

THE WORLD'S FIRST
NON-MECHANICALLY COOLED
INDIRECT AIR ECONOMISER
DATA CENTRE COOLER

low energy | low carbon
data centre cooling

PUE=1.10

Simple | Efficient | Reliable

- **simple technology**

  Excool uses an arrangement of air-to-air heat exchangers, ECDC fans and water atomisers combined and developed to optimise the Excool principle

- **few moving parts**

  The only moving parts are a series of fans and the water atomising pumps

- **EC fan technology**

  The latest high efficiency EC fan technology delivers enhanced reliability with low operational costs

- **optimisation**

  The specially developed Excool control centre is designed to switch between five modes of operation to ensure maximum efficiency at all times

- **up to 95% power reduction**

  No main water circulating pumps, no mechanical cooling and no indoor units

- **no need for standby units**

  Excool's multiple modular design delivers inherent resilience removing the need for additional back-up systems

Low carbon | Energy | Cost

no mechanical cooling

With the exception of tropical environments additional mechanical cooling systems are not required. In the few cases where it is needed the optional cooling package can be added. This is fully integrated and small being only required to cool the air by a maximum of 5°C

indirect cooling

Unlike other Air Economizer systems Excool re-circulates and cools the air in the hall removing the need for sophisticated filtration, humidification and refrigeration thus reducing the contamination risk

capital expenditure reduction

Excool does not require the sophisticated infrastructure and support systems typical of industry standard systems. Savings on capital expenditure of 30% compared with the latest chilled water free cooling systems are achievable

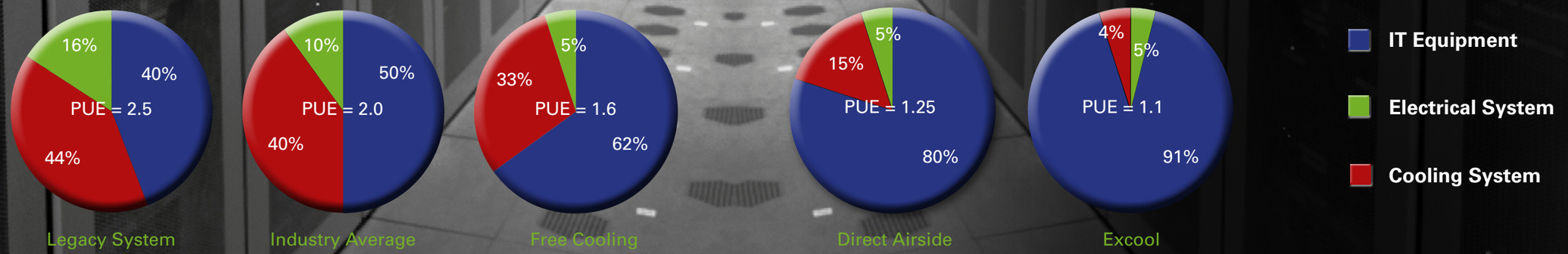
operational expenditure reduction

The Excool cost model shows approximate savings of up to 95% on running costs when compared with the latest chilled water free cooling systems

High efficiency | Low power

Excool reduces power hungry dependency on mechanical cooling, high level filtration and humidification systems improving efficiency and maximising the power available for the IT process.

The charts below show efficiencies for various systems based upon UK weather data. The Power Usage Effectiveness (PUE) = Total Facility Power / IT Equipment Power.



Tier IV Resilience

- **Dual power supplies and optional on-board UPS are all that are needed for Excool to be deployed in a Tier IV system.**

  In addition resilience is built in as standard at no extra cost. The units are designed to run at part load to optimise the efficiency.

  In the event of a component or unit failure the system automatically increases the air volume to compensate.

The following levels of redundancy are typical for a 1mW data hall. An alarm is raised for each event.

Standard Unit

Event	Automated Response	Delivered capacity	Maximum capacity
Healthy	–	100%	150%
Outdoor fan failure	Remaining fans increase speed	100%	148%
Indoor fan failure	**Remaining fans increase speed**	**100%**	**148%**
Control system failure	Unit runs at last setting before failure	100%	130-150%
Water pump failure	**Section shuts down, other units increase fan speed and pump speed**	**100%**	**125%**
Catastrophic unit failure	**Other units increase fan and pump speed**	**100%**	**125%**

Optional DX module for tropical climates

Event	Automated Response	Delivered capacity	Maximum capacity
Compressor failure	DX Module shutdown	100%	125%
Refrigerant leak	DX Module shutdown	100%	125%

