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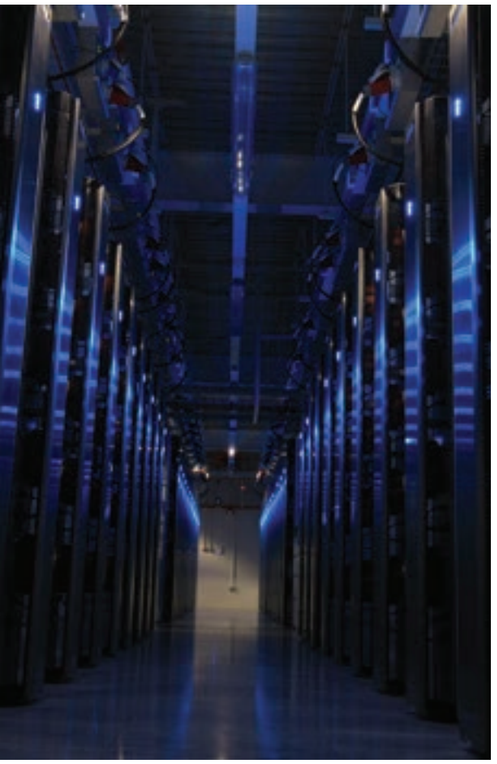
COLDLOGIK

THE LOGICAL DATA CENTER



YESTERDAY'S THINKING

FOR TODAYS DATA CENTERS

Nobody invites change, especially when their existing business model works and is profitable, so for change to occur, there are normally key drivers. The data center industry is no different and the need for change is beginning to accelerate.

Data center owners are being made accountable for their environmental impact, poorly designed data centers simply create massive carbon emissions, waste vast amounts of valuable potable water and continue to use ozone depleting refrigerants. Because emotion alone doesn't always create change, enforcement via legislation by governments, alongside demands from customers and stakeholders, is starting to be introduced to help combat high carbon emissions and encourage sustainability.

Technology changes are also a key driver in data center utilization, and the introduction of new chip sets, with their leap in compute power and the resulting increase in heat load, will leave many air moving data center designs, even with bolt on improvements simply unable to cope.

But, it will be the customers who will choose to use eco-friendly data centers, that will prove to be the tipping point – The good news is, change is a coming!

ABOUT US

USystems are positively led by innovation, passion and desire to revolutionize the cooling solutions offered within the sector, whilst leading the change in modernizing the utilization of the white space and to help drive the overall advancements in data center designs.

Commitment to the ongoing reduction of carbon emissions is important to USystems, we strive to provide the sector with cost-effective and sustainable solutions, that can operate without mechanical intervention in a wide range of environments, and consequentially contributing to our customers own environmental ambitions and help achieve legislative targets.

We have a wealth of history and experience in data center cooling design which allows us to provide true value. We continue to listen to and work with our customers while observing the market and new technologies closely, permitting us to continue to push envelopes and develop our solutions even further.

ColdLogik technology is deployed globally in numerous world leading data centers. Our clients are pushing the limits of what is possible in terms of cooling and energy efficiency. As data driven processes scale to the mass market it is essential that the infrastructure in place to support is efficient to help fight the exponentially growing climate change crisis. Cooling a data center, impacts all industries and all walks of life.

THE MODERN

DATA CENTER APPROACH

A modern data center design should be able to meet each one of these drivers, and at the same time offer more. A ColdLogik data center does exactly that. A data center that is robust, adaptable and ready to control the whole room temperature from this one single solution in a sustainable and more profitable way.

Capable of low, medium and high duty using the same technology and control philosophy – it's not genius, it's simply ColdLogik!

WE ENGINEER FOR A SUSTAINABLE TOMORROW.

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SUSTAINABILITY & PROFITABILITY

PRODUCT BENEFITS

Energy Saving

- Energy Efficiency Ratio (EER) of over 100 at maximum capacity
- Average 15% reclaimed power for Compute by comparison to traditional cooling
- Potential Cooling PUE available of 1.035 with RDC
- 3.5% ColdLogik Power to Cool 100% Heat Load vs 38% traditional methods

Carbon Reduction

Isolating Global Warming Potential (GWP) gasses to one centralised area, and reducing the volume of GWP gas significantly.

Zero Water Use

Higher water temperatures reduce the need for mechanical cooling, whilst maintaining ASHRAE A1 temperatures.

Simple Design

Control the entire room temperature without the need for supplementary cooling or specialized hardware, enabling fast-track Data Center planning.

Real Estate Increase

No requirement for supplementary cooling, and no space is allocated in the white space for coolant distribution.

Operational Savings

Increase computing capacity and hardware lifespan by removing hot spots, plus rapid ROI and lower cost of ownership.

