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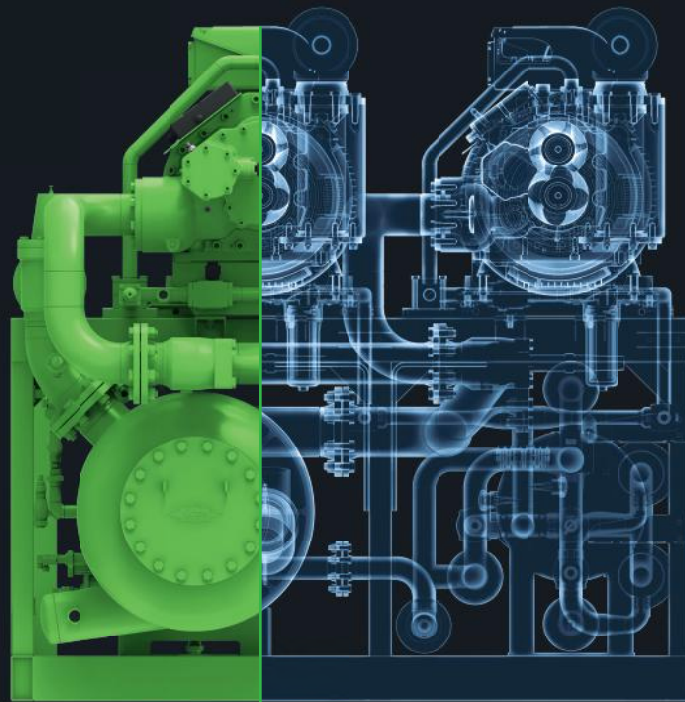
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Welcome to this April / May edition of ACR Journal. It was great to see so many of you enjoying yourselves at the recent National Air Conditioning, Refrigeration & Heat Pump Awards. It was a fantastic event, and credit should go to Juliet and Hayley, who spent a lot of time organising and dealing with last-minute changes to make the evening a success. Congratulations to all the winners and highly commended entries, and thank you to everyone who takes the time to participate. I'm always astounded at some of the dedication and innovation detailed in the entries, so please take time to look through the enclosed award supplement.



Elsewhere, Women in ACR features Clarys Radford, an award winner herself after scooping gold in the Sales and Support Services category at the ACR & HP Trainee of the Year Awards. Trox and Ciat provide indoor air quality features, Sam Bainborough of Vertiv discusses the importance of a holistic data centre cooling design, and Steve Shipp of Ultra Refrigeration explores the vital role of energy-efficient refrigeration equipment.

I hope you enjoy this edition.

Andy



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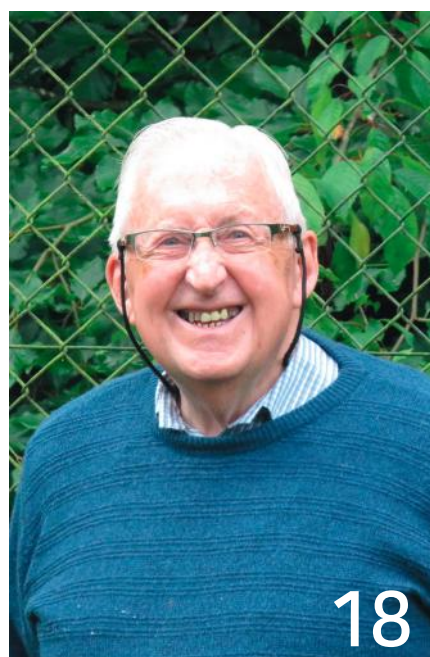
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Illegal refrigerants are still being smuggled into Europe, says EIA

Illegal refrigerant gases are still being smuggled into Europe, new research from the Environmental Investigation Agency (EIA) shows.

Five years after the London-based EIA first reported a widespread illegal trade in hydrofluorocarbon (HFC) climate gases, its new investigation has revealed that significant levels of trafficking persist despite the worsening climate emergency. And the evidence suggests that black market traders and traffickers are becoming more sophisticated and adapting their tactics to evade detection.

Commonly used in refrigeration and air conditioning, HFCs are currently being phased down under the European Union's F-Gas Regulation. But organised criminals attracted by high profits are taking advantage of weak law enforcement to meet the demand left by the transition away from the harmful gases.

In 2021, EIA's report, *Europe's Most Chilling Crime*, highlighted Romania as a key entry point for illegal HFCs arriving in the EU.

The latest investigation, *More Chilling Than Ever*, uncovered evidence of traders primarily sourcing HFCs from Turkey and China to import illegally into the EU. Trafficked from Bulgaria and other countries on the edge of the bloc, these chemicals are smuggled across the continent to destinations such as Greece, Germany, France, Italy, Portugal and Spain.

The new investigation demonstrated that traders are becoming smarter at dodging detection, employing tactics such as avoiding banned disposable cylinders and disguising HFCs as less-regulated hydrofluoroolefin (HFO) refrigerant alternatives.

EIA Senior Climate Campaigner Fin Walravens warned that the illegal HFC trade not only exacerbates climate change but has also been linked to significant tax evasion.

"The EU has recently revised its F-Gas Regulation, offering enforcement agencies additional tools to combat illegal trade – but these will only work if they are implemented quickly and effectively," she said.

"As 2024 signals another reduction in HFC supply to EU markets, this risks fuelling demand for illegal HFCs. There is an urgent need for coordinated, proactive enforcement efforts across the EU to combat HFC climate crime."

More Chilling Than Ever calls on the European Commission and all EU Member States to prioritise implementation of compliance-related measures under the new F-Gas Regulation and to step up enforcement.

Walravens added: "Globally, HFCs are being phased down under the Kigali Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer. As countries around the world begin to reduce HFC consumption, they can learn important lessons from Europe's experience of illegal trade.

"There is a clear need to invest and strengthen monitoring, reporting, verification and enforcement under the Montreal Protocol and to build capacity in developing countries, to ensure it is fit to meet the complex challenges posed by the global HFC phase-down.

"Ultimately, the illegal trade in HFCs is fuelled by ongoing demand for the gases, primarily used in the cooling sector, and there is an urgent need to find better ways to keep cool."



Mitsubishi Electric sets pace at partner conference



Mitsubishi Electric hosted its new-look partner conference and expo, PACE24, designed to provide customers with information around Net Zero and support to help their businesses to thrive in the future.

The manufacturer used the conference to explore the opportunities that Net Zero brings to its customers, as well as how the wider supply chain is approaching the task of decarbonising. The event discussed key drivers for change such as F-Gas regulations, as well as the products and solutions available to Mitsubishi Electric customers that meet requirements today and in the future.

A number of guest speakers also joined the event. Lord Deben, pictured, former chairman of the Committee on Climate Change, examined why Net Zero was so important for businesses and how their commercial customers will be asked and pressured to lead the change. Jennifer Kelly, Head of Sustainability at Chester Zoo, Andy O'Hare, Climate Lead at NatWest, and Phil Draper, MD at Twenty One Engineering, all gave different perspectives on the opportunities ahead.

The event also showcased Mitsubishi Electric's product roadmap, including the VRF, HVRF and commercial heating range, as well as new products which will expand Mitsubishi Electric's portfolio in refrigeration and controls. The expo area covered the latest in VR training tools, as well as a wide range of ways Mitsubishi Electric Partners can be supported.

More information about the Mitsubishi Electric Partner Programme is available at: <https://les.mitsubishielectric.co.uk/installers/partner-programme>

BREng on move to meet demand

Low-carbon HVAC specialist BREng has moved to larger premises in Hull city centre.

Managing Director Rob Smelt said: "There is a tremendous surge in demand for HVAC projects focussed on decarbonisation and energy reduction. This is being driven by the recent steep rises in energy costs and the imperative to move to low-carbon technologies. Our new premises provide the facilities to meet the expanded workload."

BREng has particular expertise in decarbonisation and low energy solutions, including integration of heat pumps, heat recovery systems, energy optimisation, control strategies, ventilation and on-site troubleshooting. It recently completed decarbonisation projects for a number of schools in the North East, including conversion to air source heat pumps and phased projects using enhanced heat emitters.

Current projects include a heat-recovery system for an NHS consulting centre in Wembley, an integrated HVAC system for an office complex in Derby, and a high efficiency close-control temperature and humidity solution for a German-owned prestige motor manufacturer.

The company recently introduced a 3D digital building scanning service that involves rendering an entire building envelope in digital form for use in BIM project planning. This enables detailed schemes for HVAC, plumbing and electrical services to be mapped out without the need to attend site.

As part of the expansion, the family-owned company – founded by Rob Smelt and Bridget Marvin-Smelt in 2019 – has been joined by sons Tom and Jack, who specialise in building services engineering and building digitalisation respectively.



Rob Smelt added: "It is an exciting time to be part of the air conditioning and building services industry. The technology, and the legislative framework in which we operate, is changing rapidly. It will have a huge impact on the entire national building estate, and require massive investment by both the public and private sector to achieve the net zero targets mandated by government.

"With more than 30 years experience in the industry and proven expertise in low carbon solutions, BREng is well placed to help clients plan their journey to net zero."

BCIA backing for Teenage Cancer Trust

Graeme Rees, Immediate Past-President of the Building Controls Industry Association (BCIA), has presented a cheque for £11,679 to the Teenage Cancer Trust, his nominated charity during his two-year term as President.



