Airedale
APPLIED THERMAL INNOVATION

Sector Data Centre

Data Centre

Flexible, high efficiency cooling solutions

Qualified for Energy Technology List
www.eca.gov.uk
TM
Authorised User No. 00007

IT COOLING
PRECISION AIR CONDITIONING
CHILLERS
CONDENSERS & CONDENSING UNITS

www.airedale.com

BRITISH MANUFACTURER
ENERGY EFFICIENCY
CONTROLS
SERVICE
TRAINING

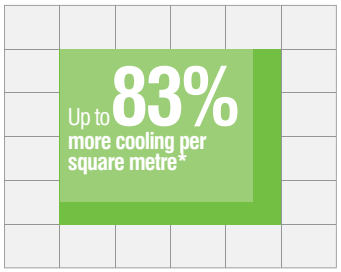
Meeting the challenge
with 24/7, cooling solutions

Global demand for data exchange is escalating, placing unprecedented constraints on space and power available to the data centre operator. Tightly packed server racks are generating exponentially more computer power and most of this is converted into rejected heat.

From small computer rooms to future-proof solutions across multiple data centres

Airedale's flexible, high efficiency cooling solutions work smarter not harder to give you more cooling for less power and ensure a stable environment and availability 24/7.

More cooling for less space and energy



Airedale systems are designed to minimise space claim:

The InRak™ in-row cooler for example typically offers up to 83% more cooling kw/m²

