



## WHAT IS EXCOOL?

The Excool cooling system has the most effective, efficient and lowest energy process currently available to cool data centers.

In the colder winter months, the system relies on sensible heat exchange typically above 70% overall efficiency, however as the ambient temperature increases to typically 68°F water is introduced into the process increasing overall efficiency in excess of 90%.

The first stage of water introduction follows an adiabatic path along the wet bulb line on a psychrometric chart using a closely controlled atomising technique enabling relative humidity approaching 100% to be achieved.

The second stage utilises a highly effective evaporative technique. The heat exchanger plates are "charged" with water on the ambient side to achieve heat exchange in an effective 2mm spacing between the heat exchange surfaces. The water is held onto the heat exchange surface during this charging process and the cooling effect transfers from air to air to an effective air to water process.

To evaporate water requires a relative exceptionally high energy source which in this application is provided by the air returning from the data center.

Overall, relatively small amounts of water evaporation provides an exceptional cooling effect all harnessed within the Excool heat exchanger, which is manufactured from a composite material, which unlike the more commonly used aluminium, makes it resistant to corrosion, more robust and leak tight and able to be "charged" with water.

Using Evaporative & Adiabatic cooled outdoor air as a cooling medium without introducing this into the data hall eliminates the dependency on mechanical cooling in thousands of global locations.

We have designed, developed and improved this technology in a purpose built test centre in our West Midlands Headquarters.

Our 4000ft<sup>2</sup> test facility allows clients, consultants and data center operators to witness performance tests of the Excool units in real life conditions.

Data centers are required for nearly all of the operations we take for granted in modern life across the world; such as surfing the worldwide web, communications, banking and continues to be one of the fastest growth sectors in the construction industry. The move to cloud computing is accelerating that growth even further. Cooling represents almost half of the energy consumed in legacy data centers and the need to improve this situation is a pressing one.



*Indirect Adiabatic  
and Evaporative  
Data Center  
Cooling*

*After 10 year and close to 1,000 units installed, Excool launch the next evolution the Mk6 Excool model for 2020 'Excool Zero'*

*Now 2020 marks the next evolutionary step in Excool data center cooling technology with the release of the Excool Zero.*

The latest technology, such as fully variable heat loads, temperature and humidity sensing equipment, large capacity data logger/taker, energy & water usage monitoring systems are utilised.

This allows Excool units to be thoroughly tested in real life conditions across the world such as external ambient conditions ranging from 32°F upto +122°F dry bulb and +86°F wet bulb; Internal heat loads of upto 600kw simulating a working data center.

All the sensing & monitoring equipment are of the highest specification; with sensing equipment being Class A & ASHRAE approved, providing real time feedback of accuracy to 100th of a degree. This equipment is periodically test & calibrated to ensure the results are true and accurate. After 10 years of testings Excool can confidently quote low pPUE's of 1.025 in many locations across the world. 'pPUE = (Cooling input power + IT power) ÷ IT power'.

How the technology integrates with other green building innovations. The operational gains delivered by the Excool system are part of a project wide holistic approach to electrical energy and water efficiency.

The servers are held in racks within a contained aisle system. This avoids recirculation of the hot discharge air returning it directly to the Excool unit. an power efficiency at both the server and the Excool unit are enhanced by this approach.

The very latest energy efficient UPS systems are also deployed. These are most efficient when fully deployed but are marginally less so at very low loads. The Excool units follow this pattern but in reverse becoming more efficient as the load decreases. This ensures that the two systems work in harmony to provide a fairly stable PUE at all loads.

Excool is considered ahead of traditional technologies and is being designed and installed into data centers globally. Within a small time frame Excool has changed the global landscape in the approach to data center cooling and continues to go from strength to strength.



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