As a charity close to his own heart, Rees was committed to raising both money and awareness of trust's work and an impressive £5,000 was raised in just one night at the 2023 BCIA Awards. The BCIA also set up a five-million step challenge to attract sponsorship and donations, with a number of BCIA members getting involved and committing to the cause. The challenge was inspired by Teenage Cancer Trust's Walk With Us 15,000-step challenge, which is driven by the amount of steps per day the average nurse works in their role of supporting young people and their families affected by cancer.

Rees said: "One of my wishes when I became BCIA President was to see if we could do more to support our nominated charity and I am delighted at how our members responded and engaged so passionately with the challenge. I am very proud to sign off my term with this contribution and I would like to thank everybody who has done their bit to support this hugely important organisation."

Helen Farquharson, Senior Relationship Manager at Teenage Cancer Trust, said: "We are so grateful to Graeme for choosing Teenage Cancer Trust as his charity, and to all at the BCIA for their fantastic support in 2022 and 2023. Members have really gone above and beyond with their efforts, with an incredible response at the Awards and the five-million step challenge."

www.teenagecancertrust.org

Flying start for NRGs golf season

The Northern Refrigeration Golf Society (NRGS) hosted its first event of the year at Wheatley Golf Club, Doncaster, with the course in excellent condition despite heavy rain beforehand.

Following a breakfast of bacon sandwiches, NRGs captain Mike Ruston, from Coldtemp, triumphed in the 18-hole ISD Trophy competition, with ACR Journal editor Andy Slater runner-up and Karl Anderson (Oceanair) third.

Paul Fisher won the 9-hole ACR Journal Trophy competition, with Richard Dawson runner-up.

More than 20 guests enjoyed a great day of golf and evening meal.



ACR Journal Trophy winner Paul Fisher, centre, with Mike Ruston, left, and Andy Slater



ACR Journal Trophy runner-up Richard Dawson, right, with Mike Ruston and Andy Slater

Toshiba partners with Viridus in Ireland

Toshiba Carrier UK has appointed Viridus Energy as its new distributor in Ireland for its Toshiba air conditioning products..

Dublin-based Viridus takes over from GT Phelan, which worked successfully with Toshiba for more than 40 years. The company already had a relationship with Toshiba Carrier UK before becoming its new distributor.

David Dunn, Toshiba Carrier UK Managing Director, Carrier Global Comfort Solutions Europe, said: "Due to the excellent work of our distributors over many years, Toshiba has a fantastic reputation in Ireland as a high quality brand, with a combination of industry leading efficiency, reliability and technical excellence. We will be working closely with Viridus Energy over the coming months and years to build on this and realise the potential."



Tom Lyons, Managing Director of Viridus Energy, said: "Holding the distinction of being an independent distributor for Toshiba products in Ireland, our expertise in this brand's technical details and capabilities are second to none."

CAREL reports anniversary year growth

Controls specialist CAREL says its 50th anniversary year delivered 'solid and steady growth'.

The CAREL Industries board has approved the results for 2023, with consolidated revenues equal to €650.2 million, up 19.3% compared to 2022. Net of the impact of currency exchange rates, the company says growth would have been 21.1%.

Francesco Nalini, CEO of the group, said: "I am particularly proud to present the results of 2023, as the year just ended marks the 50th anniversary of the CAREL's foundation. In these first 50 years, we have achieved exceptional milestones. We started as a small local company and have become a world leader in the design, development and production of control solutions for air conditioning, ventilation and refrigeration.

"The daily commitment of those who have put their talent and enthusiasm at the company's disposal, together with the constant search for innovation based on environmental and social sustainability, have made it possible to shape an uninterrupted path of success that has also marked the recently concluded year."



Francesco Nalini of CAREL

Nalini described external growth for the year as "very satisfactory" with the acquisitions of distributor and system integrator Eurotec, in New Zealand, and Norwegian software solutions company Kiona.

He added: "In order to maintain the financial flexibility to be able to take advantage of possible further investment opportunities in the near future as well, in the second half of 2023, we proceeded to launch a capital increase of approximately €200 million, which met with considerable interest in the market and was successfully closed at the end of December."

World Humidity Control Day launched



The Humidity Control Group, a specialist group within the HEVAC trade association and part of the Federation of Environmental Trade Associations (FETA), launched the inaugural World Humidity Control Day on March 12.

World Humidity Control Day commemorates the visionary John Frederick Daniell. Born on March 12, 1790, Daniell was an English chemist and physicist who, in 1820, invented a dew-point hygrometer - a device that indicates atmospheric humidity - which then came into widespread use.

Humidity control is important for several reasons. High humidity levels can lead to discomfort, making the air feel heavy and causing excessive sweating, whilst low humidity levels can cause dryness in the air, which can lead to respiratory issues, dry skin, and irritation of the eyes and throat. Humidity control is therefore used to maintain a comfortable and healthy indoor environment.

John Barker, Chairman of the Humidity Control Group, said: "World Humidity Control Day gives us the perfect platform to raise the profile of humidity control whilst recognising the achievements of John Frederick Daniell. By improving education and awareness we can better promote the many benefits of maintaining optimum humidity levels in the buildings we live and work in."

The group has created a website at www.worldhumiditycontrolday.co.uk

Vent-Axia innovation earns CIBSE air quality accolade

Sussex-based ventilation manufacturer Vent-Axia won the Product or Innovation of the Year - Air Quality category at the CIBSE Building Performance Awards for its Sentinel Apex commercial heat recovery ventilation.

After a rigorous judging process, the judges selected the Sentinel Apex, which they noted supplies fresh, healthy, filtered air to improve indoor air quality (IAQ), removing pollutants such as moisture, carbon dioxide and external fumes. The award judges also noted that Vent-Axia's Sentinel Apex was developed from the outset with equal consideration to operational performance and whole life costing, and this is visible in the data available for the product.

Designed to have a low embodied carbon footprint, Vent-Axia has used the

CIBSE TM65 data collection methodology to collect accurate, detailed embodied carbon information for the Apex, working from a component level upwards. This methodology ensures data is comprehensive, accurate, reliable and up-to-date, making it easier for specifiers to focus on designing low carbon

Lorna Kerrigan-Hall, Sales Director C&I at Vent-Axia, said: "This marks the third industry award for the innovative Sentinel Apex since its launch in November 2023. We understand the challenges that come with designing low-carbon buildings, which means every aspect has been considered in the Apex's development to maximise its energy efficiency and performance, while providing excellent IAQ, ultra-low sound levels and thermal comfort."



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Record year for Ziehl-Abegg



German electric motor and fan manufacturer Ziehl-Abegg has reported its most successful year ever, with revenue growth of 9.5% in 2023 to €955million.

Dr. Marc Wucherer, CEO of Ziehl-Abegg, said: "This is the best year in the company's history."

A highlight of 2023 was the groundbreaking new plant in the US, a €100 million investment to support growth in American markets. Ziehl-Abegg also began construction of a new plant construction in Vietnam and launched a new production facility in Poland.

This year, production is being set up in India, while in Germany, Ziehl-Abegg has invested more than €30 million in an improved machinery park and automation technology.

Food group targets emissions savings with Transicold Eco-Drive

Hunt's Food Group has taken delivery of its first tractor fitted with the Carrier Transicold Eco-Drive system, alongside three new specialist 15.5m variable deck longer semi-trailers (LST), each mounted with a Carrier Transicold Vector HE 19 MT unit.

The addition of the new trailers, which were supplied by Gray & Adams,

means that 12 of the company's 13-strong trailer fleet are now Carrier-cooled. By opting for the 15.5m LST design, Hunt's Food Group will benefit from the ability to carry more payload per trip, reducing the number of overall delivery journeys required and therefore helping to cut its carbon footprint – savings that increase further when combined with its new Eco-Drive unit.

"Having exclusively opted for Carrier Transicold products since 2015, we've grown accustomed to both top-notch service and unrivalled performance," said Phil Hopkins, Transport Director, Hunt's Food Group. "The addition of the new Eco-Drive technology to the fleet is very exciting, especially when combined with the Vectors on the larger trailers. We are especially grateful to how closely Carrier worked alongside Gray & Adams on the design of the new LSTs, the team went above and beyond to make sure we received the ideal solution for our needs."

Combining Carrier Transicold's E-Drive all-electric technology with a multi-speed engine design, the Vector HE 19 MT can deliver up to 30% fuel savings when compared to the previous generation Vector 1950. The presence of a fully hermetic scroll compressor and economiser also provides a 40% increase in refrigeration capacity during pull-down, all while being 3 db(A) quieter than the legacy unit, helping to minimise sound pollution. The hermetic scroll compressor further boosts the Vector HE 19 MT's sustainability credentials by providing unparalleled levels of refrigerant gas containment, which plays a significant part in reducing overall carbon emissions.



BESA guidance on alternative support systems

The owners of Bracknell-based HVAC specialist Campbell West have gone back to the future to strengthen the company's workforce and air conditioning offer.

Steven Campbell and Daniel West left school to become apprentice plumbers and have now shown their continued faith in the training system with a £10,000 investment in two members of the team.

Frank Smith and Tommy Gill have boosted their skillset by completing a 15-day new starter refrigeration course at Ellis Training in Hertfordshire, becoming certified F-Gas engineers in the process.

Director Daniel West said: "We are committed to ensuring we offer customers the highest possible standards which is why we invest in our people, so they're equipped with the very latest skills and expertise.

"Steven and I are both products of the apprenticeship system which we still see as key to maintaining the company's growth. So we're delighted Frank and Tommy did Campbell West proud by passing this challenge with flying colours and we know they will enhance our air conditioning service."