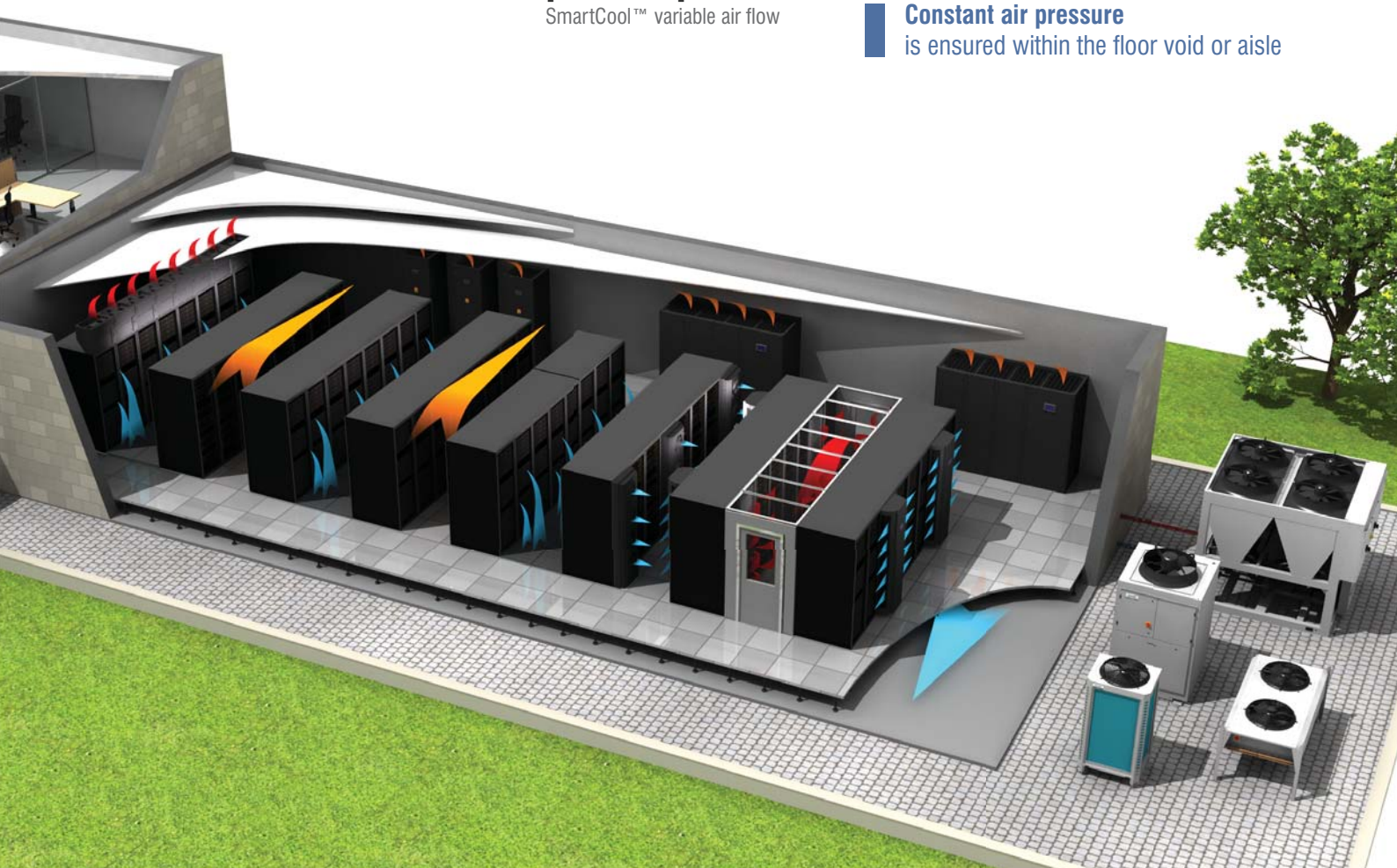
*compared to a conventional CRAC unit

A 50% drop in air volume gives an 83% reduction in fan power input

SmartCool™ variable air flow

Optimised air flow

- **EC fans** save up to 70% energy at part load
- **Variable air flow** uses minimum power to match demand
- **Constant air volume** automatically maintains design air volume
- **Constant air pressure** is ensured within the floor void or aisle



Intuitive cooling
for a greener data centre

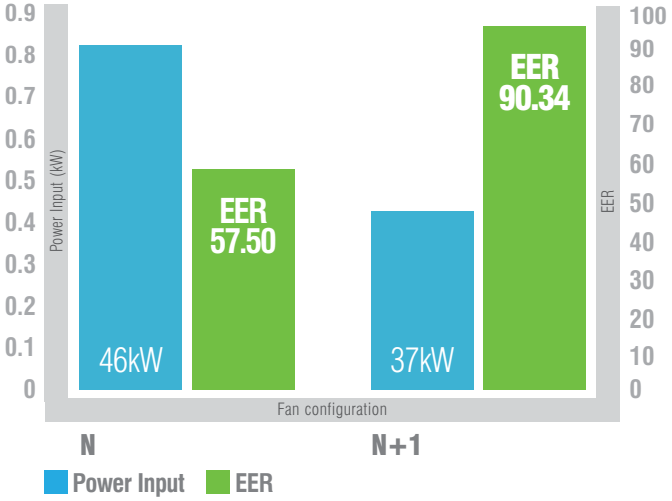
Many servers racks are under-utilised and thermal loads can fluctuate daily. Airedale cooling systems, led by dynamic controls, significantly reduce cost of ownership and carbon footprint through intuitive, modulated cooling. They work efficiently at part load and eliminate the risk of wasted power consumption. The cooling systems constantly monitor varying load conditions and adapt to anticipated or unexpected load requirements to maintain setpoint.

Reducing PUE

Airedale cooling systems have a direct, positive impact on PUE. An indicator of the efficiency of power use in the data centre, the closer the PUE is to 1, the more of the available power can be used by the IT equipment.

InRak™: Excellent part load efficiency

N (45.6kW of cooling), N+1 (37.4kW of cooling)



Smart control of the room

- **Inverter compressors**
  offer 17 – 100% modulation for exact capacity match
- **Staged cooling**
  increases part load efficiency by 5%
- **Variable humidity**
  uses 80% less power during de-humidification
- **Electronic Expansion Valves**
  increase system EER by up to 30% at part load

Enhanced Capital Allowance scheme:

Selected Airedale products/models are included on the Energy Technology List, offering the potential for investors to claim 100% first-year capital allowance. For details: www.airedale.com and www.eca.gov.uk.

Qualified for Energy Technology List www.eca.gov.uk ™
Authorised User No. 00007

"We are already seeing a PUE of 1.2

I believe we are the first company in the world to install Airedale's advanced technology, the TurboChill™ FreeCool chiller. When the data centre is operating in free- cooling mode, the PUE has been measured at 1.2 and we expect that to reduce further as we install more equipment."

Bob Finn
Programme Manager, EDF Energy

One kilowatt of power saved every hour 24/7, represents a saving of £876* a year, equivalent to over 4 tonnes of CO_2

* £0.10/kWh

Bespoke, flexible
Best practice cooling

Airedale has nearly 40 years' experience in designing and manufacturing high efficiency IT cooling solutions. Through continuous development and applying latest technology led by smart control logic, we offer flexible, bespoke systems that will optimise performance and help you achieve best practice, now and in the future.

Versatile, growing with your data centre

Our systems give you the confidence to move from low to medium to high density cooling as you populate and grow your data centre - from small rooms with DX indoor units linked with condensers outside to larger rooms benefitting from the better heat transfer of chilled water coupled with a free-cooing chiller.

Integration: Over 50% energy saving

Designed to be stand-alone, together our units are even more efficient, sharing intelligence. Indoor units can be integrated with a free-cooling chiller which reduces total lifecycle costs by typically saving more than 50% of the energy consumed by a conventional chiller (London, UK).

