



# Wet Leisure Super Heroes

## HEAT PUMPS HAVE REDUCED THE COSTS OF ENVIRONMENTAL CONTROL IN MODERN SWIMMING POOLS...

Huge hikes in gas, electricity and water tariffs have added massive costs of over £54m to the country's annual community swimming bill.

Compared to a recuperator based air-handling unit, a heat pump based system can save over 250 tonnes of CO<sub>2</sub> emissions per annum on a typical 25m pool.

Heat pump technology provides the ultimate solution for local authorities and leisure operators that find themselves under more pressure than ever to demonstrate efficient and effective energy efficiency.

A typical leisure centre pool can contain up to a million litres of water heated to around 30 deg C. Water evaporates from the surface at a rate

of hundreds of litres every hour. Evaporated water needs to be removed or it will turn to condensation that will immediately start to cause problems.

Before the introduction of heat pumps, that valuable energy would have just been expelled to the outside atmosphere. Heat pumps cleverly provide the means of recovering that energy. Air is passed through the evaporator, a finned coil, where it is continuously cooled. The water vapour is condensed to give up its latent heat and runs away as water.

At normal pool temperatures, 2 kWh of latent heat is recovered for every three litres of water vapour condensed. The air temperature has been lowered by the removal of sensible heat to



Patients at a specialist orthopaedic hospital are reaping the benefits of a purpose-built hydrotherapy pool that features an HRD 25 – a purpose-designed swimming pool dehumidification, ventilation and heat recovery air

handling package from Calorex.

The Robert Jones and Agnes Hunt Hospital in Oswestry has a national and international reputation for orthopaedic surgery and musculo-skeletal medicine, including research into disorders of bone, joints and muscles. Hydrotherapy plays a vital role in the rehabilitation of patients and the new pool offers a valuable resource to the NHS Trust run centre of excellence.

On a typical leisure centre with 25m and learner pools for instance an HRD system can reduce CO<sub>2</sub> emissions by 250 tonnes per year.

## Off The Shelf

A thermodynamic heat-recovery dehumidifier comes complete with a control panel, air temperature and humidity and water temperature sensors, pool air and pool-water heat exchangers — in fact everything necessary to control the pool environment, and it will fit into a plant room space substantially smaller than that needed for a conventional system.

Because the complete unit is in one insulated case and has been factory tested and set-up, it is very simple to fit. All controls and sensors are inside, and it only requires a three-phase power supply, connection to the LPHW headers, connection to the pool water circuit, condensate drain and duct connections. A commissioning engineer is provided at start-up to ensure all is well.

When the overall costs of using a heat-pump, heat-recovery dehumidifier are considered, it is important to remember that heat-pump dehumidifiers will recover sensible and latent heat that will be returned back into the pool water giving an efficiency of 300 – 350%. Passive units cannot do this, offering



only 50 – 60% when external air temperatures are favourable.

Modified office AHU units are far less efficient than dedicated heat pump units in swimming pool heat recovery. They are also not designed for a swimming-pool atmosphere, which is reflected in their operating life. In fact, dedicated swimming-pool equipment will always give better service than something simply 'cobbled together' for individual jobs.

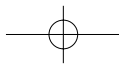
Systems for wet leisure environments are specialist because they need to be designed to tolerate the harsh environment of a pool hall and its associated water treatment chemicals, such as chlorine. All components have to be specially selected resulting in extensive use of coatings, treatments and plastics.

enable the dehumidification process to proceed and both the sensible and latent energy come together in the refrigerant gas. This is now raised to a higher temperature by the compressor and used to heat the pool water as well as the pool air.