Modular & Retrofittable

Enhanced scalability, rapid deployment, and future-proofing capabilities make it ideal for legacy or new build environments, eliminating the need for raised floors and aisle containment.

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COLDLOGIK RDHx'S

ONE SOLUTION

Rear Door Heat Exchangers (RDHx) are often misrepresented especially by competing product manufacturers.

Most discussions center around the argument between Air Cooling and Liquid Cooling, whereas RDHx's are in a league of their own and are 'Air Assisted Liquid Cooling', which means they provide comparable energy savings and high performance capabilities as liquid cooling products, but without specialist hardware or the requirement of supplementary cooling products in order to cool the rest of the data center. Furthermore they provide the same low CapEx and duty capabilities of 'Air Cooling', but unlike 'Air Cooling' technology RDHx's provide a rapid return on investment 'ROI', at the same time as future proofing the data center.

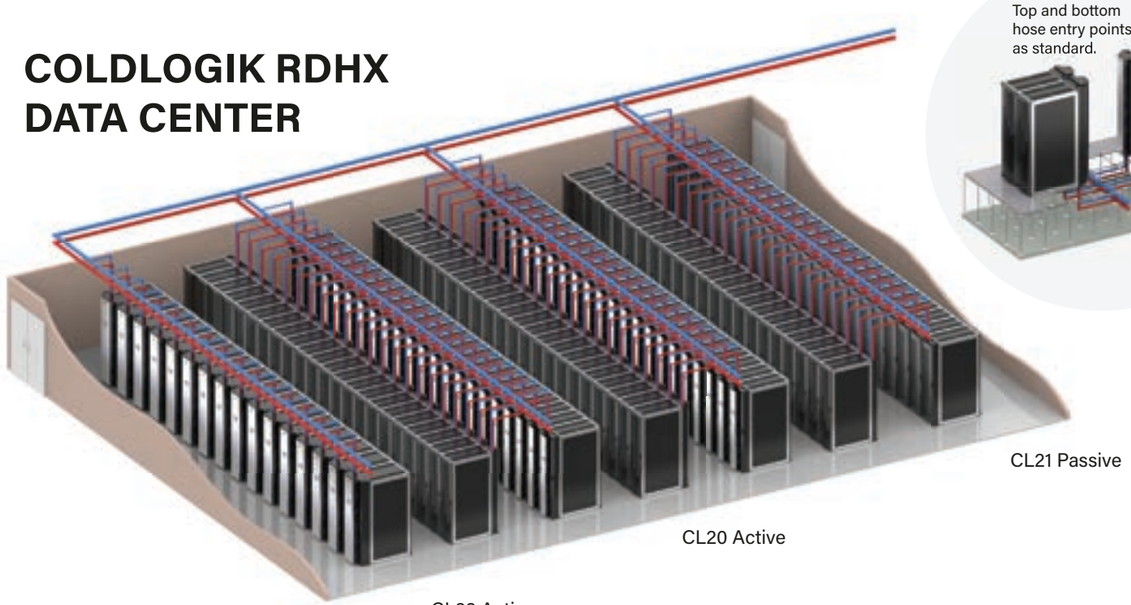
So, to dispel the disinformation, we challenge to prove that RDHx's are the ideal cooling technology for both legacy and new build data centers. Whether the rack density is below 10kW, for typical applications, through to 200kW for high performance compute, ColdLogik RDHx's offer the most cost effective and energy efficient cooling solution on the market.

EXTERNAL PLANTS

Resource/Technology	PUE*
Borehole	1.035
Sea/River/Lake	1.035
Dry-Air Coolers ONLY NB. Climate Dependant	1.06
Cooling Tower/Adiabatic Cooler	1.06
ColdLogik Standard Chiller (20 – 30)	1.18
Standard Chiller (14-20) NB. Industry standard	1.38
Standard Chiller (7-14) NB. Industry standard	1.43

*Cooling Only

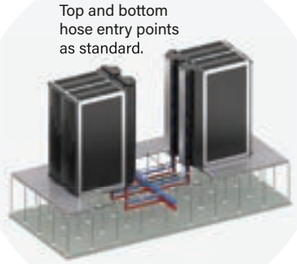
COLDLOGIK RDHX DATA CENTER



CL23 Active

CL20 Active

CL21 Passive



Top and bottom hose entry points as standard.

LEGACY

DATA CENTERS

There are many reasons to want to get more from an existing data center, such as increasing revenue stream, removing hot spots, offering customers greater flexibility, or simply increasing the life cycle of the data center; the ColdLogik RDHx solution provides exactly that, and is the only truly retrofittable solution capable of achieving and overcoming restrictive issues within legacy data centers.

