Maintaining temperatures of POOLS

Why is it necessary to heat a swimming pool?

Studies show that most people prefer a swimming pool to be between 28-30^{0}C, about 8^{0}C cooler than human body temperature. As water evaporates from the large exposed surface area of a pool, a thermodynamic effect called evaporative cooling occurs. Due to this phenomenon, a pool can lose heat even on a hot sunny day. Whenever ambient air temperatures falls below the pool temperature, convective, conductive and radiant heat transfer occurs. This amount is very small and is usually replaced by solar gain. Even in warm and sunny locations, pools require a heat source nearly all year to remain at a comfortable temperature to compensate for the heat lost due to evaporative cooling.

Heat pumps are an ideal method to heat the pool water to the required level. Heat pumps consume minimal energy to raise the temperature of the pool water. 75% of the heat needed for heating is transferred directly from the atmosphere to the pool water. Since the temperature differential between the pool water and the desired level is minimal, the heat pumps can handle a large volume of water.

For swimming pool applications, a titanium heat exchanger in a PVC shell is used as the condensing unit .

Why Titanium Heat Exchanger

Only a Titanium Heat Exchanger can withstand salt or chlorine water. Other lesser materials like stainless steel, copper, or cupronickel will corrode and eventually fail when exposed to the chlorine levels found in swimming pools.

Why PVC For The Outer Body?

The titanium heat exchangers are enclosed in a heavy PVC (Polyvinyl Chloride) shell. This is chosen since PVC is strong and highly durable, and naturally resistant to chlorine.

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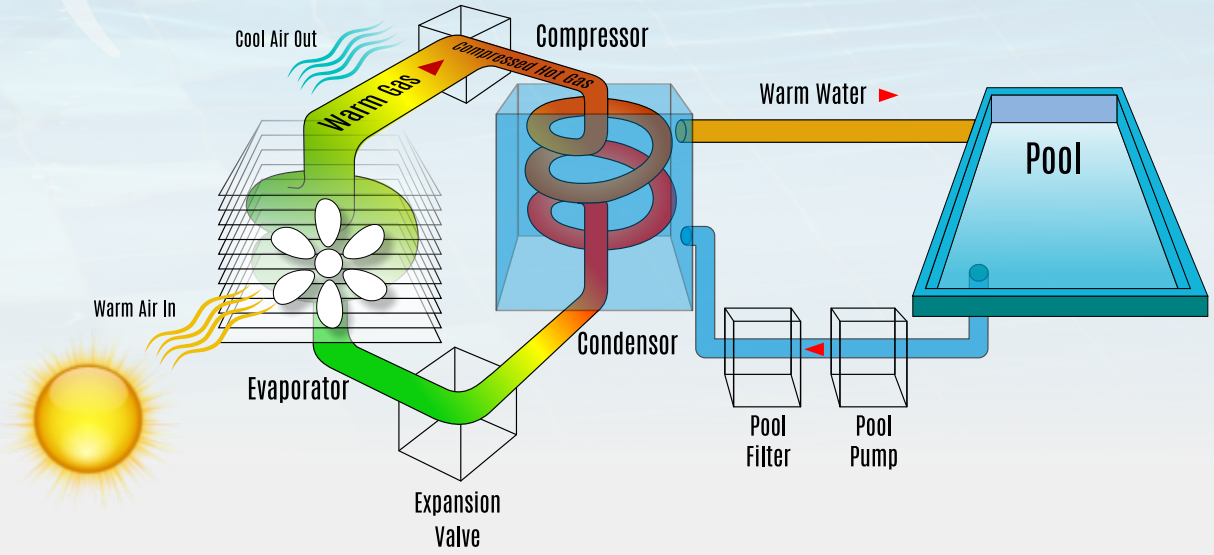
Working Principles

When the liquid refrigerant at a low temperature passes through the outdoor evaporator coil, ambient air is drawn across it by the use of a fan. The heat in the air causes the liquid to boil due to the refrigerant's low boiling point of 7^0C . This boiling or change of state process amasses energy as latent heat. The vapour is then drawn into a compressor that further boosts the temperature of the vapour.



The hot vapour enters the titanium heat exchanger condenser where it transfers its heat to the water. As the vapour cools, it condenses back into a liquid, and releases its latent heat to the water passing over the heat exchanger condenser unit. Exiting the condenser, the cold liquid refrigerant is under high pressure. The refrigerant passes through an expansion valve that reduces the pressure and allows the refrigerant to re-enter the evaporator to begin a new cycle.

Tips to prevent evaporation losses

Use a pool cover when not in use
Check all plumbing to ensure that there are no leaks
Line the pool with trees to reduce the wind speeds and thereby evaporation losses
Use energy efficient pumps and filtration equipments

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