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What's wrong with Heat pump dehumidification on a swimming pool

A heat pump dehumidifier is like your refrigerator at home. We have a cool compartment which is called the evaporator and a condenser where the heat generated by the refrigeration process is dissipated, on your refrigerator this would be the coil on the back of the casing.

Air that is brought back from the pool at a nominal condition of 30 °C 60% RH, is cooled in the evaporator to 22 °C.

The air at this lower temperature can't hold as much water as the air at 30 °C and so the moisture content of the air is reduced. The air then passes over the condenser where the heat that was removed in the evaporator plus the heat generated in the compressor is discharged into the supply air, heating it from 22 °C to 34 °C.

The air that comes off the condenser at 34 °C would then have its temperature increased by a heater battery which is served from the boiler, before being returned to the pool hall.

Some of the heat generated by the heat pump can be diverted into the pool water circuit to preheat the water however where the heat is put isn't important. What's important is how much this heat has cost you.

That very roughly is how a heat pump works

So what's wrong with using a heat pump

ELECTRICITY TO HEAT????

A lot is made of how efficient heat pumps are They will tell you that you get 4.5 kW of heat out of the condenser for every 1 kW of electricity consumed by the compressor.

But the 4.5 kW went in heating the air from 22 °C to 34 °C. You started with air at 30 °C and you finished with air at 34 °C so your actual gain is only 4 °C this relates to 1.5 kW for every 1 kW input not 4.5.

For the average domestic user the price of a kW of electricity is 5 times more expensive than the cost of a kW of gas. So you can see that if we are only getting a ratio of 1.5:1 out of the heat pump we are actually losing money if we use the heat pump for heating purposes.

For commercial users the difference is even greater because they are able to negotiate very low prices for there gas.

The people promoting heat pumps will tell you that the heat you get is waste heat from the dehumidification process but that assumes that we need a dehumidifier to control the humidity, which as you will see later we don't.

CORROSION

When you dehumidify the air, the condensation that is produced will contain small amounts of chlorine. This chlorine has a corroding effect on the evaporator coil. Now you can have a copper tube copper finned electro-tinned coil but if it is condensing out moisture then it will corrode.

MAINTENANCE.

Mechanically a heat pump is a complicated unit. It isn't something that could be maintained by the on site handy man. When things go wrong you need a qualified refrigeration engineer. These engineers do not come cheap.

STALE ATMOSPHERE

For the heat pump system to work you need to be recirculating the most of the air this will give you a stale atmosphere in the pool hall. A fresh air system dehumidifies using the fresh air and therefore gives a much better atmosphere.