The Refrigeration, Air Conditioning & Heat Pump Systems City & Guilds course mainly involves practical sessions, learning to use tools and equipment and installing systems. The pair will hone their new skills by carrying out some of the smaller air conditioning installations Campbell West has on its order book.



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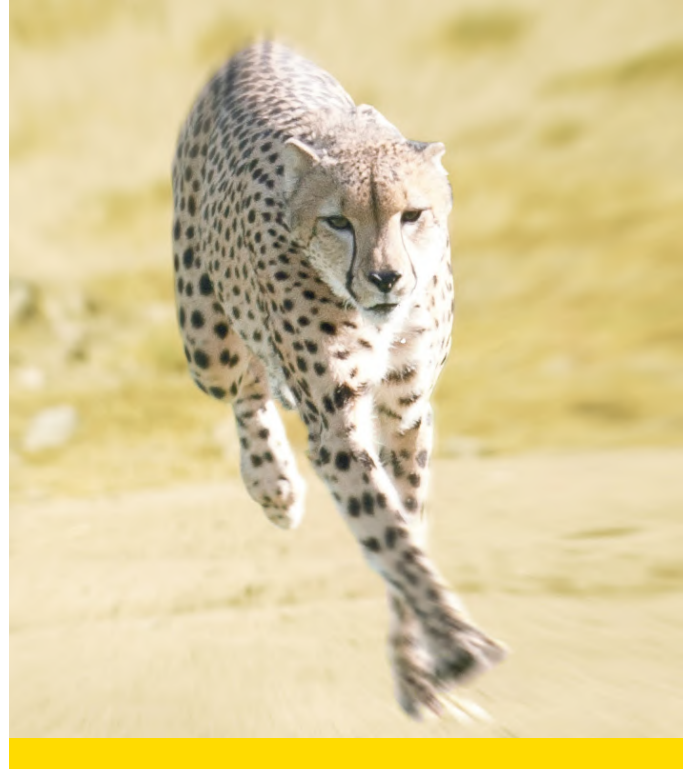
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Have you got the right tools for the job?

TOOLS TALK

Luke Parry, Area Sales Manager and BOSCH expert at DiversiTech International, explains why the BOSCH RG-4.0 is the “must-have” recovery machine to own in your tool line-up for 2024.

This efficient, well-designed and robust machine makes refrigerant recovery easier and safer, while boasting the sleek “BOSCH” branding. Its 1/2 HP 1700-1750 rpm (110V) / 1/2 HP 1400-1450 rpm (240V) motor ensures it always delivers the best performance anywhere.

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The right tools for the job

With the growing use of hydrocarbons in the refrigeration industry, it is important to ensure that the right equipment is being used when servicing and maintaining any equipment.

There are very few options on the market for the safe recovery of hydrocarbons. The Bosch RG 4.0 is a refrigerant recovery machine which is suitable for recovering all HCFC, HFC, HFO refrigerants and is A2L compliant.

The proof is in the certification!

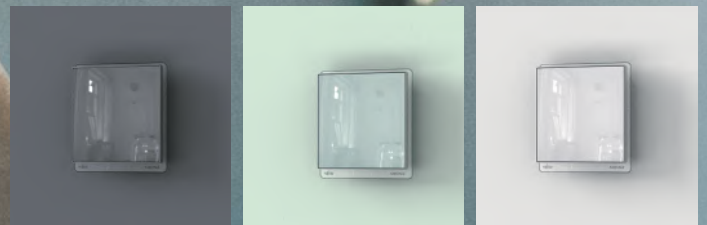
Being Bosch, the product development team were not content at stopping there. The Bosch RG 4.0 is also independently certified as being SAFE for USE with A3 refrigerants – which



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Model name : UTY-RVRY

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Enhancing wellbeing and efficiency

Matthew Maleki, CIAT's indoor air quality champion, explores the significance of the new IEQ Standard and what it means for the workplace.



Matthew Maleki



We think of our workplaces and homes as our 'safe spaces,' but most people have little idea of the significant impact indoor air pollutants can have on our mental and physical health. In the UK, worklessness through sickness absence and health-related productivity losses costs the economy over £100bn every year.¹

As more and more people return to the office after working from home during the pandemic, making our workplaces safe and healthy spaces becomes increasingly important.

Specifically tailored for non-domestic buildings, the new British Standard for IEQ offers comprehensive recommendations for measuring, monitoring, and reporting the health and wellbeing performance of indoor spaces.

Embracing this standard and making small changes in the way we manage and maintain our indoor environments can make a significant impact on occupant wellbeing and productivity, whilst reducing energy consumption and system running costs. For instance, implementing demand control ventilation (DCV) can typically

reduce a building's HVAC running costs by 20-70% depending on the type of application and occupancy.²

What is the new standard?

The British Standards Institute's BS 40102³ is a new standard that covers the evaluation of a building's health and wellbeing and indoor environmental quality (IEQ), including a new best practice approach to indoor air quality, thermal comfort, and overheating in buildings.

The standard provides an evaluation and rating system which aims to enhance IEQ to create healthier buildings and boost the wellbeing of building occupants. The IEQ performance score is based on air quality, light quality, thermal comfort and soundscape quality. A building's HVAC system plays a fundamental role in indoor environmental quality and should therefore be focussed upon.

The new exposure limits are based on DEFRA Daily Air Quality Index, WHO Air Quality Guidelines 2021, Approved Document F, BREEAM and WELL Guidelines and British Standard BS EN 16798-1.

Why do we need the new standard?

The effects of poor quality air indoors have long been overshadowed by outdoor pollution – although we spend more than 90 percent of our time inside and 3.2 million people die prematurely due to indoor air pollution each year, according to WHO.⁴

Carbon monoxide from cooking and heating, volatile organic compounds (VOCs) from personal care products, particulate matter, tobacco smoke, paint, solvents, mould and bacteria can all affect the quality of air indoors. In fact, more VOCs are emitted from personal care products than there are emitted from all the petrol and diesel vehicles on the road at any one time.

It's not just cognitive function that is impaired by indoor air pollution, it also has a major effect on our physical health. A large number of hospital admissions in the UK could be related back, whether directly or indirectly, to air quality issues.

Respiratory issues, dry skin, headaches, and ear, nose and throat issues are just some of the short-term problems caused by poor indoor air quality – but long-term it's even more significant.

England's chief medical officer Chris Whitty, after being at the forefront of speaking about the importance of ventilation in combating the spread of COVID-19, is now calling for increased focus on tackling indoor air quality.⁵ He said monitoring indoor air quality in public spaces should be standard practice and called for urgent investment to establish records of pollutants that accumulate indoors.

With the drive towards greater energy efficiency, buildings are now being designed to be insulated and as airtight as possible to reduce draughts and avoid heat loss. The result of this is an increase in the retention of moisture in the building with a lack of air circulation and a need to maintain healthy air quality.

The most recent updates to Part F Building Regulations address the need for improving ventilation and offer guidance on the optimum levels of ventilation required to maintain a healthy indoor environment.

What are the benefits of the new standard?

One of the most substantial advantages that BS 40102-1:2023 brings to the table is the potential for cost savings. The local or personalised control and automation of systems not only enhance wellbeing but can also boost energy efficiency, leading to a reduction in operational expenditure. By adopting the standards outlined in BS 40102-1:2023, building owners can optimise their systems to function more efficiently, ultimately saving on energy costs and contributing to a more sustainable future.

Operational efficiency aside, the standard also addresses the pivotal issue of occupant wellbeing. Improved indoor environmental quality (IEQ) has a direct correlation with increased cognitive function, productivity, and a reduction in fatigue, tiredness, and stress. The holistic approach advocated by BS 40102-1:2023 ensures that all aspects of IEQ, including air quality, light quality, thermal comfort, and soundscape quality, are evaluated collectively rather than in isolation. This comprehensive evaluation system provides a benchmark IEQ performance score, enabling organisations to identify areas of subpar performance and implement targeted improvements.

For building owners and managers, customer retention and loyalty are crucial metrics. BS 40102-1:2023 acknowledges this by emphasising the creation of an environment where occupants feel comfortable and valued. The positive impact of improved IEQ on customer satisfaction cannot be overstated. A workspace that prioritises the health and wellbeing of its occupants fosters a sense of loyalty and contentment, ensuring that customers view the building as a location of choice. This not only benefits the building's reputation but also attracts new

staff and customers, further solidifying its status in the competitive market.

How do workplaces tackle IEQ monitoring?

The process of measuring, monitoring, and reporting IEQ outlined in BS 40102-1:2023 involves a multi-layered evaluation system. To begin, a scope assessment should be conducted to determine the extent and parameters of the IEQ review. This includes recording company/organisational information, building structure and building services details, maintenance regimes, and potential external pollutant sources. By understanding the primary function of each space, the typical number of occupants, and the time of day assessments are conducted, building owners can gain a comprehensive overview of their IEQ performance and with the data seek solutions to maintain a healthy indoor environment.

The measurement-based assessment involves recording values for various IEQ factors, including air quality (PM, carbon monoxide, ozone, carbon dioxide), and thermal comfort. Thermal comfort, a critical component of IEQ, revolves around air temperature, relative humidity, and, in the case of buildings with fan-powered ventilation or air-conditioning, air velocity. The inclusion of such parameters ensures a thorough evaluation that goes beyond superficial assessments, providing a nuanced understanding of the indoor environment. Gathering this valuable data will allow the relevant application of ventilation solutions based on the specific needs of the building.