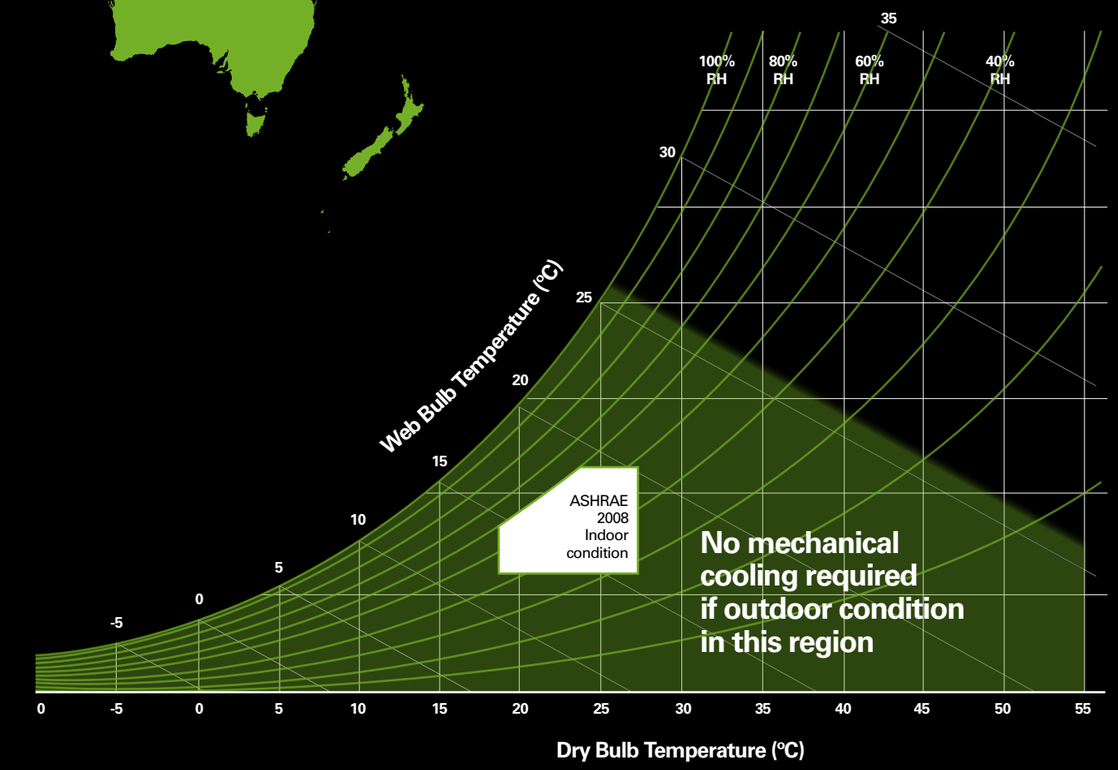
DX Module requires UPS backup in Tier IV systems. The DX Module has a relatively low power consumption as it is only required to cool the supply air by a maximum of 5ºC.



Worldwide Operation

- **Excool can be used anywhere in the world.**

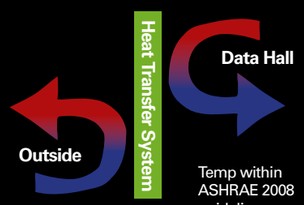
The chart below shows the operating parameters for data centres recently recommended by ASHRAE. This condition can be maintained by Excool without the need for mechanical cooling if the maximum outdoor ambient temperature and humidity fall below the line shown.



How it works

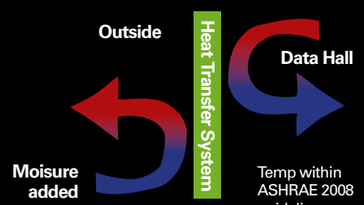
Winter

- The heat from the data hall is transferred to the cold outside air via the heat transfer system
- No outdoor air enters the building
- The heat transfer system has minimal effect on humidity within the building



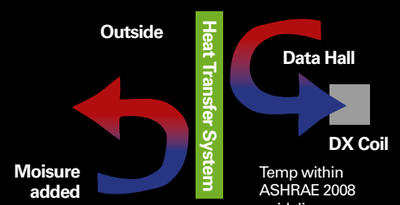
Summer

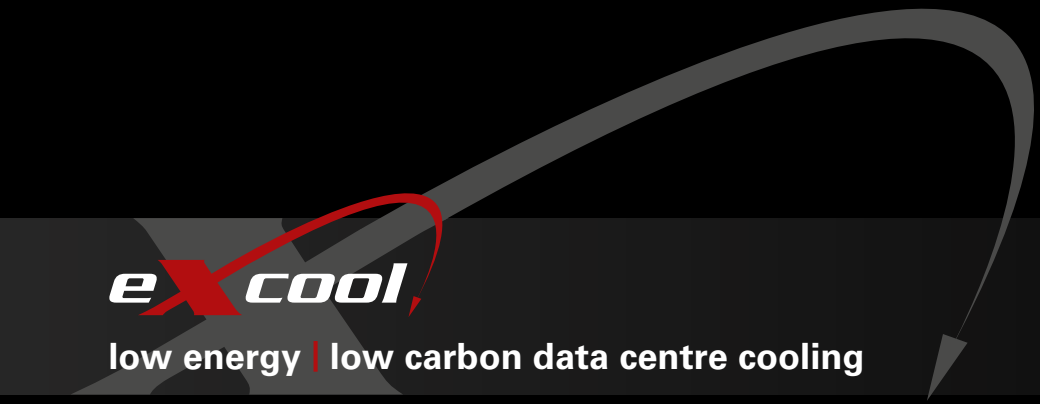
- If the outdoor (dry bulb) temperature is above 24°C water is atomised into the outdoor air stream
- This effectively reduces the temperature allowing non-mechanical cooling to continue
- No moisture or outdoor air enters the building



Summer – Tropical Climate

- No moisture or outdoor air enters the building
- Because the majority of cooling has already been done by heat transfer, the DX system is very small





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