What Size of Pool Heater Do You Need?

Pool heaters allow you to open your pool earlier in the spring, and extend the swimming season well into the fall, but they are a large investment, so before running out to buy a pool heater you should spend a little bit of time doing research.

If you don't choose the size of your pool heater careful you could end up spending a lot of time and money down the line.

What you need to consider
Before buying a pool heater there are five basic things that you need to determine:

- The size of your pool
- Your heating needs and preferences
- BTU requirements
- Whether or not you use a solar cover
- Environmental considerations.

1) Size of your pool
The larger your pool, the more powerful your heater will need to be, so that means you need to calculate the volume of your pool. To do this, you'll have to first find the surface area and then multiply that by the average depth.

To find the surface area:

- **Square and rectangular pools:** simple multiply length by width.
- **L-shaped pools:** break the pool into two rectangles and multiply length and width of each and add the two answers together.
- **Round pools** multiply the diameter by the diameter (to get diameter squared) and then multiply the answer by pi (3.14).
- **Oval pools multiply** the longest diameter by the shortest diameter for surface area.
- **Kidney shaped pools** add the longest width and shortest width, and multiply that by the length.

For all shapes of pool:

Find the average depth by adding the deepest part of the pool by the shallowest and dividing by two. Multiplying the average depth by the surface area will give you the approximate pool volume in cubic feet. Take this number and multiply it by 7.48 to convert that into gallons.

2) Your needs and preferences

There are two basic ways to run a pool heater. You can either choose to heat from cold, or maintain a constant warm temperature.
Everyone will have to heat from cold at some point, the question is: how often do you want to heat your pool? Using your heater on a need-to-heat basis to tackle particularly chilly days is a real option, but it requires a more powerful heater to heat on demand. On the other hand, keeping your pool at a warm temperature day in and day out requires a smaller heater.

3) Know your BTUs

Pool heaters measure their power in BTU (British thermal units).

BTU Needed to raise temperature

One BTU raises the temperature of one pound of water by one degree Fahrenheit. There are 8.33 pounds of water per gallon. That means that if you have a swimming pool that holds 20,000 gallons, it requires 166,000 BTUs to increase by one degree. Then divide this number by 24 to find how many BTUs you need to raise the temperature by one degree over 24 hours. Continuing the previous example this would be: 166,000 ÷ 24 = 6,916.66.

Now, if you want to increase the temperature of your pool to 80 degrees then you need to subtract your current pool temperature (let's say 60 degrees F or 15 degrees C) from your desired pool temperature (80 degrees F or 27 C): 80-60=20.

Now multiply the BTUs per hour to raise the temperature by one degree (6,916.66) by the number of degrees that you want (20): 6,916.66 x 20 = 138,333. This is how many BTUs you would need per hour to raise the temperature by 20 degrees over 24 hours.

For quicker heating you need to increase the amount of BTUs. It is also good idea to overestimate your heating needs by about 20% to account for environmental factors and natural heat loss caused by evaporation.

BTU Needed to maintain temperature
Maintaining your pool's temperature is just as important as heating it in the first place. To maintain the temperature, you need about 10 BTUs per hour, per square foot of surface, per degree above the air temperature.
That means keeping a pool with a surface area of 300 square feet at 80 F (27 C) degrees in 60 F (15 C) degree weather would require 60,000 BTU per hour.

Here's the math:

20 (the difference in temperature between the desired temperature and air temperature) multiplied by 300 (the surface area of the pool) = 6,000
Then, 6,000 is multiplied by 10 (the number of BTUs required per hour per square foot) for a total of 60,000 BTUs per hour.

To heat your pool by 20 degrees in just 12 hours (i.e. half the time), multiply the number of BTUs per hour by two. In our example this means that to heat your pool by 20 degrees in 12 hours you would need a heater with a capacity of 120,000 BTUs per hour.

So, you hate math. Here's an easier way to calculate BTUs
If you don't feel like doing all that math then Pool Supplies Canada has a great chart with some of the most common pool sizes, and estimated BTU requirements. In store pool supply retailers will also be able to do the math for you and recommend the best heater to meet your needs.

4) Do you use a solar cover?
Using a solar cover in addition to your pool heater will reduce the amount of time and energy your heater needs to warm your pool, and will keep the water warmer longer. A solar cover used in conjunction with a heater can reduce the amount of BTUs needed to heat or maintain your pool temperature by 50%-80%.

5) Environmental considerations
Most pool heaters are environmentally friendly. Modern gas and propane heaters are more efficient than earlier models and far more efficient than an oil furnace, for example. Heat pumps are even more environmentally friendly than gas and propane, and solar heaters are by far the cheapest to operate and most environmentally friendly option (but also the least powerful).

As is so often the case you will have to make a choice between efficiency and power. Choosing the latter may mean you get a few less weeks of pool timer per year, but you can also pair a solar heater with a gas heater and switch between the two to find the right balance of comfort while minimizing your footprint and your energy bill.

Choosing your heater – Which type of heater is best?
When it comes to choosing the right pool heater erring on the side of caution means going with the more powerful option. Calculating BTUs is not an exact science, the calculations depend on a completely stable temperature (not something you find often in the Canadian fall and spring) plus you have to take into consideration natural heat loss through evaporation.

Natural gas and propane heaters are generally the most powerful, followed by electrical heaters (heat pumps) which are less responsive, less powerful, and usually require temperatures in excess of about 50 degrees (10 C) to operate. Solar heaters are the most environmentally friendly option but lack the raw heating power of gas, propane or electrical units.

If you have further questions, feel free to contact one of our Customer Service Specialists at customerservice@poolsuppliescanada.ca.