Occupant-based surveys play a pivotal role in ascertaining the IEQ experienced by the users of the building. This user-centric approach acknowledges the subjective nature of wellbeing and ensures that the standards set by BS 40102-1:2023 are not merely theoretical but reflect the real experiences of the building's occupants. This data, combined with the measurement-based assessment, contributes to a more holistic and accurate evaluation of the indoor environment.

Indoor air quality is not always visible.

In fact, the visible elements of poor IAQ, like mould or mildew, occur after long-term exposure to IAQ. Measuring IAQ in real-time can make IAQ visible to occupants. It can allow for actions to be taken to improve IAQ before negative effects, including physical symptoms, can occur.

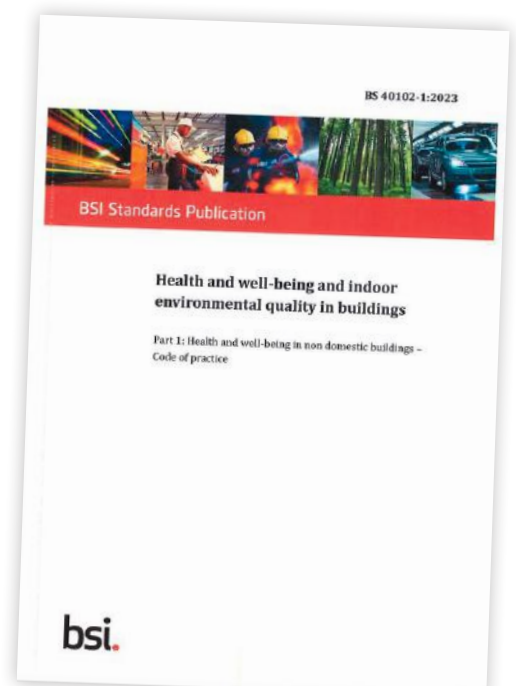
CIAT provides expert solutions to help improve indoor air quality. Many new builds are fitted with smart meters, monitoring the efficiency of mechanical ventilation heat recovery (MVHR) units or air-conditioned spaces where heat pumps utilise fan coil units as the main source of heating and cooling.

IAQ sensors and monitors allow data to be displayed and used for demand controlled ventilation (DCV). When pollutant levels increase, the HVAC system will adjust the air-change rates accordingly cleaning the space. As levels drop, the HVAC system will readjust to design levels suitable for the rate of occupancy. The result is a clean, energy-efficient space.

The new IEQ standard brings much-needed clarity and direction to the realm of non-domestic building management. Ultimately, a healthy building is an efficient building. By prioritising the health and wellbeing of occupants and advocating for a holistic approach to IEQ, this standard positions itself as a valuable tool for building owners and managers.

For further information about CIAT's ventilation solutions visit:

<https://www.ciat.com/en/uk/> 



1) https://assets.publishing.service.gov.uk/media/5ff352f2e90e0776a21a8c9b/References_Health_and_Work_infographics_v_final.pdf

2) <https://www.scauter.hu/wp-content/uploads/ImportPDM/757327.pdf>

3) <https://standardsdevelopment.bsigroup.com/projects/2021-02350#/section>

4) <https://www.who.int/news-room/fact-sheets/detail/household-air-pollution-and-health>

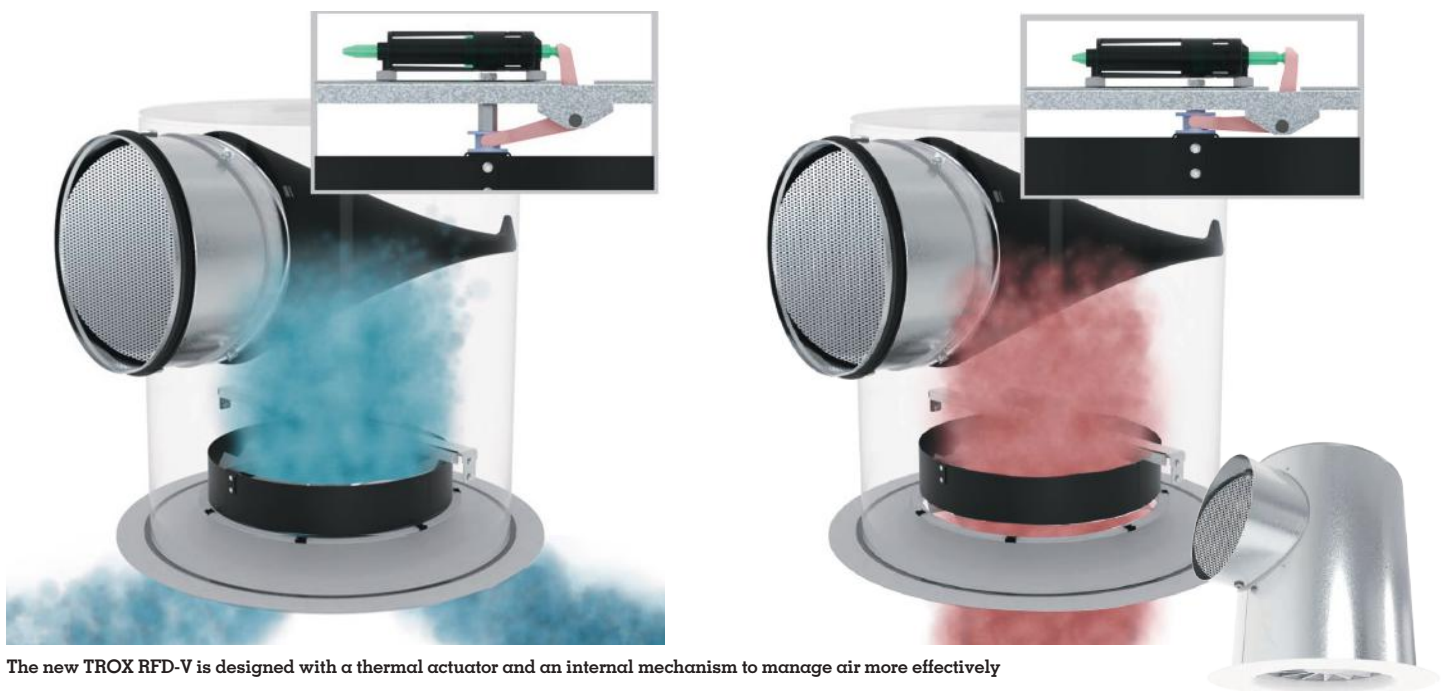
5) <https://www.nature.com/articles/d41586-023-00287-8>

Climate control and air quality in spaces with exposed ceilings



Tim Tanner

By Tim Tanner, Product Technical Manager – Ventilation Technology, TROX UK



The new TROX RFD-V is designed with a thermal actuator and an internal mechanism to manage air more effectively

It is essential that the aesthetic ambitions that the architects or interior designers have for a building can be delivered without compromising the comfortable environment that occupants require on a day-to-day basis.

This is particularly true when spaces involve exposed ceilings, also referred to as open plenums or open ceilings. This style of ceiling involves exposing structural and HVAC systems, leaving these visible to the occupants of the space. The industrial, stripped-back effect that this creates continues to be extremely popular, for a number of reasons.

Firstly the modern aesthetic it creates is, in itself, a popular option. Secondly, it suggests that the building has been designed with minimisation of building materials in mind, for reduced environmental impact. Thirdly, the space can be made to

feel more open plan and airy, enhancing the experience of the room occupant. A traditional suspended ceiling often makes a room seem smaller than it actually is, so an exposed ceiling can give the effect of extra space even in a crowded room. Fourthly, depending on the position of the room within the building as a whole, it may be possible to increase the amount of natural lighting in the space by including skylights.

Furthermore, an exposed ceiling can offer the architect or interior designer increased creative opportunities, through the installation of custom lighting and piping fixtures. Mechanical and electrical installations can become decorative elements, rather than just distribution systems. Lastly, having exposed ceilings can provide extra space for hot air to rise, making rooms cooler, reducing cooling requirement, particularly in warm climates.

Achieving comfort conditions and air quality requirements

Exposed ceilings create climate control challenges, however, as standard air conditioning systems and components are typically designed to work in conjunction with an adjacent ceiling surface.

In spaces with suspended ceilings, Coanda effect prevents ‘dumping’ of cold air into the room. A typical air distribution approach would see the supply air “attach” to the ceiling due to the low-pressure differential between the jet and the ceiling. This keeps the cooler and denser supply air, higher for longer. As it travels the jet of air expands and mixes with the warmer room air, reducing the temperature differential and the velocity. So when it hits the wall (Figure 1) or a jet travelling from the opposite direction (Figure 2) and descends into the occupied zone it is more comfortable for the room occupant.



Figure 1

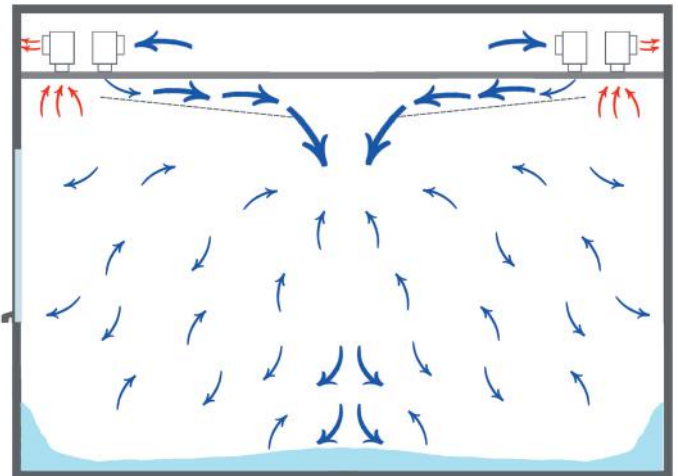


Figure 2

If the ceiling system is removed, for an exposed ceiling, almost all standard diffusers will be unable to function correctly. The loss of Coanda effect/ceiling attachment will result in near vertical discharge of cooler air into the space, resulting in insufficient time for air to mix.