DeltaChill™ FreeCool chillers providing free-cooling to indoor units in a Manchester data centre

Precision Air Conditioning

EasiCool™ 6 - 60kW

HFC R410A · HFC R407C · AIR DX · WATER DX · CW · EC

SmartCool™ 15 - 180kW*

HFC R410A · AIR DX · WATER DX · CW · INVERTER · DUAL COOL · FREE COOL · EC

IT Cooling

InRak™ 10 - 60kW

HFC R410A · AIR DX · CW · DIGITAL · EC

ACE (ECHO) 2 - 20kW per rack

CW · EC

OnRak™ 3 - 33kW

CW · EC

Condensers/Condensing units/Dry Coolers

Air Cooled Condensers & Dry Coolers
CR 12 - 165kW (R410A)
C/CS 11 - 105kW (R407C)
Dry Coolers 10 - 100kW

HFC R410A · HFC R407C · EC

BluCube™ 10 – 45kW

HFC R410A · HEAT PUMP · INVERTER · EC

Chillers

DeltaChill™ 110 - 960kW
D/Chill FreeCool 140 - 1030kW

HFC R410A · AIR DX · MICRO · FREE COOL · EC

TurboChill™ 200 - 1100kW
TurboChill™ FreeCool 200 - 950kW

HFC R134a · FREE COOL · EC · MICRO

LogiCool™ FreeCool 20 / 40kW

HFC R410A · DIGITAL · FREE COOL · EC

24/7 total confidence

Resilience is designed into Airedale units from day one and is managed by advanced controls logic to give you complete confidence that your data centre is never put at risk and to help you achieve data centre tier classification.

Dual Cool

Two different cooling mediums in the same case: Intelligent controls select which medium acts as the primary source of cooling or which acts as back-up if the primary source fails or is unable to cope with the heat load. Offered as an option in the SmartCool™.

N+1 fans

The OnRak™ & InRak™ fans run at 75% capacity during normal operation. If one fan fails, the other three immediately speed up to 100% to provide the same total amount of cooling and maintain temperature control.

Pressure differential management

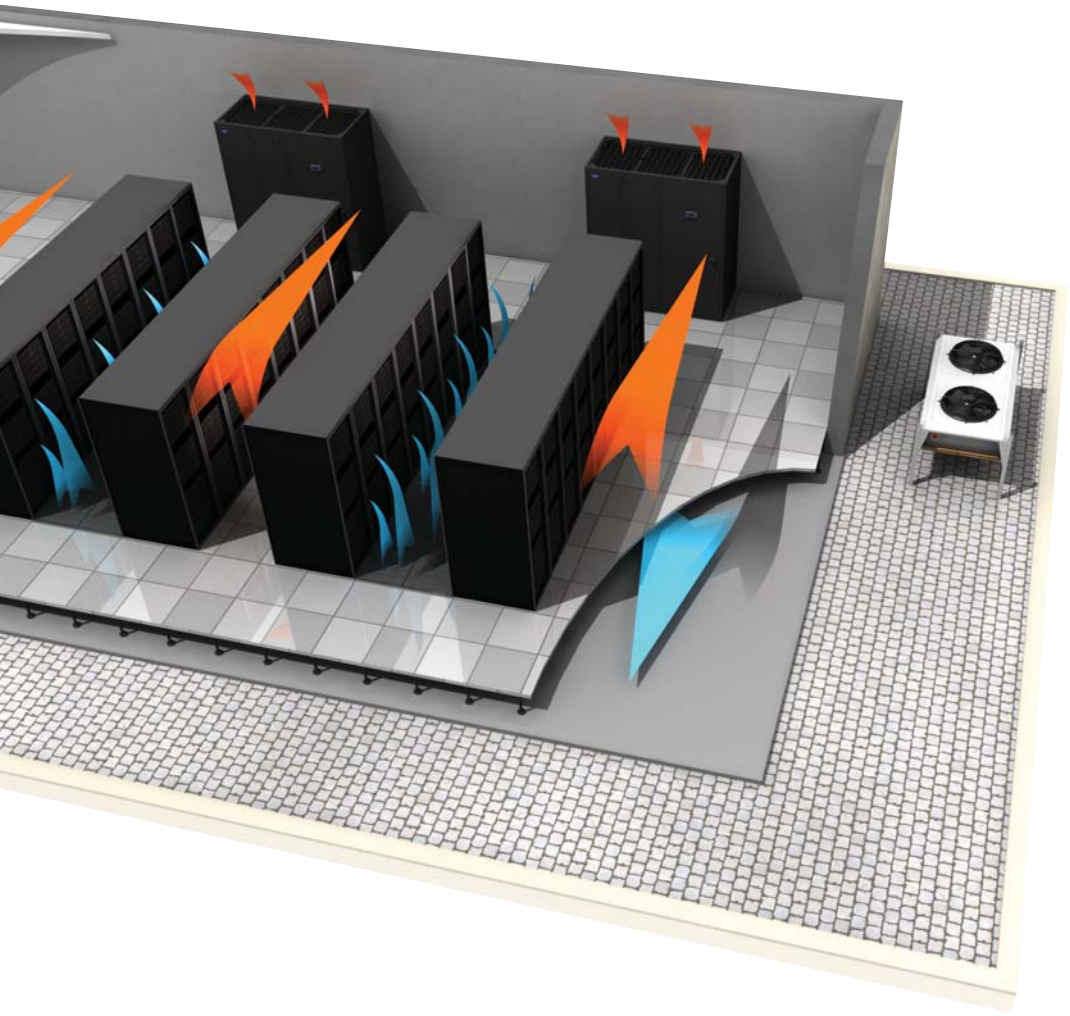
The InRak™, OnRak™ and ACE (ECHO) maintain pressure in the rack within the server design envelope, whilst still ensuring temperature is controlled.