- ColdLogik RDHx's are fully retrofittable onto any OEM Rack
- RDHx's can use the return water from the existing perimeter room cooling and chiller system
- RDHx's can be top and bottom fed as standard
- RDHx's do not affect baying racks on either side

- Full rear access to rack
- Can be retrofitted to Hot Aisle Containment System, without need to change floor layout
- RDHx's are the only retrofittable solution capable of achieving all the restrictive issues within legacy data centers

THE RANGE

CL21

CL20

CL23

HOW IT WORKS

THE ACTIVE AND PASSIVE

Ambient air is drawn into the rack via the IT equipment fans. The hot exhaust air is expelled from the equipment and pulled over the heat exchanger assisted by EC fans mounted in the RDHx chassis. The exhaust air transfers heat into the coolant within the heat exchanger, and the newly chilled air is expelled into the room at, or just below, the predetermined room ambient temperature designed around sensible cooling.

Both processes are managed by the ColdLogik adaptive intelligence present in every active RDHx, in this way the Rear Door Heat Exchanger uses air assisted liquid-cooling to control the whole room temperature automatically at its most efficient point.

The passive RDHx operates in the same way, but because it has no controller or fans, it relies purely on the IT equipment fans producing enough static air pressure to self cool. In the correct deployment, the passive RDHx is truly the most efficient cooling method available today. If the active equipment is unable to produce sufficient air, the CL21 passive also provides an upgrade path without needing to replace the entire unit as with others. This means the airflow represented in the CL21 RDHx below is applicable to both the passive model and its upgrade path.

ROOM MANAGEMENT

Each ColdLogik Cooler is able to operate without requiring active supervision and can be remotely monitored through the Building Management System, or through the ColdLogik Room Management System (RMS) for a 'hands-off' approach to cooling and a significant reduction in service tickets being raised.

COLDLOGIK SOLUTION

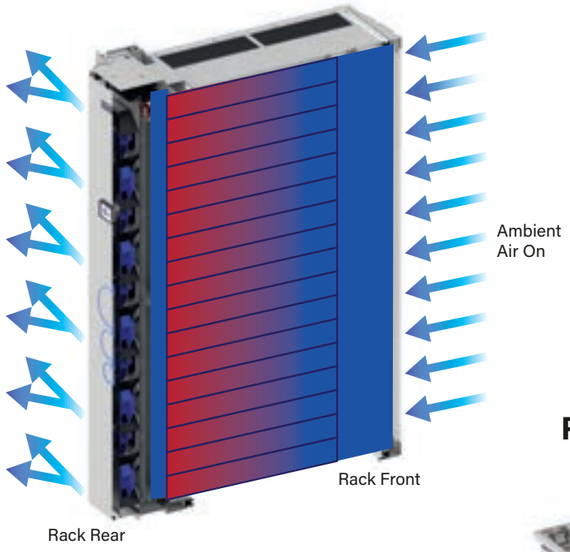
ColdLogik RDHx enhance the efficiency of most data centers without the need for any changes to their current design. However, greater energy efficiencies are achievable when the complete ColdLogik solution is deployed.

By negating the heat at source, and removing the need for air mixing or containment, you gain the ability to significantly increase the supply water temperature, which means more efficient external heat rejection options become available. In some scenarios this means that the ColdLogik RDHx solution removed all compressor-based cooling therefore promoting the option to free cool all year round.

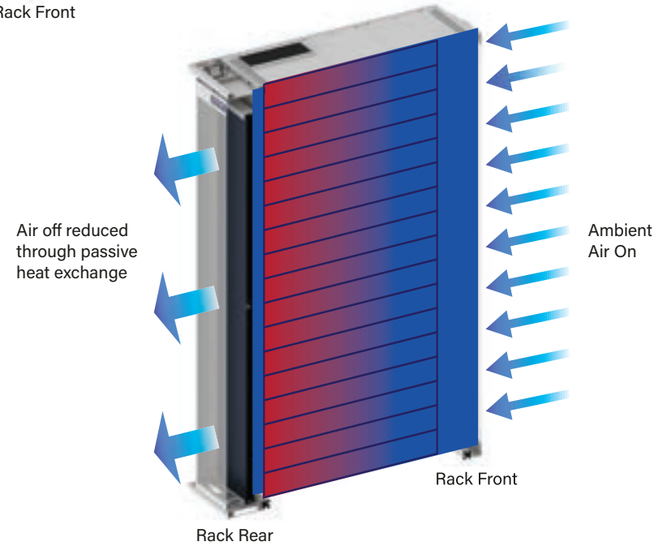
RESILIENCY FEATURES

- Up to N+4 on fans
- A and B power feeds (ATS) as standard
- Specifically designed PCB's for enhanced functionality in the event of failure
- Hot swappable fans
- Universal fans reducing the need for localized resiliency stock
- Leak prevention system available for deployment if requested