Even with a high discharge velocity and pressure, diffusers may still dump without a ceiling to provide Coanda effect. If the distance from the air discharge to the occupant is not sufficient, the air will not mix, resulting in excessive velocity (high air speed), excessive temperature differential (large difference between room and supply air) and a high risk of draughts. This would make it difficult to achieve the required comfort conditions. ISO7730 states a DR of <20% is necessary for a CAT B environment. This greatly effects the turndown that can be achieved by fan coils and the associated air terminal devices..

Solutions for both cooling and heating

It is possible, of course, to consider slot diffusers for exposed ceiling applications. These are not ideal for use in the middle of a room, but they could still be utilised in certain places with the correct conditions, such as on the perimeter, or when discharging air at a 45° angle.

When discharging at an angle, slot diffusers have to be installed at a higher level than standard slot diffusers, however, and have a lower flowrate capacity to ensure comfortable conditions within the space.

However, a number of diffusers have been launched recently that have been designed specifically for exposed installation. These can provide a more effective alternative. The

TROX Tellus swirl diffuser is one option, for example. It works differently to most diffusers on the market, as it has a gap between the diffuser face and the plenum which allows for the air to discharge horizontally and form a ‘Coanda jet’. The air flowing through the swirl pattern face connects to this jet, increasing the throw distance. For high rooms, Tellus can be provided with a centre punched face for vertical air discharge. Another option is the TROX RFD swirl diffuser. This has an increased diameter discharge nozzle (Dx Face), which ensures the diffuser works well in an exposed application without requiring the high discharge velocities and pressures.

In terms of heating, when there is not a false ceiling in place, the warm air is free to stratify. This means the space above the diffusers will be heated before the occupied zone, wasting energy, slowing the rate temperature change, and possibly creating discomfort (due to high temperature gradients between head and ankle).

The answer to this, and other problems, is the use of variable geometry diffusers. The new TROX RFD-V, for example, is designed with a thermal actuator and an internal mechanism to manage air more effectively. An adjustable internal sleeve enables the unit to move between horizontal and vertical air discharge, depending on whether the system needs to cool or warm the space. During cooling the air discharge is horizontal and radial. As the supply temperature increases the discharge pattern will switch automatically to vertical, directing warmer air more effectively into the occupied space. Once the supply temperature decreases, the air discharge switches back to horizontal once more. These changes to air discharge are controlled by an integral thermal

actuator, within the diffuser which, in turn, controls the internal sleeve. The supply air to room air temperature difference may range from -10 to +15K. By facilitating the ability to move automatically between cooling and heating, a variable geometry diffuser enables the comfort conditions for the occupied space to be managed much more effectively.

Don’t forget acoustics

Suspended ceilings are typically constructed from metal tiles incorporating acoustic materials that can absorb sound, minimising noise and reducing the reverberation time within the occupied space. Without these sound-absorbing materials in the vicinity of building services, ambient noise can be expected to increase. To assess the acoustic requirements for a room with exposed services, a direct noise contribution therefore needs to be calculated. This includes assessment for:

- % leaving outlet
- Distance to listener
- Directivity
- Reverberation time

With the arrival of new diffusers designed specifically for spaces with exposed ceilings, building services engineers and architects no longer need to fear air management problems. As long as the diffuser selected for the application is capable of overcoming the specific air management and acoustic challenges that these present, buildings can achieve their aesthetic impact without compromising comfort or air quality.

For more information on air movement strategies for exposed ceilings, contact TROX on 01842 754545 or email sales@troxuk.co.uk.

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Do heat pumps have a north-south divide?

Chris Thornton-Riley of Mitsubishi Electric explores regional differences but discovers a common ambition.



Chris Thornton-Riley is a Technical Trainer at Mitsubishi Electric

Like a lot of society, training had to change because of the pandemic and the long period where we weren't allowed to physically mix. That made us review our whole training process and we've developed an award-winning online programme that helps engineers understand things much more clearly, before they need to come and get their hands on our equipment.

When we did come back into the 'classroom' this meant quite a bit more travel for me, as I've taught engineers in both our Manchester and Hatfield training suites. So, when I was asked recently if I noticed any differences between southern engineers and their northern counterparts, I had to stop and think whether there were any differences – except for the colour of the tea!

The end of gas

What I would start by saying is that both north and south engineers all attend the training with the same openness and are all eager to learn. The majority of heating engineers I see all come from the same background in the gas industry, so they approach the training with the "evolve or die" mindset.

They have realised that we are at the end of gas, that a low carbon heating solution is the future for home heating, and they need to upskill to stay ahead of the trend.

The biggest difference I find up north is that a lot of the engineers are employed by housing associations and 100% of their work is being carried out in social housing. Could this be down to a bigger driving force from northern councils in decarbonising their housing stock? Or just a better understanding of what needs to be done to secure a better future?

Most engineers I have had the pleasure of training in Hatfield seem to be from large privately owned companies or self-employed individuals, whose work is predominantly working in private households, in retro fits or in new self-builds. I have yet to train anyone from a company working directly for a housing association or who has a contract with local councils, but I think this may just be me.

My colleagues report that there are certainly heating companies that work with housing associations in the south but I have carried out a vast number of training and yet to recall a single company. In the main though, this does seem the biggest difference between north and

south engineers. The north seems focused more on social housing, the south more on private homes.

Get rich quick brigade

In addition to existing companies looking to add renewable heating to their existing skillset, I've also noticed a marked increase in companies coming into training who are very new to the industry. In the main, these engineers share the same drive and passion for heat pumps as the low carbon solution.

However, I do notice the odd engineer who seems to see renewable heating as the next 'get rich quick' scheme, although they don't leave my training without this being challenged.

This search for 'easy money' is not new and I've likened the current heat pump market to the double-glazing craze of the 1990s, when they earned their "white gold" nickname. Double glazing had unscrupulous operators who had no regard for either the homeowner or the technology.

But the market is quickly settling and there is absolutely no doubt in my mind that there is a fantastic opportunity to make a very decent living installing heat pumps.

Firstly, there is plenty of work to come with millions of homes and commercial properties needing to decarbonise and move to sustainable heating. Secondly, you can take pride in being part of the future and helping both businesses and individuals do their bit by reduce the amount of carbon from their heating.

Coming back to any differences, I can honestly say that even though we may take our teas differently, both northern and southern engineers all share the same passion for heat pumps and driving the net zero goals one installation at a time.



<https://les.mitsubishielectric.co.uk/installers/installer-training>



Dr Forbes Pearson, 1931-2024

Star Refrigeration co-founder Dr Forbes Pearson, widely regarded as one of the world's foremost refrigeration engineers, has died peacefully at 92.

Forbes was born in Pollokshields, Glasgow, on 25 June 1931 and attended school at Paisley Grammar and then Kelvinside Academy. He considered becoming a doctor like his grandfather, Charles Stewart, but instead studied mechanical engineering at the University of Glasgow, graduating in 1953. He spent undergraduate summer vacations working in the Rolls Royce factory at Hillington and the Tecumseh compressor factory in Michigan. The connection with Tecumseh Products was through his father, who was the Works Manager for L Sterne and Co, and who was responsible in 1948 for setting up the first production line in Europe to manufacture hermetic compressors, which were made under licence from Tecumseh.

Following graduation Forbes enrolled at the Royal College of Science and Technology in Glasgow to complete a thesis on valve design for reciprocating compressors under the supervision of Dr Jimmy Brown, who remained a friend and colleague for life, working together on a wide range of technical developments in refrigeration. With his PhD complete, Forbes was appointed as Scientific Officer at the Torry Research Station in Aberdeen and spent three years developing techniques for freezing fish on trawlers to enhance quality and extend shelf life.

In April 1959 Forbes married Jean Lyall and returned to Glasgow, setting up home in Maryhill and joining his father at L Sterne and Co's Crown Iron Works. As Chief Engineer for Sterne his work was divided between design of products, such as industrial compressors and heat exchangers, and design of industrial refrigeration systems.

By 1969 the company had decided to close down the industrial division to focus on the mass market manufacturing of domestic and commercial equipment. Forbes and two of his colleagues, Bert Campbell and Anthony Brown decided that there was plenty of industrial work available in Scotland and so they set up Star Refrigeration Ltd in 1970, initially from the Pearson family home in Maryhill, moving a few months later to Thornliebank Industrial Estate on the south side of Glasgow.

Star Refrigeration quickly gained a reputation for innovative but robust and reliable engineering, mainly founded on the technical developments led by Forbes in his role as Technical Director. In the late 1980s the phaseout of CFCs under the Montreal Protocol prompted him to combine his knowledge of organic chemistry with his understanding of how compressors worked to create a range of refrigerant fluids suited to the rigours of extreme temperature operation. The intention was to provide Star with suitable fluids to replace the R-12 and R-502 that they had been using for industrial systems since 1970 but his new refrigerants were much more widely used in commercial refrigeration and so were licenced to major suppliers and were marketed all over the world.