Automatic transfer switch

In the event of a power failure, power supply is switched instantly to an alternative power supply and cooling continues, supporting redundancy power supply specifications in critical data centre builds. Available on selected Airedale products.

Low density cooling

Directed to the server inlet



≤ 5kW heat load per rack

Typically low density areas are cooled by positioning racks to create open hot and cold aisles for increased efficiency compared with a traditionally configured room. Downflow versions of the EasiCool™ or SmartCool™ precision air conditioning units will deliver cooled air through the floor directly to the front of the racks.

“It is the whole design package

We have put in an energy efficient model. The EasiCool™ is a robust design for the computer room and is giving excellent performance. It is the whole package; Airedale covered all key design considerations. Not many companies can provide Airedale’s level of quality and reliability.”

Edmund Fosbrook, Senior Estate Manager
Victoria & Albert Museum

Up to 88% saving in power with modulated cooling and hot gas re-heat compared to traditional electric re-heat

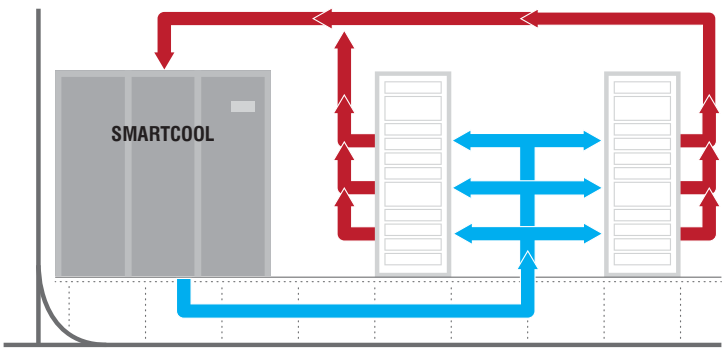
SmartCool™ DX 60 - 150kW

SPACE SAVING

Up to 6% cooling kW/m² ahead of the market

SmartCool™
DX 15 – 60kW
Ideal for small computer rooms

Open aisle structure:
Offers flexibility to scale up and reduces mixing of hot and cold air and wasteful warming of previously cooled air; temperatures are more uniform at server inlet and capital cost decreased



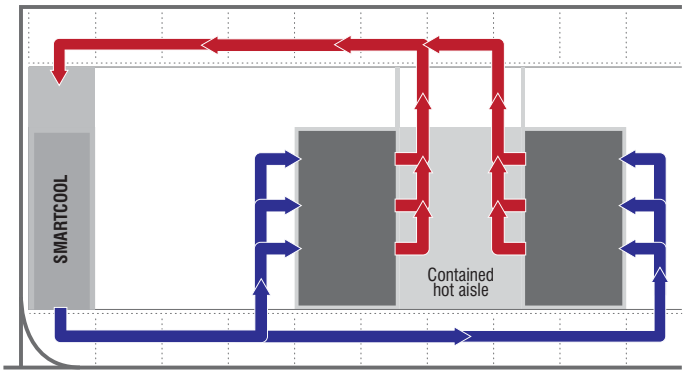
Medium density cooling

Using heat to reduce PUE

6 – 20kW heat load per rack

As heat load density in the room increases, the performance of the server racks is significantly enhanced by aisle containment, preventing any mixing of hot and cold air. Capped cold aisles ensure tight control of cold air to the servers, whilst in hot aisle containment, the higher return temperatures increase the units' duty and the free-cooling opportunity.

Typically where the return temperature increases from 24°C to 35°C, the same SmartCool™ unit will increase its cooling duty by 30% from 60 to 80kW.



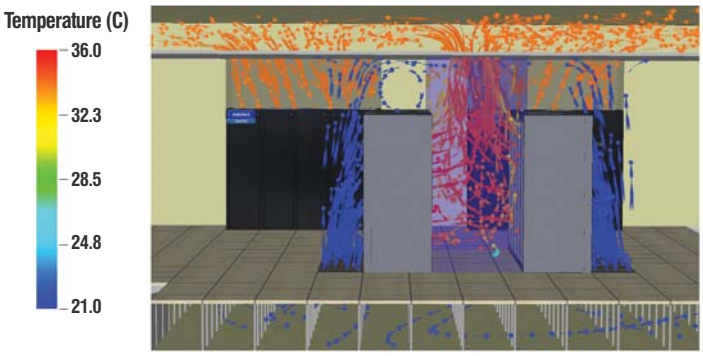
In higher setpoint temperatures:
The SmartCool™ operates more efficiently; free-cooling threshold is increased and working conditions are more comfortable