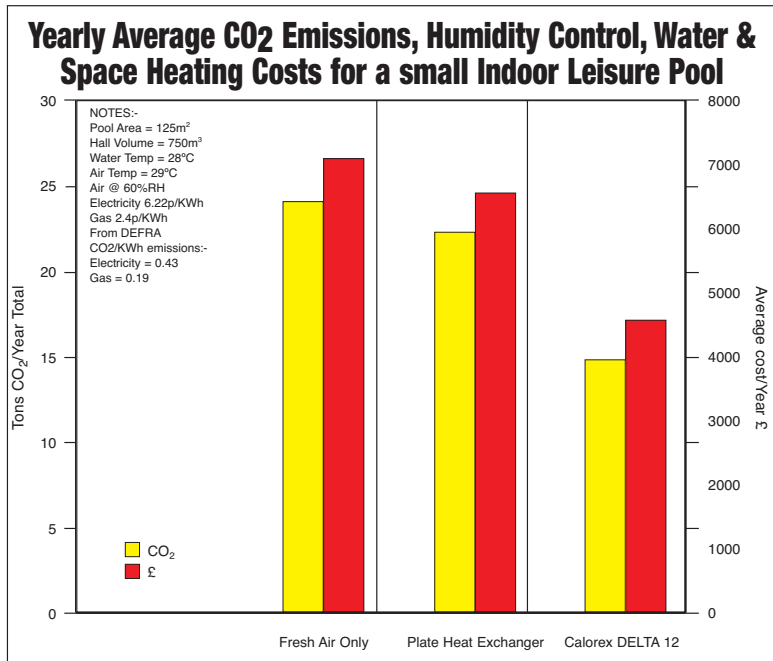
When the humidity rises above the target level, a compressor is switched on, together with the integral heat pump circuit and the heat recovery dehumidification process starts. Latent and sensible energy available in the moist air is recovered and returned to the pool water and air, via the built-in heat exchangers.

If the recovered energy is insufficient to meet the water and/or air heating load, the unit's integral low pressure hot water heat exchangers redress the balance.

Continued overleaf



Continued from overleaf



The system cleverly takes care of the pool environment by incorporating automatic fresh air control. Introduction of fresh air that also passes through the heat recovery process at up to 70% of re-circulated air is kept to a minimum to satisfy

occupancy and dilution demands, reducing to virtually zero during unoccupied periods. Should natural solar gain increase the air temperature of the pool hall, the units can even provide air conditioning by dissipating unwanted heat into the exhaust air.

## Top Of The Class For Energy and Efficiency



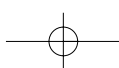
Despite increases in energy fuel costs, Northampton's Oundle School has seen running costs tumble from £22k to £11k per annum with total kW/hr usage figures reduced by one third following the introduction of a Calorex heat recovery system. Associated CO<sub>2</sub> emissions were also reduced from 422 to 224 tonnes per annum, a reduction of over 45%.

Calorex offers a full design advice service and an extensive product range supported by a nationwide network of service engineers.



**Tel 01621 856611 Fax 01621 850871**  
**Email sales@calorex.com**  
**Web www.calorex.com**

Calorex Heat Pumps, The Causeway, Maldon, Essex, CM9 5PU



## Twin Set In Tandem



A pair of identical Calorex HRD25 air-handling units work in tandem to maintain perfect atmospheric conditions offering heat recovery to either the pool water or the pool hall air system depending upon demand at the Willowburn Sports Centre at Alnwick in Northumberland. Two pools operate at different water temperatures i.e. main pool at approx. +28 deg C and teaching pool at approx. +30 deg C. Pool hall air temperature is maintained at a minimum of +1 deg C above the pool water temperature, providing an air change rate of around six per hour in the pool hall, introducing high volumes of fresh air via the plant and controlling humidity levels within a band of 55% to 65% RH.

## Swimming Experience Transformed



Swimming conditions at South Moorlands Leisure Centre in Staffordshire have been transformed thanks to the installation of a Calorex HRD30 air-handling unit. Prior to the overhaul of the existing ventilation system, the pool hall was plagued with condensation and damp problems, resulting in rotting windows and doors as well as unpleasant conditions for both swimmers and leisure centre staff. Not only is swimming a more pleasant experience at South Moorlands, running costs have been reduced. The Calorex HRD30 typically offers 300% heat recovery to pool water and/or pool hall air compared to just 50-60% from recuperator type air handling units. Typically, the unit is capable of removing 216 litres per hour – and plays a vital role in maintaining temperatures and conditions for indoor pool environments.

HEAT PUMPS CASE STUDY