Pioneering work

He was one of the first people in the world to recognise the possibilities of blending organic chemicals to create a refrigerant fluid mixture with particularly favourable properties for unusual or extreme operating conditions. This pioneering work led to the award by the International Institute of Refrigeration of their Gustav Lorentzen medal in 2003, only the second time that this international accolade, "the Nobel prize for Refrigeration", was presented.


In parallel with the significant development of CFC replacements, Forbes also designed new systems for the traditional refrigerants, ammonia and carbon dioxide. He was instrumental in the adoption of the latter as a viable refrigerant for commercial and industrial refrigeration applications around the world including the freeze-drying of coffee at -50°C , the freezing of petfood, the refrigeration of distribution warehouses and the cooling of mainframe computers. Each of these systems required a very wide range of knowledge and experience that he was uniquely able to provide. During his career with Star he was awarded over 100 patents for a variety of refrigeration innovations.



He was a regular contributor of technical papers on a wide range of topics to the Institute of Refrigeration, receiving their Lightfoot medal for the best paper of the year on six occasions. He also chaired the Institute's Technical Committee for many years, he served as President from 1987 to 1988 and he was awarded the Institute's Hall-Thermotank Gold medal in 1991. He helped to set up the Institute's Scottish Branch in the mid 1970s and was awarded their Kooltech medal in 1987.

His service to the wider refrigeration community included many years on the British Standards Institute's committee on refrigeration safety, latterly as chairman of both the BSI national committee and the European working group through the 1990s when he helped to introduce the first version of the European refrigeration safety standard, EN378. He was honoured to be appointed as a visiting Professor in the Department of Mechanical and Aerospace Engineering at the University of Strathclyde, and he enjoyed mentoring undergraduate engineering students in their project work. He was also elected as an honorary life member of the International Institute of Ammonia Refrigeration in 2001.

Following a stroke in 2021, Forbes' mobility gradually decreased to the point where, by the end of 2022, he was housebound. Thanks to the loving and practical care provided by Jean, he enjoyed a peaceful and contented life at home in Netherlee, Glasgow. His final move in January this year to Mearns View care home brought him expert care along with comfort and company, visited regularly by his family including grandchildren and great grandchildren.

Forbes died at Mearns View on March 14. He is survived by his wife, Jean, daughters Muriel and Libby, and sons Stephen, Andy and Dave. 

The importance of recovery and reclamation

A-Gas Rapid Recovery Operations Manager Jake Matthews explains how the service has a key role to play in the lifecycle management of used gases.

A-Gas is playing a leading role in the lifecycle management of used refrigerants as the industry looks to reduce its carbon emissions and move away from high global warming potential (GWP) gases.

The recovery and reclamation of gases is a key pillar of lifecycle refrigerant management (LRM). It is clear that reducing leakage and recovering existing refrigerants for future re-use, or destruction, has a far greater impact on our climate than the substitution of lower global warming potential refrigerants alone.

You can be sure that the role of refrigerant recovery and re-use will grow in future. By safely recovering, reclaiming or repurposing the product that is already out there we are embracing the principles of the circular economy.

This is the opposite to the take, make and dispose business model and by adopting these principles we are making better use of what we already have, and at the same time, making sure that these gases are not vented or leaked into the atmosphere. Reclaimed refrigerant can reduce raw material usage, energy consumption and unnecessary transport,

normally associated with virgin production. Every time the product is recovered the circular cycle repeats.

Tools that make refrigerant recovery easier and quicken the process are valuable. The F-Gas compliant A-Gas Rapid Recovery on-site recovery service is a good example of how having the right equipment can make a real difference when it matters.

A-Gas Rapid Recovery has a network of vehicles and engineers in place to give refrigeration contractors national coverage and this is available to go on site at short notice to handle jobs of all sizes.

Towards Zero, Together

The equipment can recover refrigerants up to 10 times faster than the conventional recovery methods and the team take responsibility for all aspects of the recovery work – from start to finish.

Once recovered, refrigerant is returned to A-Gas for reprocessing through mechanisms such as filtering, drying and non-condensable gas removal to return it to the same quality as virgin refrigerant, in line with AHRI 700 specification.



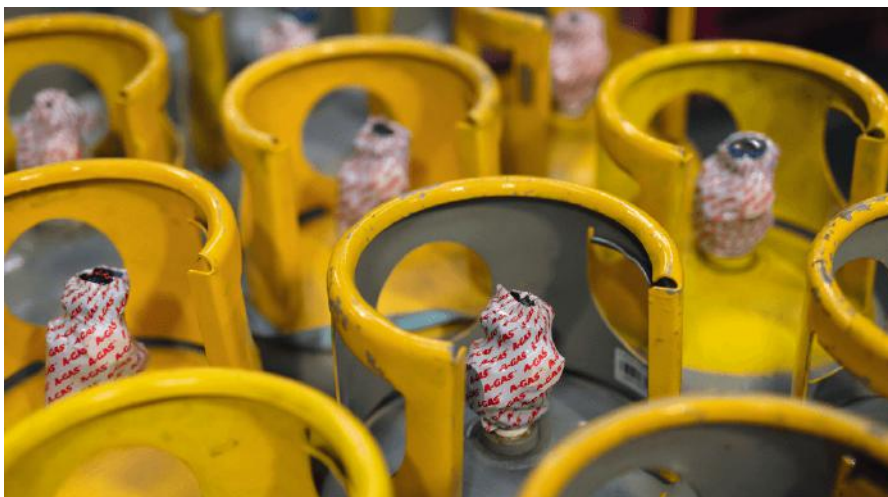
Lifecycle refrigerant management is an effective and deliverable circular economy solution

The importance of conserving every kilogram of refrigerant should not be underestimated. As an industry we need to do all we can to ensure no kilogram of refrigerant, once produced, is released into the atmosphere.

A-Gas is proud to support customers on their journey to net-zero. Our dedicated Towards Zero, Together campaign puts net-zero at the top of our agenda. We are aiming to become a net-zero group of companies by 2035 with an early target of reducing baseline emissions by 50 per cent by or before 2028.

Towards Zero, Together encompasses three key areas – our dedication to stay safe, providing superior quality to customers and protecting our environment by preventing emissions to the atmosphere. We are engaging meaningfully with our talented people, looking at our processes and seeing how they can be materially improved to become best practices. We believe that together with our customers we can lower the carbon footprint of this industry and help build a more sustainable world for us all.

www.agas.com



A-Gas has a dedicated fleet of recovery cylinders available for use

Act now to hit Net Zero targets

Steve Shipp, Managing Director of Ultra Refrigeration, explores the vital role played by efficient refrigeration equipment in keeping the cold chain moving towards Net Zero, and urges operators to act now to have any chance of meeting energy reduction targets.



Steve Shipp,
Managing Director
of Ultra Refrigeration



Refrigeration plant will likely represent more than 60% of the total energy usage for most operators

The Government's ambitious plan to combat Climate Change requires the UK to become Net Zero by 2050. However, it's clear that the changes required to make this target a reality across the UK's industries and businesses are simply not happening fast enough.

The Climate Change Committee, the independent body set up to advise the UK on emissions targets, has called for urgent action from the Government; 'to commit to bolder delivery ... when pace must be prioritised over perfection.' The Government itself seems uncertain how to balance short-term economic pressures against long-term climate goals, while also trying to win popular support for its policies.

There are Government grants for energy efficiency advances in some sectors - the domestic Boiler Upgrade Scheme, for example, which encourages the take-up of heat pumps - but other sectors, such as the cold chain, are left to their own devices.

The challenge for cold chain operators

With no clear Net Zero vision for our industry, little direction offered via Government or legislation, and a lack of joined-up thinking (e.g. the debate about using the lowest GWP refrigerant rather than the most efficient) it's no wonder that operators are confused about how best to achieve targets. Given that the lifecycle of large refrigerant plant may be as long as 20-30 years, it's clear that any equipment being specified now needs to be Net Zero ready.

Refrigeration plant will likely represent more than 60% of the total energy usage for most operators within the cold chain. This fact, combined with the high costs of energy and the quest for Net Zero, already focuses minds on increasing the efficiency of refrigeration equipment and looking at ways of sourcing sustainable energy. Many are already generating and/or storing their own energy in order to reduce costs and offset their impact on the climate.

But as an operator in the cold chain, there will always be a need to run a refrigeration system; the efficiency of this equipment will be key to reducing ongoing energy usage.

At the latest Cold Chain Live! event, respected speakers urged cold chain operators 'not to wait for the stars to align before you take action' and to 'try things and be prepared to fail fast and move on.'

So how, as an industry, do we go about ensuring we're 'energy smart'?

First steps to ensuring we're 'Energy Smart'

Our view is that now is the time to look closely at your existing system and decide how, or whether, it's going to deliver the energy savings required to meet Net Zero targets.

Looking after your existing equipment

Planned service and maintenance should be in place to ensure ongoing efficiency and avoid possible failure at peak loads. Something as simple as keeping condensers clean for example; clogged fins can restrict airflow and increase energy usage by 23%. Or ensuring optimal refrigerant levels; a 15% refrigerant shortage sees a 100% increase in energy.

Look at all aspects of the operation; the integrity of the cold store itself - the insulation material, the vapour-seal joints between panels, the correct operation of doors - should be examined carefully to ensure optimum working.

Using either available data or desk-top calculations, it should be possible to create a theoretical load profile for the whole refrigeration system which can then be used to examine where energy savings can be made. If you don't have the expertise to do this in-house, then we suggest you call in experts to do this for you.