SPACE SAVING

Up to10% more cooling kW/m²
SmartCool™ CW 93 – 162kW*
Ideal for large data centres

*compared to Airedale's previous generation precision air conditioning

49%
less fan power running five CRAC units at 80% air flow rather than four run and one standby



Example hot aisle containment:
Three SmartCool™ units are cooling ten 20kW racks; cold aisle temperature is at 21°C and the hot aisle 36°C

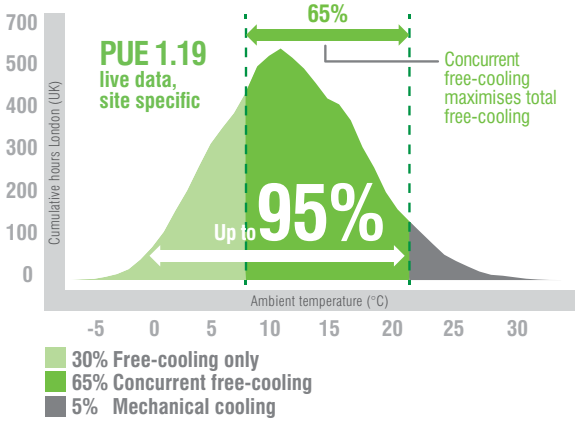
FREE COOL
FREE-COOLING

Up to 95% of the year in free-cooling

Airedale free-cooling chillers offer concurrent free-cooling - a mixture of free-cooling and/or mechanical cooling. Concurrent free-cooling enables free-cooling to be captured whenever the ambient is 1°C or more below the return water temperature.

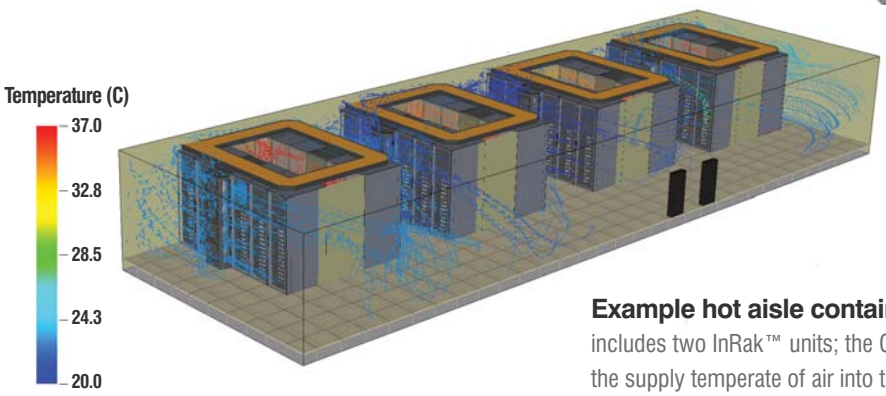
In a 24/7 data centre with a typical room temperature of 24°C, over 95% of the year can be spent with free-cooling active (cumulative hours, London, UK).

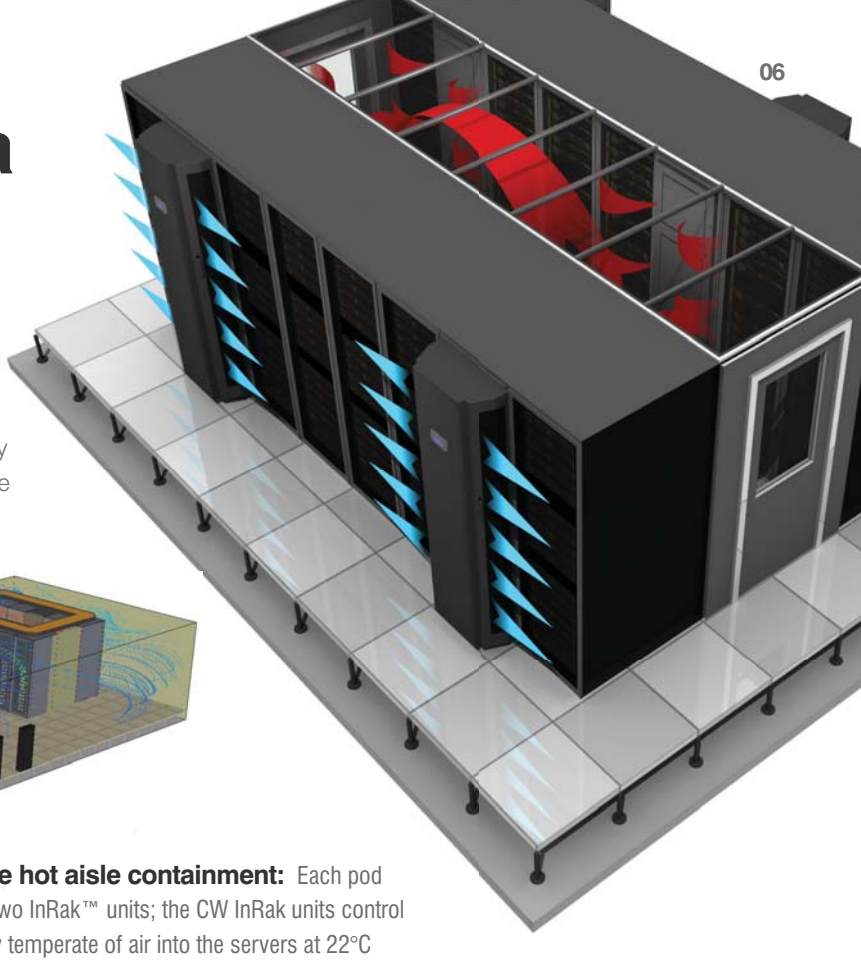
Up to 95% of the year spent in free-cooling