ACTIVE RDHx



PASSIVE RDHx

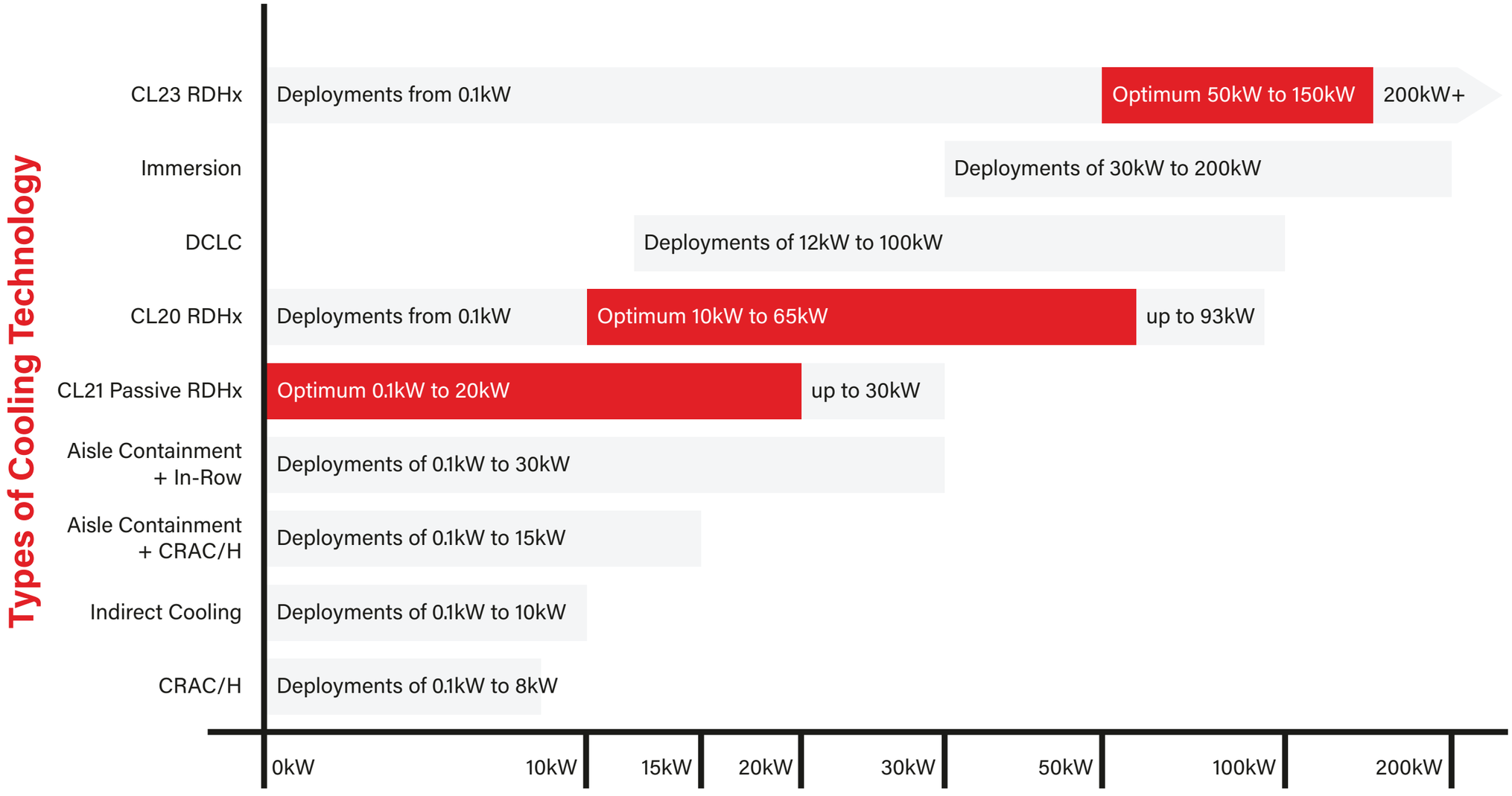


COLDLOGIK RDHx PERFORMANCE

VS OTHER COMPETITIVE TECHNOLOGIES

The ColdLogik RDHx is unique in its proposition. It can efficiently service any duty range whilst offering resiliency in operation and, unrivalled flexibility when it comes to pairing with heat rejection equipment.

This is all whilst negating 100% of the heat generated which is unique by comparison to other HPC deployment methods.



CONTACT DETAILS

EUROPE

Systems House
235 Ampthill Road
Bedford
MK42 9QG

NORTH AMERICA

260 East Main Street
Suite 6413,
Rochester
NY 14604

+44 (0) 1234 761 720

General Enquiries:

uk-bed-sm-sales@legrand.com

Technical Support:

uk-bed-sm-technicalsupport@legrand.com

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