This exercise should point towards ways in which your existing system could be made more efficient, or suggest that a new system would be a better bet.

Upgrading your existing system

There are usually a number of ways to improve the efficiency of existing equipment, through replacement components or via more intuitive control strategies. It could be that these changes have not been considered previously because either the data or the load profile wasn't available, or the energy savings were considered negligible. Now however, all marginal gains need to be explored.

Alternative components might include, for example; the use of variable speed drives (VSDs) on compressors to provide variable capacity control; EC fans (which, at half-speed, use one eighth of their full power, representing an energy saving of up to 70% over 'standard' AC fans); electronically modulated valves; and pressure regulators.

Different control regimes could include; floating temperature setpoints on usage; use of structured shut-downs of equipment based on the load profile; and a change of defrost strategy amongst others.

Specifying a new system

The opportunity to specify a whole new refrigeration system provides the greatest chance to ensure the best outcome in terms of ROI and Net Zero targets. The design can consider the overall operational demands in detail, the system requirements, the type of refrigerant, and



Planned service and maintenance should be in place to ensure ongoing efficiency

the available budget. The earlier the design of the refrigeration system is considered as part of the investment process, the more options are available and the greater the energy impact of the overall design can be.

Taking a holistic approach to new-build design challenges provides greater opportunity for innovative solutions. For example, looking at the overall heating and cooling demands of the whole site - and perhaps the wider community - can open the door for heat recovery systems to utilise heat elsewhere, so reducing overall energy usage.

Advances in software design and flexibility mean that what can be achieved from a system in terms of data gathering, control and monitoring for energy efficiency is often

only limited by your imagination. As no two businesses are identical, off-the-shelf software solutions are usually not the best fit; programming according to precise system needs is the way forward.

Act now to hit targets

The many technologies applicable to refrigeration - design, equipment, software - are evolving fast in terms of energy efficiency. This very speed of advancement may encourage some to delay investing, preferring to wait until efficiencies are further improved in the future. And then there's the question of whether to upgrade your existing equipment or look to invest in a new system.

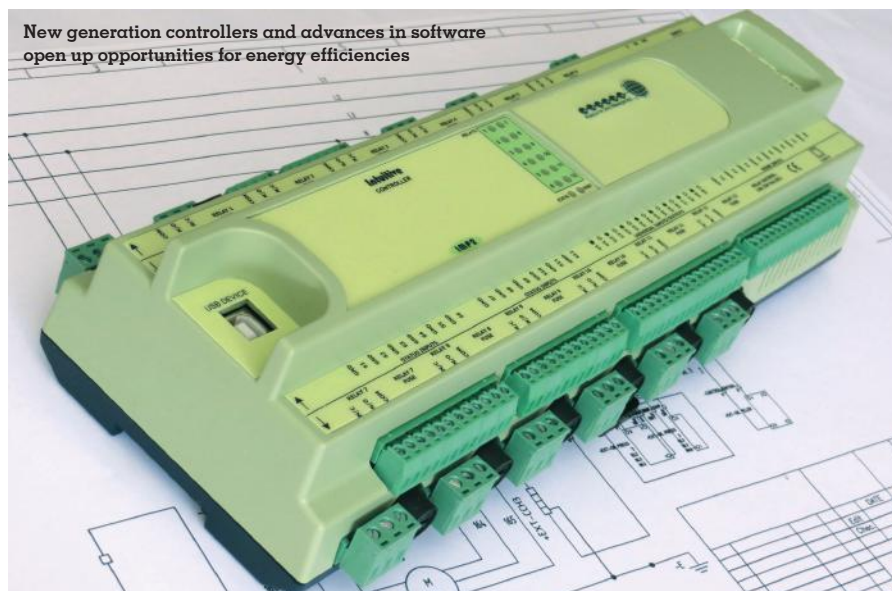
Our view is that all the time we do nothing, we leave ourselves with less time to make the difference to move towards Net Zero, and more difference to make up.

We would encourage a more immediate and radical approach; be brave, do things differently. In short, innovate, take risks, pioneer new solutions, do more trials and discover the data required to make sound decisions.

Finally, trust your supply chain to create the ideas and deliver the solutions.

Ultra Refrigeration

We consider ourselves leaders in energy efficient cooling solutions and innovative heat recovery technology. Whatever the scale of your project, contact Ultra today on +44 (0) 330 2232404 or info@ultraref.co.uk, or visit our website at <https://ultra-refrigeration.com/>



New generation controllers and advances in software open up opportunities for energy efficiencies

The importance of holistic design in the era of surging AI workloads

By Sam Bainborough, Sales Director EMEA-Strategic Segment Colocation & Hyperscale at Vertiv.



Sam Bainborough



There's no denying that AI, mobile and cloud technologies dominate operations, and hybrid computing is the new norm. The surge in AI applications alone has created an immense demand for computing power, putting significant pressure on data centres to rapidly adapt to evolving needs. As a result, the importance of innovation in data centres has never been more apparent.

For organisations to successfully navigate this dynamic landscape, a holistic approach is required - not least because data centre architects are confronted with multiple challenges such as climate change, surging power requirements and heightened heat generation. Embracing a holistic design philosophy enables data centres to not only meet but thrive amidst

the burgeoning demands of the AI-driven era. Prioritising sustainability and efficiency is even more paramount, if operators are to lay the groundwork for data centres to lead the charge in a time defined by growth and technological innovation.

Two key areas that need to be addressed are power, to cope with the demands of AI workloads, and thermal management, to ensure that the critical digital infrastructure operates as efficiently as possible.

Power demands

High Performance Computing is changing with the rise of AI, causing a significant increase in power demands, fuelled by the adoption of specialised processors essential for managing complex tasks. Typical

data centre computer racks are expected to increase from 5 kW to 7 kW today (equivalent to the size of a small residential backup generator) to 50 kW or more in the not-too-distant future, according to Omdia's 2022 Data Center Thermal Management Market Analysis report. Addressing this challenge demands that data centres adopt creative solutions that are capable of delivering increasing power, whilst employing energy-efficient methods.

The strategic emphasis on power efficiency goes beyond immediate operational needs; it aligns with the broader imperative of promoting sustainability in the face of escalating energy consumption. This includes expanding the use of alternative energy, smart grids, hybrid grids and innovative data centre designs to deliver reliable solutions for customers, while lessening the negative impacts on our planet in the process. By taking a forward-thinking stance on power efficiency, data centres can not only meet the challenges posed by burgeoning AI workloads but also contribute to a more environmentally conscious and sustainable future.

Thermal management and cooling

The second critical challenge stems from the heightened heat generated by the advancements in processor technology such as high performance Central Processing Units (CPU's) and Graphics Processing Units (GPU's) essential for handling intricate AI workloads. As

supercomputers continue to shrink and become more power-dense, the data centre industry is constantly looking at how it can keep them cool, whilst concurrently tapping alternative power sources to support the increased energy demand.

Throughout the years, data centre designs have progressed from chilled water systems to indirect adiabatic systems. Today, there are three typical approaches to thermal management:

- Air cooling: This involves the use of rear-door heat exchangers in conjunction with air cooling. This solution has the ability to displace heat outside the servers.
- Immersion cooling: This involves submerging servers and other components in a thermally conductive dielectric liquid or fluid.
- Direct-to-chip liquid cooling: This process delivers cooling liquid through cold plates that lay atop the heat sources within the computers, drawing the heat away when the liquid circulates.

There is currently a resurgence of interest in chilled water systems with three distinct options for liquid cooling at the rack level. The first option involves directing liquid to the server itself, using a room-based heat exchanger to reject heat back into the air. This modular system allows seamless integration without substantial changes to existing infrastructure. The second option introduces a Cooling Distribution Unit (CDU), directly circulating liquid from the server or GPU, connecting to a chilled water system. The third option is an interchangeable liquid-to-gas system. This approach incorporates a remote condenser on the roof or building, utilising gas-to-liquid heat exchangers for deployment flexibility.

It is most likely that air-cooled and liquid-cooled solutions will co-exist and data centres will need to tightly orchestrate both to optimise the overall environment within the facility. Even within liquid-cooled servers, elements necessitating air cooling persist, highlighting the nuanced nature of the evolving thermal management landscape.

It's also important to note that, alongside technical intricacies of cooling systems lies a crucial aspect of sustainability. Implementing efficient thermal management solutions not only enables optimal performance but also contributes to reducing the environmental footprint of data centres. By minimising energy consumption and maximising resource utilisation, innovative cooling practices play a pivotal role in mitigating the ecological impact of data centre operations.

A holistic approach to success

To ensure success in the realm of AI, it's necessary to take a holistic approach to data centre architecture. It is good practice to involve all stakeholders, recognising the importance of collaboration and communication across diverse disciplines. Engaging not only power and cooling specialists but also those responsible for facility management, storage and technology deployment fosters a comprehensive understanding of the data centre's complex requirements.

As data centres embrace denser configurations, the holistic approach extends to decision-making timelines. While operators may be inclined to defer decisions to the final stages of design, a balance must be struck to avoid risks

associated with delayed investments and potential loss of market shares. Holistic design, therefore, involves streamlining decision-making processes while considering lead times and involving stakeholders at every stage.

In a dialogue with industry experts, the importance of technology interchangeability surfaces as a critical consideration for clients. In some areas we have seen a slowdown in direct deployments by hyperscalers, which may reflect a strategic pause to understand what technology changes and specifications are required. Challenges arise in finding the optimal operating conditions for CPUs and GPUs, with manufacturers defining specifications and clients striving to plan for a diverse technology landscape over the next five to ten years.