InRak™ – cooling via the shortest route

Ideal for rooms with or without a floor void and offering more cooling/m² than a CRAC unit, the 10 – 60kW InRak™ in-row cooler is also extremely versatile. It can be positioned within a row of six 10kW server cabinets in a medium density room, for example, or sit between two 30kW racks in a higher density area. The InRak™ directs cold air horizontally to the front of the server racks, which acts like a curtain, providing even cooling top and bottom and maintaining pressure.





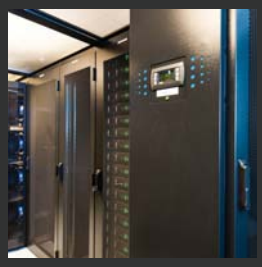
Example hot aisle containment: Each pod includes two InRak™ units; the CW InRak units control the supply temperate of air into the servers at 22°C ±2°C; hot aisle temperature is 36°C

CW
CHILLED WATER

Up to 90.34 EER*

Optional n+1 fan configuration, smart control logic and EC fan technology, give the InRak™ built-in redundancy and excellent part load efficiencies

* Energy Efficiency Ratio



"The InRak™ makes the aisle containment far more efficient"

The InRak™ units are very clever; they communicate with each other to maintain pressure and temperature consistent in the room. Their EC fans are linked to the ACIS™ and ramp up and down according to demand. ACIS™ gives us 24/7 control of the operation and peace of mind. When fully populated, Airedale's cooling solution should guarantee an annualised PUE of 1.3 for the room."

Mike Marchant
Data Centre Manager
EMIS

High efficiency ECHO system 50% less air volumes

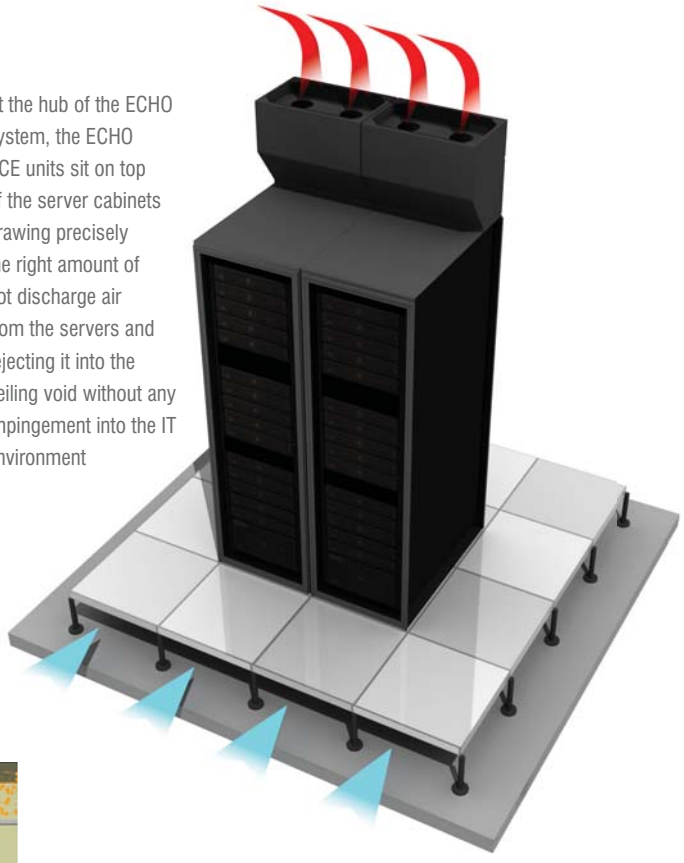
The high efficiency ECHO IT cooling system operates with air volumes 50% less than traditional cooling systems. It comprises an ECHO ACE (Active Cabinet Exhaust) unit, CRAC unit, free-cooling chiller and control system.

