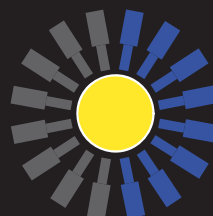


# SunMaxx™

## Information Guide: Pool and Spa Heating



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**Silicon Solar Inc**  
Innovative Solar Solutions

# SunMaxx™

## Information Guide: Pool & Spa Heating



Solar pool and spa heating is considered one of the most efficient and cost-effective applications for using SunMaxx solar hot water systems.

Combining any SunMaxx solar collectors with a specialized heat exchanger and a system controller, a SunMaxx solar thermal system can be used efficiently heat pools and spas of any size.

Using the power of the Sun to offset the use of fuels or electricity in heating will provide dramatic economic and environmental benefits. By installing a solar hot water system on a pool that is currently unheated, you can gain heated swimming and months of extra use from your pool at to no extra annual cost.

For outdoor pools, these systems make it possible to swim earlier in the spring and later into the fall. In some locations, a SunMaxx solar pool heating system can increase the useful season of an outdoor pool to all year round.

For indoor pools, A solar pool heater is the most cost-effective way to ensure that your pool's temperature remains constant and comfortable all year round, without overwhelming heating bills, or the high maintenance costs that traditional heating systems require.

SunMaxx solar pool and spa heating systems are ideal for a number of different applications and clients, including:

- Residential indoor/outdoor pools
- Residential hot tubs & spas
- Municipal / public pools
- School / collegiate pools
- Hotel / resort pools & spas
- Bathhouses

If the current cost of heating your pool or spa is becoming overbearing, or you interested in your first pool heater without the breaking the bank in operation costs, a SunMaxx solar pool heater is the best choice for a smart, economical and efficient system.

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# Solar Pool & Spa Heating Basics

## General Tips

### Always use a pool/spa cover

The first, and most important note when you are considering a solar pool or spa heater is to ensure that you are not losing the heat that you are generating. It is imperative to the efficiency and cost-effectiveness of your SunMaxx solar pool or spa heater that you always use a pool or spa cover when not in use.

### Using the right collectors

Choosing the right solar collectors for your solar pool or spa heater is essential to strong, economic operation. For warmer climates, flat plate solar collectors should be adequate for your solar pool or spa heating system. However, in northern, colder climates, especially for systems heating indoor pools that are in use year-round, you should consider using SunMaxx evacuated tube solar collectors.

### Understanding the limitations

A solar pool heating system is designed, and sized, to provide day-long heating when the sun is out. Because of the tremendous volume of water being heated, these systems will not simply heat a cold pool to a warm temperature of only a few hours, but rather, assist in maintaining reaching, and maintaining a warm temperature pool over a long period of time.

Conversely, with solar spa heating systems, higher temperatures can be achieved in shorter periods of time, because of the lower water volume. However, the system still operates at its best when it is used in conjunction with the current heater in order to maintain a higher temperature over a longer period of time.

### General Sizing Rule

Though a SunMaxx Representative, Dealer or Installer can assist you in sizing a solar pool heater exactly to your needs, a rough estimation of the size system you will require can be gathered from the following rules:

Climate	Collector Area vs Pool Area (%)
Southern	~ 50%
Middle	~ 75%
Northern	~ 100%

## Solar Collector Types Used

There are a number of different types of solar collectors that can, and are, used successfully in solar pool and spa heating systems. This versatility is just one of the key factors that make solar pool & spa heaters one of the most popular uses of solar thermal systems, and one of the most economical.

### Unglazed solar collectors

These solar collectors are typically made of rubber, or a similar material, which connects a heater and footer tube with vertical tubes running beneath. Generally black, to attract as much sunlight and heat as possible, your pool, or spa's water is heated within the collector each time through the loop - gently warming your pool over the course of the day.

\* Should not be used in cold climates, regardless of season.

### Glazed solar collectors

These solar collectors are flat plate solar collectors, like the SunMaxx-FP. In fact, the SunMaxx-FP is a great example of a glazed flat plate solar collector that is well adapted for use in solar pool and spa heating systems. These collectors operate the same in a solar pool or spa heating system as they would in a domestic hot water system.

\* Can be used in cold climates, though not for indoor pools, or outdoor spas that will be used year-round.

