a gallon of water, evaporation turns out to be 70% of the heat loss from a pool.

MINIMIZE THE HEAT LOSS

The first step in selecting a pool heating system is to minimize the heat loss from the pool, which in the case of pools is primarily evaporation.

How do you stop evaporation?… Use a pool cover. Pool covers are the most effective way to reduce pool heating costs. By covering the pool when it is not in use, you can greatly reduce your pool heating costs. See the RSPEC fact sheet on Pool Covers for additional information.



WHAT TEMPERATURE?

The decision on how warm to keep the pool is up to the individual owner. The temperature recommended by the American Red Cross for competitive swimming is 78° F. This comfort level also coincides with good fuel savings.

However, this may be too cool for young children and the elderly who may require a temperature of 80° F or higher. The typical range for pools is 78°- 82° F. Keep in mind, however, that the energy consumption for each degree rise in temperature will cost from 10-30% more in energy costs depending on your location.

In warmer climates the percentage is higher due to the relatively low cost of heating a pool at 78° F. The chart below shows costs of heating pools in different parts of the country to different temperatures. The figures are based on a 1000 square foot outdoor pool heated with an 80% efficient natural gas heater at $.50 per therm. The pool is uncovered for 8 hours per day.

Location	Season	Temperature		
		78°	80°	82°
Miami	1/1-12/31	$1335	$1780	$2250
w/ cover	1/1-12/31	$260	$365	$500
Phoenix	3/1-10/31	$865	$1110	$1385
w/ cover	3/1-10/31	$60	$105	$160
Dallas	4/1-10/31	$945	$1200	$1535
w/ cover	4/1-10/31	$115	$175	$255
Atlanta	4/1-10/31	$1065	$1405	$1800
w/ cover	4/1-10/31	$200	$265	$370
Los Angeles	5/1-10/31	$1165	$1485	$1815
w/ cover	5/1-10/31	$105	$190	$295
Kansas City	5/1-10/31	$896	$1170	$1490
w/ cover	5/1-10/31	$180	$260	$340
New York	5/1-9/30	$905	$1190	$1490
w/ cover	5/1-9/30	$130	$185	$250
Chicago	5/1-9/30	$1013	$1295	$1585
w/ cover	5/1-9/30	$135	$185	$240
Denver	5/1-8/31	$1292	$1560	$1835
w/ cover	5/1-8/31	$110	$145	$225
Boston	5/1-8/31	$1070	$1310	$1565
w/ cover	5/1-8/31	$145	$205	$288
Minneapolis	6/1-9/30	$832	$1110	$1360
w/ cover	6/1-9/30	$120	$155	$240
San Fran	6/1-8/31	$975	$1160	$1355
w/ cover	6/1-8/31	$120	$200	$295
Seattle	6/1-8/31	$953	$1115	$1285
w/ cover	6/1-8/31	$190	$265	$345

GAS POOL HEATERS

Today the most popular method of heating pools is the gas-fired pool heater. Heaters are either natural gas or propane.

Gas appliances have become increasingly more efficient in recent years. With innovations in hydraulics, heat exchanger technology, forced draft combustion systems, and pilot-less ignitions, efficiency has almost doubled in recent years. High efficiency pool heaters are now available that are 89-95% efficient. Squeezing every bit of useful energy out of fuel burned not only conserves non-renewable resources and protects the environment, it makes good economic sense.

Heater efficiency is the ratio of usable output to energy input. For example, with a 80% efficient heating appliance, there is $80 worth of useful heat for every $100 of fuel bought. 20% of the fuel is wasted.

What Size?

Pool heaters are mainly sized according to the surface area of the pool and the difference between the pool and average air temperatures. One method uses the following procedure :

1. Determine the desired swimming temperature of the pool.
2. Determine the average temperature for the coldest month of pool use.
3. Subtract the average temperature from the desired pool temperature to get the temperature rise needed.
4. Calculate the pool surface area.
5. Use the following formula to determine the Btu/Hr output requirement of the heater.

$$PoolArea \times TemperatureRise \times 12$$

This formula is based on 1° to 1-1/4° F temperature rise per hour and a 3-1/2 mph average wind at the pool surface. For a 1-1/2° F rise multiply by 1.5. For a 2°F rise multiply by 2.0.

The heating load is also affected by other factors such as wind exposure, humidity levels and cool night temperatures. Pools located in areas with higher average wind speeds at the pool surface, lower humidity, and cool nights will require a larger heater.

This calculation will give you an approximate size. You should have a trained professional perform a proper sizing analysis for your specific pool.

Determining Your Best Investment

The first step in determining which efficiency heater is your best investment is to determine the efficiency of your current pool heater. Most pool heaters include this information on the name plate. The following chart gives some guidelines to go by if you can't locate the efficiency.

Years Old	Efficiency
5-10	70-75%
10-20	60-65%

The following chart shows what you can save for every $1000 in annual pool heating costs by installing a high efficiency pool heater.

Current Htr Eff	Cost w/ 95%	Annual Savings
55%	$580	$420
60%	$630	$370
65%	$685	$315
70%	$735	$265
75%	$790	$210
80%	$840	$160

The formula used to determine your annual savings is:

$$CurrentAnnualCost \times \left(1 - \frac{CurrentEfficiency}{NewEfficiency}\right)$$

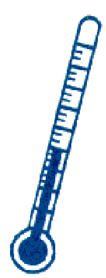
New gas pool heaters have a standard test they go through to determine their efficiency. You can use the efficiency number that the manufacturers publish in the equation above.

Other Factors:

Efficiency is one consideration, but you should also consider the reputation of the manufacturer and/or dealer who will install your heater. Get some references of satisfied customers and call the Better Business Bureau if you don't have anything to go on. Also be sure to ask for and read all warranties before making your decision.

Other Tips:

The following are additional tips to help you reduce your pool heating costs.



1. Keep a thermometer in your pool. It will help you determine the temperature that is perfect for you.
2. Keep your pool thermostat at the lowest setting that still maintains a comfortable swimming environment.
3. Mark the "comfort setting" on the thermostat dial to avoid accidental or careless overheating.
4. Lower your thermostat setting to 70° when the pool is to be unused for three or four days. For longer periods, shut the pool heater off.
5. Protect your pool from wind. Use a fence or hedge. A 7 mph wind at the surface of the pool can triple a pool's heat loss.
6. Use pool cover when the pool is not in use. This can reduce your pool's energy consumption by 50-75%.
7. Get your pool heater tuned up annually. A properly tuned pool heater will operate more efficiently

Pool Analysis!

How much could YOU save by installing a high efficiency heat pump pool heater? Contact the organization who supplied you with this fact sheet (listed in the box below) to receive an energy analysis of your pool using the Department of Energy's *Energy Smart Pools* software. Or you can download a free copy of the software from the **RSPEC** Internet web site at: *http://www.eren.doe.gov/rspec*.

You will also find additional fact sheets and information on saving energy in pools at the **RSPEC** web site or by calling the Energy Efficiency and Renewable Energy Clearinghouse at 800-DOE-EREC.

Tell a Friend

If you know someone else who's interested in saving money on their pool operation, feel free to pass along a copy of this fact sheet to them. Reproduction and distribution of this piece or any of the **RSPEC** fact sheets or software is not restricted, but actually encouraged. **RSPEC** can make a difference!

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