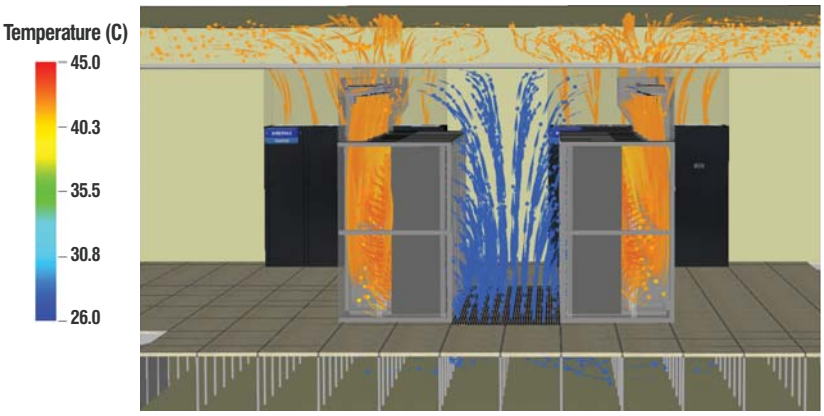
The combined system ensures the right air temperature, in the correct quantity and at the correct pressure, is presented to the server inlet. Elevated water temperatures allow up to 95% free-cooling. All noise is contained and the entire data centre is at server inlet temperature, eliminating hot spots and creating a more comfortable working environment, with no CW connections in the IT space.

Typically 56% energy savings* and payback** in less than a year

* compared to a conventional downflow CW system
**of the increased capital costs

At the hub of the ECHO system, the ECHO ACE units sit on top of the server cabinets drawing precisely the right amount of hot discharge air from the servers and rejecting it into the ceiling void without any impingement into the IT environment



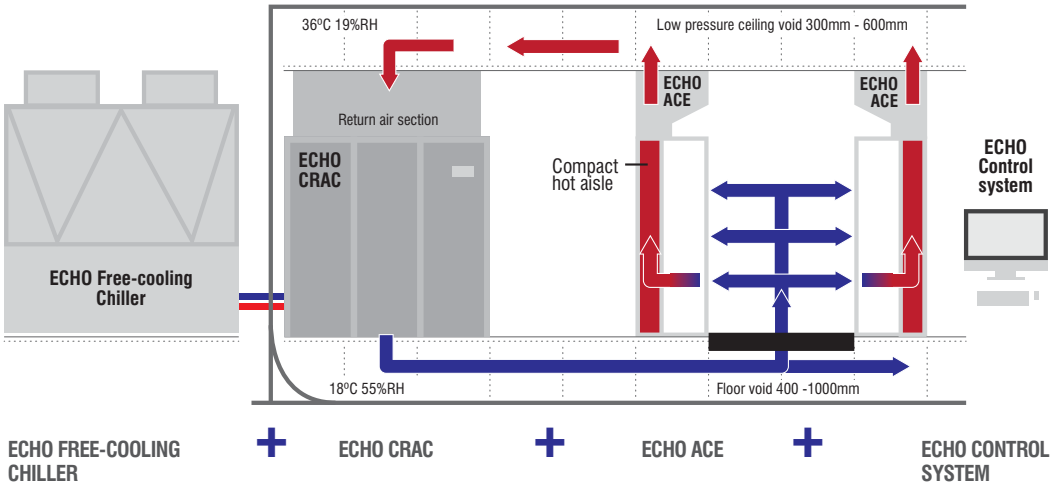


Example ECHO system:
Two CW ECHO CRAC units are cooling ten server racks with a total load of 180kW. The ECHO ACE compact hot aisle is at 43°C and server inlet at 27°C

SPACE SAVING

There is no re-circulation of hot air into the IT space, eliminating the need for hot aisles; the ECHO ACE sits on top of a rack and there are no CW connections required at the rack

ECHO IT Cooling System



High density cooling

Where it matters

> 20kW per rack

OnRak™ targeting hot spots

In high density areas hot spots abound and space is at a premium. The OnRak™ is a resilient rear door heat exchanger, designed to manage discharge temperatures directly from the server into the aisle space. Ideal for dealing with hot spots, the OnRak™ takes full advantage of the high temperatures, increasing the efficiency of the cooling system and raising the free-cooling potential when integrated with a free-cooling chiller. Extremely flexible, it is easily applied directly to a 42 – 48U rack or supplied with a mating frame to fit any manufacturer's rack.

144.68 EER* and 88% saving in power input p.a. OnRak™ with EC fan

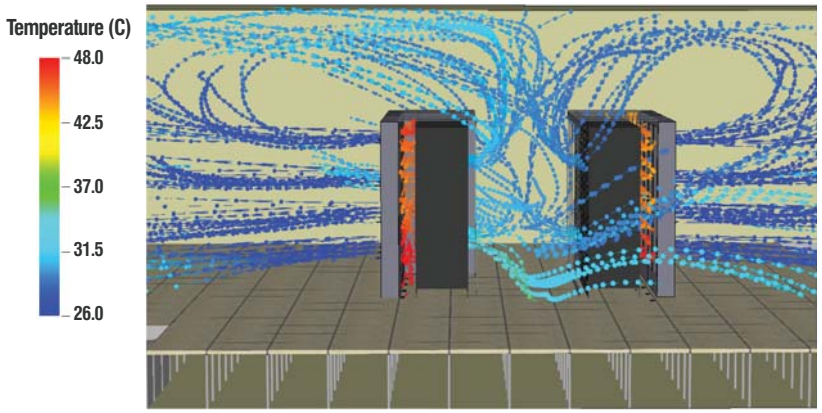
Compared to a traditional PAC unit to the same capacity