### Evacuated tube solar collectors

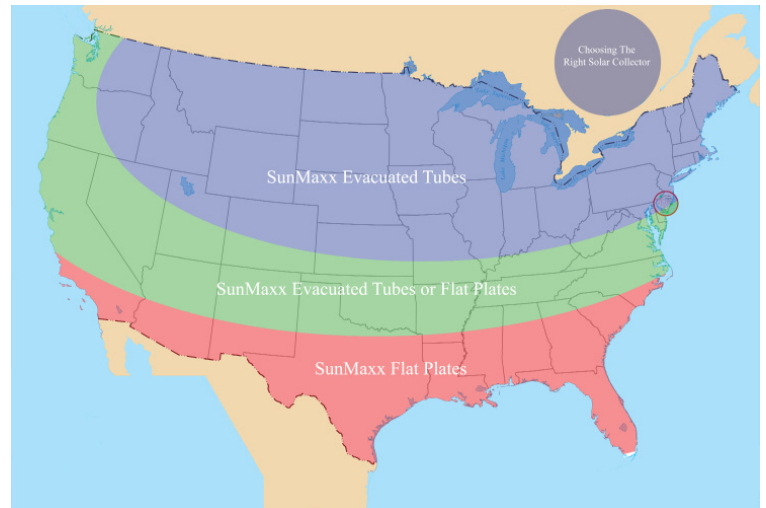
SunMaxx heat pipe and SunMaxx u-pipe solar collectors are ideal for use in solar pool and spa heating systems. Like glazed flat plates, SunMaxx evacuated tube solar collectors will operate the same in a solar pool or spa heating system as they would in a typical domestic hot water system.

\* Can be used successfully in any climate, in any season.

## Choosing the Right Solar Collectors

Choosing the right solar collectors for your SunMaxx solar pool or spa heater is simple with SunMaxx. Through our experience, we have divided the country into sections, denoting which SunMaxx solar collectors are most effective in which areas due to a number of factors including solar exposure, season temperatures and other climate related information.

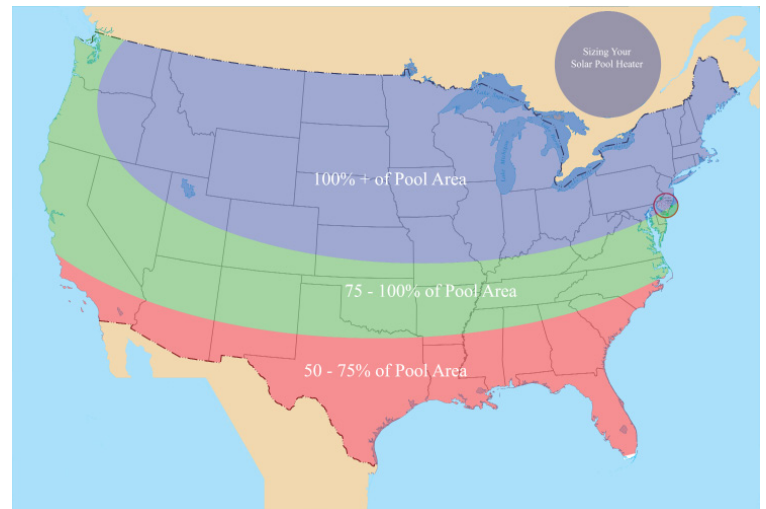
The map to the right shows the United States, and which SunMaxx solar collectors should be chosen by customers in which areas. Assuming that the recommended solar collectors fit within your budget, and the type of solar collector you feel comfortable using, you should base your SunMaxx solar pool or spa heating system around these recommended solar collectors for maximum performance and cost-effectiveness.



## Sizing Your Solar Pool Heater

Sizing a SunMaxx does not have to be difficult. While, for larger pools, or for a more intricately designed solar pool heater, calculations based on your pool, your climate, and the performance of SunMaxx solar collectors in your area, can yield a more customized, and perhaps better performing, system, a simple calculation is more than enough to give you a rough estimate of the size, and cost, of your SunMaxx solar pool heating system.

The map to the right shows the approximate square footage of solar collector area (aperture area) vs the square footage of your pool, depending on your location within the United States.



# Typical Components & System Design/Layout

## Typical System Components

The components used in a SunMaxx solar pool or spa heating system are similar to those to used in other SunMaxx solar hot water and heating systems, with a few exceptions.

### Solar collectors

Whether you use SunMaxx flat Plate or evacuated tube solar collectors, they are the key to your SunMaxx solar pool heater. Your solar collectors transfer the heat generated by the sun to the HTF, which in turn will heat your pool water.

