

Pool Heating

There are various ways to heat your outdoor or indoor pool, each with its own merits. This fact sheet outlines each method and will help you choose the right solution for your pool (whether it is outdoors or indoors). Choosing the right type of heating will maximise your chances of having the most suitable energy efficient system and this will help to save you money.

SPATA would always recommend that to assist minimising operating costs, the use of a heat retention cover should ideally be used with whatever heat source you choose, as most of the heat loss from a swimming pool is from surface evaporation, although some is also lost through the pool shell walls and floor.

It is also imperative to ensure that heating equipment is installed only by fully qualified and / or certified people.

Consumers also need to be aware that Building Regulations (Part L) will require indoor pool shells to be constructed to meet minimum requirements for thermal efficiency and so please talk to your SPATA member about how these insulation requirements can be met.

The most common forms of swimming pool heating are:

- Heat pumps - air source
(and ground source more for indoor pools)
- Gas and oil boilers
- Direct resistance electric heating
- Solar heating



Heat pumps

There is growing popularity in this form of swimming pool heating due to their ease of installation, low operating cost and low carbon generation. There are air source and ground source versions of heat pumps. Some heat pumps provide heating direct to the pool water, whilst indirect units utilise a heat exchanger. The indirect units have the ability to heat other things (like changing room radiators) as part of a multi zone system, but because they would need to run at higher temperatures, they would be less efficient than a purpose built swimming pool heat pump.

Heat pumps tend to be most popular for outdoor pools, since the operational months of an outdoor pool coincide with the warmest weather. Heat pumps extract most of the heat they provide from outside air (or the ground). Typically, during an outdoor pool heating season, they will provide 3.5 to 4.5 times more heat to the water than the power they consume in electrical input, this ratio is commonly known as the CoP (Coefficient of Performance).

Heat pumps designed for winter operation can provide useful heat in air temperatures as low as -15°C , although at this temperature they are less efficient than the temperatures expected during an outdoor pool heating season. Typically, the average winter efficiency (CoP) of a well designed heat pump on an indoor pool is between 2.5 to 3.5.

Air source heat pumps are required to be sited in a freely ventilated space (indoor or outdoor). As heat pumps contain rotating components due to noise consideration to the proximity of bedrooms and boundaries should be given.

Heat pumps are generally sized to match the average heat loss from a swimming pool, therefore the initial warm up times are likely to be slower than for other forms of heating being considered (warm up periods of less than 5 days are generally unlikely).

Due to the sudden explosion in popularity of heat pumps, many products from an unknown source are currently available. It is important to ensure that the chosen product can be supported by the supplier and is designed specifically for swimming pool heating and further that the claimed performance can be supported for UK climatic conditions.



Gas and oil boilers

Boilers are a common and effective method of swimming pool heating. They are available as either a purpose built “direct” type, where swimming pool water passes directly through the boiler, or an “indirect” type, where a conventional boiler is linked to an additional external heat exchanger. The part of the heating equipment in contact with the pool water must be specifically designed to be compatible with the chemicals contained within swimming pool water and the required flow rates. All boilers will require some kind of flue and must be installed by a qualified boiler installer. Some boilers, especially the direct type, can be installed outside, but it is generally more common to install boilers in a plant room.

Of the different boiler types, mains gas boilers will offer the lowest running cost due to the charge made for this fuel compared to oil and LPG. Due consideration to the availability of an adequate gas supply should be given and this cost should be verified before selecting a mains gas boiler. The adequacy of the supply should include the size of the present gas meter, the amount of capacity currently connected and the size of the gas pipe between the meter and the pool boiler.

Indirect gas boilers offer the benefit of being able to heat other items, such as changing room radiators and hot water cylinders.

Oil boilers are often considered when mains gas is not available. Oil boilers cost more to operate and service than natural mains gas boilers and are generally more expensive to purchase, but do offer an effective means of swimming pool heating.



LPG boilers are often only considered when it is not practical to install either a mains gas or oil boiler, as their fuel cost is expensive, compared to other forms of fossil fuel. However, where the client desires a gas cooking system, then the cost of the pool heating installation may have to take account of the fact that LPG is already available, or is being installed anyway. Bulk storage tanks are available and these can reduce the unit purchase price of LPG. Space will be required for the tank, but the larger tanks can be installed underground.

As an outdoor swimming pool is heated when the load on a house boiler is at a minimum, it is possible to consider using the house boiler to provide swimming pool heating, through a dedicated swimming pool heat exchanger. The capital cost of such an installation will be determined by the proximity of swimming pool filtration circuits to the house boiler as pipes and electrical control signals will have to be run between the two. It is also important to ensure that the house boiler capacity is reasonably matched to the swimming pool heating requirement.

All boiler types are generally sized to provide an initial one to two day heat up time. They are therefore very suitable for pools that are not used on a frequent basis.

Direct resistance electric heating

Electric resistance heaters are compact devices that are always installed within a plant room. They provide the cheapest capital cost for installing dynamic heating, but running costs are amongst the highest of all of the available heat sources. They are totally silent in operation and require minimum maintenance. This form of heating is often sized to provide an initial heat up period similar to that of a heat pump. As with other forms of swimming pool heaters, it is important to ensure that the heater is specifically designed for this purpose. Due to the relatively high cost of electricity, they would normally be operated on supply tariffs that offer block periods of lower cost electricity. With the high electrical demand from this type of heating, it is essential that an electrical survey is undertaken to ensure that there is sufficient capacity available.





Solar panels

The concept of the solar heating system gathering free heat from the sun is attractive and will work for swimming pool heating. In the UK climate, it can be difficult to maintain the desired temperature in the pool, therefore a supplementary heat source is often combined with solar panels.

The panels are operated by a separate controller that measures the temperature of the pool and the temperature of the air. This controller will normally ensure that pool water only flows through the panels when solar heat gains are available.

Standard pool solar collectors require a bank of panels that are normally over 50% of the surface area of the pool, depending on the location. Ideally, the bank should be optimised according to manufacturer's instructions and are angled towards the sun. It is possible that the distance between the filter pump and the panels may require a booster pump which may have to be taken into consideration when designing and siting such a system.



Indoor pool heating

Indoor pool water can be heated by any of the options listed in the fact sheet, although solar heating is rarely used. The choice of heating system will normally take into account the need to heat the air and possibly the domestic hot water and changing rooms.

Heating of the swimming pool air will help reduce moisture evaporation from the swimming pool and provide a comfortable atmosphere for occupants of the room. Inevitably, some moisture from the swimming pool may evaporate into the room. This can cause high humidity, that may lead to condensation, fabric damage and causes personal discomfort. Swimming pool room heating should be complemented with a form of moisture control, such as a dehumidification system, or a combined heating and dehumidification air handling system.

The heated, dehumidified air can only be efficiently distributed around a pool hall by forced air draft, either through a ductwork system, or simply by "blasting" the air into the room and recovering it from the same point. Therefore using radiators and other forms of convection heating will not provide a uniform temperature throughout the pool hall, nor the essential air movement over glazed areas. Underfloor heating is very effective at producing a pleasant, quick drying surface to walk on and the heat produced may be taken into consideration during the design process.

For more information on indoor pool climate control, please read the relevant fact sheet available from SPATA.

Now that you have more idea about what type of heating you may want, talk to a SPATA Member about what they can provide you with to meet your needs.