* Energy Efficiency Ratio

"The OnRak™ allows us to go to higher densities

Our HPC (High Performance Computing) facility is growing and without the use of the OnRak™ rear door coolers it would not be possible to go to such high densities. The OnRak™ has saved us space in an already densely packed environment. It has also given us the flexibility to fit rear door heat exchangers to legacy or new cabinets from any manufacturer."

Dr Jon Summers
Senior Lecturer
The University of Leeds



OnRak™ units each cooling a 20kW heat load; the OnRak™'s compact hot aisle temperature is 43°C and the cold aisle is 27°C

SPACE SAVING

The OnRak adds only 200mm to the depth of the server rack

Intelligent controls

Seamlessly managing your system

The control centre of each of our cooling systems is a sophisticated electronic microprocessor specially developed by Airedale. The intelligent microprocessor uses sensors to send and receive messages to and from active components so they respond and interact. By integrating and sequencing components, the controller manages and optimises the system's performance, availability and power draw, giving the operator complete system control.

Fully-programmable via the control panel's user-friendly display, the microprocessor can be linked with all standard BMS protocols and will:

- **Trigger alarm messages**
- **Send alarm/service messages via email or SMS using an interface**
- **Operate time scheduling**
- **Allow adjustment of temperature setpoints**

ACIS Building Management

Taking data centre management to another level

ACIS™ building management system developed by Airedale, enables you to manage smart cooling and other building services, from any manufacturer, in a single, integrated system across multiple sites and communication protocols. ACIS™ sits at the front end of a building system, putting you in control of reducing operating costs.

With the click of a button on a PC, tablet or phone, intelligent information can be pulled back automatically for remote 24/7 monitoring and maintenance including live PUE, EER and COP calculations and power distribution monitoring.

Integration protocols

Modbus® BACnet™ PlantVisorPRO TREND SNMP ECHELON

Total support
Whenever you need it

Sharing our expertise

By investing in an Airedale cooling system, you can benefit from our advice, expertise and support all along the way. From design and selection through to commissioning and beyond, we make sure your cooling system reduces your total cost of ownership and gives you maximum system availability and longevity.




1 Talk directly with an experienced engineer

+44 (0)113 239 1000

Find out how we design our systems to reduce your whole life costs. Our highly experienced engineers are adept at tailoring our systems to suit your solution.

2 Have complete control of your site

Customers with critical sites can benefit from our remote monitoring facility. After-sales services include chiller sequencing, network setup and integration as well as a live demonstration and training centre at our head-office.

3 24/7 support; maintenance and spares

Knowing you have immediate help on hand day or night, is reassuring particularly if you are responsible for keeping critical systems operational 24/7. Realise the full potential of your system; improve its longevity and efficiency and be F Gas compliant. Avoid downtime with our fast, efficient spares service.

4 Develop your skills

Learn more about your cooling system by attending an air conditioning and refrigeration course in our purpose-built training school. Train on high-tech cooling systems and fully operational rigs in our dedicated workshops. Industry-recognised courses also available.

Air conditioning & refrigeration courses

+ Module 1 - Basic refrigeration & air conditioning
+ Module 2 - Air conditioning installation, commissioning & maintenance
+ Module 3 - Design principles

Regulatory industry courses

+ ConstructionSkills F Gas J11 Category 1, 2, 3 & 4
+ ConstructionSkills JO4 & JO5 Pipework & Brazing
+ ConstructionSkills Essential & Refrigeration Electrics
+ Air conditioning & refrigeration technology

Book online: www.airedale.com/training

ChillerGuard™ and SafeCool™ Service Plans
maximising your system's efficiency 24/7

An Airedale service plan provides a planned, preventative maintenance package to sustain the optimum efficiency of your system and enable the user to see real savings in energy costs and reduced carbon emissions. A priority, 24/7 emergency helpline; professional support and call-out service is on hand throughout the year with guaranteed response by a fully qualified Airedale engineer. The service plan also ensures F Gas compliance and incorporates a full parts and labour warranty for the first 12 months.

For more information visit www.airedale.com

* For customers outside the UK, our international distributors trained by Airedale would be pleased to offer service on Airedale units

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Airedale
APPLIED THERMAL INNOVATION

www.airedale.com

Airedale International Air Conditioning Limited | Leeds Road, Rawdon, Leeds LS19 6JY, England
Tel: +44 (0) 113 239 1000 **Fax:** +44 (0) 113 250 7219 **E-Mail:** enquiries@airedale.com

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