### Circulator pump

Aside from your current pool pump, you will need a circulator pump within your solar collector loop. The TACO, LAING or GRUNDFOS pumps used in other SunMaxx solar hot water or heating systems will be more than adequate for most solar pool heating systems.

### Controller

The controller used in your SunMaxx solar pool heater will be different, and slightly more complex, than the controller used in a standard domestic hot water system. The controller you are installing will control the pump within the solar collector loop, as well a three-way actuator valve, which diverts your pool's

water to the heat exchanger when heating is taking place, and stops that flow when heating is not, such as at night, or during extremely cloudy days.

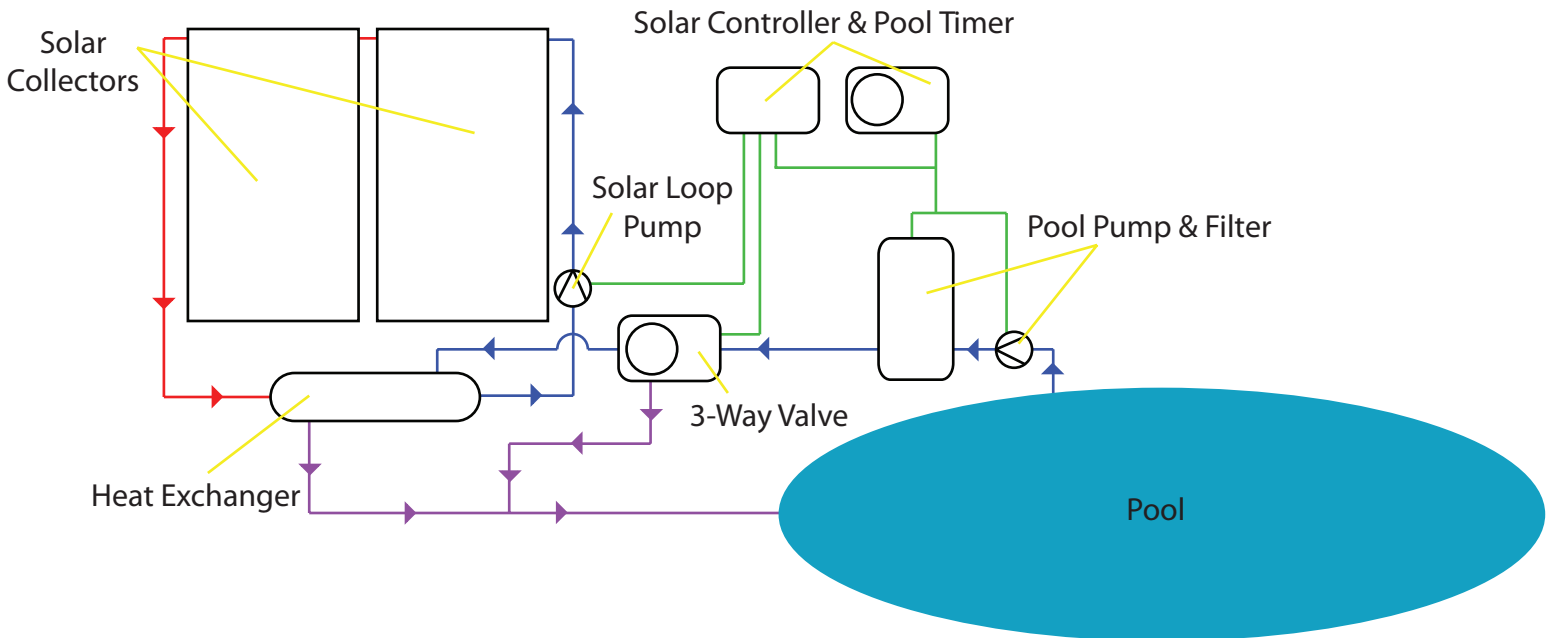
### Three-way valve with actuator

The three-way valve in your SunMaxx solar pool heater will be automatically controlled and operated by the controller. The valve is placed between the pool pump/filter and the heat exchanger. The valve allows water from the pool to be sent to the heat exchanger (to be heated) or bypass the heat exchanger and back to the pool (at night, or when the solar collectors are cold).

### Shell and tube heat exchanger

Because the chlorine in pool water can corrode, and destroy, copper, it must be kept away from the header tubes, and pipe work of your SunMaxx solar collectors and solar collector loop. A shell and tube heat exchanger allows your pool water to be heated without coming into contact with the water (or HTF) within the solar collector loop, much like a brazed plate heat exchanger does in a domestic hot water or radiant heating system.

## Typical System Layout



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