In this pursuit of future-ready design principles, clients encounter design pitfalls and challenges. The balance between CPU and GPU environments, coupled with defining optimal operating conditions, requires a meticulous approach to allow adaptability over an extended operational lifespan. As the industry grapples with these complexities, a holistic design ethos remains the compass guiding operators through the dynamic terrain of data centre evolution.

Looking ahead

AI is a fascinating technology that's poised to change our world, but it's impossible to predict exactly how it will evolve and what it will do. However, its potential is only as great as the world's data centres' capacity to support the computational intelligence it will require. The data centre industry must continue to evolve to provide the dynamic and innovative cooling and power solutions needed to support evolving data centre challenges and maximise AI's true potential.

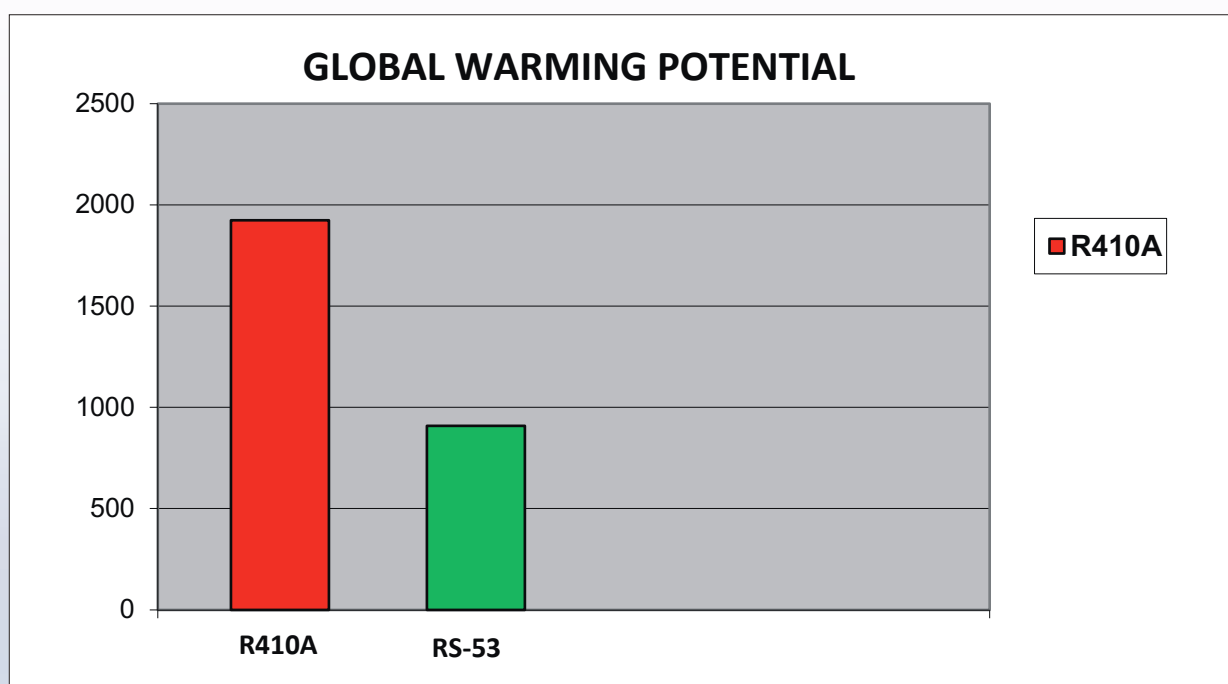
This proactive approach not only enables data centres to meet the burgeoning demands of AI applications but also positions them as catalysts for progress. By prioritising sustainability, data centres not only mitigate their environmental impact but also enhance their resilience in the face of evolving challenges such as climate change and resource scarcity. Moreover, by optimising efficiency through innovative practices and technologies, data centres can provide optimal performance while minimising energy consumption and operational costs. 🌱



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WOMEN IN THE ACR INDUSTRY

Claryhs Radford is Project Sales Engineer for Mitsubishi Heavy Industries in partnership with Beijer Ref UK.



Claryhs Radford

What was your first job?

My first job was working in a fish and chip shop called Mr Luigis when I was 15. I would answer the phone and take the orders and pack them for the delivery drivers. It was great fun interacting with people with the added bonus of getting free fish and chips at the end of my weekend shifts.

What does your current role involve?

As Project Sales Engineer I meet with customers face to face and get a clear understanding of their requirement, both need-to and want-to have. With this knowledge I propose the best product and service offering. I am empowered to be flexible in solution selling. I can offer site visits, product training and differing distribution options through the Beijer Ref wholesale network or supply direct from central distribution. I concentrate my sales effort on the VRF product range. I am available for the customer from the start to

the end of any project they may have. I am the first point of contact for them, their gatekeeper to ensure the supply of product doesn't finish at the point of order

What attracted you to the industry?

Since leaving school I always wanted a career in sales, it probably started indirectly when working in the fish and chip shop at 15 years old. I liked the interaction with customers and enjoyed the buzz of a smiling customer face. The problem was I didn't know how to enter the sales arena or what I wanted to sell. By chance I saw a job advert for an internal Sales Account Manager with MHI. This position offered both product and sales training. It was a perfect match for me at the time back in 2021. I applied for the position and before being interviewed I spent three days researching both MHI and Beijer Ref. I thought I knew quite a lot at this point though I now realise I didn't know too much! Since this I haven't looked back, I find the HVAC industry fascinating and often undersold. I am only at the start of my career and enjoy all the learning experiences both MHI and Beijer Ref offer me. I have enjoyed every minute of my career so far.

What excites/interests you about the industry?

Personally I get excited over the rewarding feeling I get from helping others. The phrase 'happy to help' is often overused

and insincere. For me I mean it, I really am happy to help. I feel valued by my employer and customers, who both help with my training and development within this industry. Technologies are constantly changing and I feel I have joined an air conditioning industry that has just begun, although it started over 120 years ago. The team around me encourages questions which I may have considered as silly in the past. However, the team always make me feel valued which has increased my confidence. I realise now there is no such thing as a silly question.

How would you like to see your career developing?

I have a personal standard to always be a good role model for younger people coming into the industry to help and advise them through the early stages of their career. I am currently going through the STEMazing programme to become an ambassador for women in STEM, and this is already helping me to achieve this standard. This is in addition to always developing my own skills in my current role. I have a staircase to climb and am enjoying every minute of it

What is the best piece of advice you were ever given?

To never shy away from any task and throw yourself in the deep end! For me doing this has helped me build my self-confidence within my life both in and out of work. I used this advice when I was going for my Level 2 City & Guilds F-Gas

qualification, even though it was one of the most challenging experiences I have had to date. I gave it my all and passed the qualification which I will always remember and be proud of.

What do you see as the challenges facing the industry?

As a young adult in the HVAC industry, one of the challenges I have recognised is that there are not enough young people or women wanting to enter the sector. It is our responsibility to make the industry more appealing to the next generation, welcome them in and educate them on what impact they could have in making our country more sustainable on the journey to Net Zero. This is a great industry to work in and it offers fantastic career opportunities. We need to support schools, colleges and universities by imparting knowledge about what we do. This way we should create the interest needed to make a positive change.

What would you say to other women who are considering coming into the ACR industry?

The industry is still perceived as and actually is male dominated. Yes, we still face the stigma around this but things are changing slowly. Personally, I have been supported by some amazing women throughout my short time in the industry. Beijer Ref and MHI prioritise on diversity. Other companies are doing similar. The more noise we make and the more we SHOUT about diversity the more chance



Clarhys enjoys the great outdoors

we have of people hearing the message. This feature in The ACR Journal and award events celebrating women in RACHP are great platforms for noise. When a woman enters this industry there is a quick realisation that women are accepted and the males within it do actually support this change.

Is there a little-known fact about yourself that would surprise other people (secret skill, unusual hobby etc)?

I don't have what I would perceive as interesting hobbies, though I do enjoy walking in the countryside and mountain



Clarhys after winning gold in the Sales & Support Services category at the ACR & HP Trainee of the Year Awards

climbing. Last year I completed the last of the Three Peaks and made it to the top of Ben Nevis in aid of Mind UK. One for my bucket list is to climb Mount Kilimanjaro. I have a lot of work to do to get to the level of fitness needed, but I will get there! 🏔️

The Innovation Zone

The guide to what's new for ACR Journal readers, offering vital industry news.

To advertise your product in 'The Innovation Zone' section please contact victoria.brown@warnersgroup.co.uk

ADVECO INTRODUCES CHILLED WATER SYSTEM TANKS

Hot water specialist Adveco introduces the Chilled Water System (CWS). This range of premium carbon steel tanks serves a diverse range of commercial cooling applications - including heat pumps, chillers or fan coil units - which require chilled water storage.

Each vessel features multiple large bore flanges providing high-capacity connections as standard at high and low levels catering for a wide range of system applications with moderate to high flow rates.

10 high-capacity, low-height models from 300 to 5000 litres enables chiller systems to considerably improve performance by ensuring better temperature control, increasing chiller longevity, reducing condenser cycling and improving system start-up times.

Each CWS tank is supplied with dual-layer insulation, the inner lining providing an anti-condensation underlay, and then a further 100mm of outer insulation. The Adveco CWS range is suitable for use with standard working pressures of up to 6 bar. For projects requiring higher pressure, such as multi-storey buildings with basement plant rooms, 10 bar versions are available on request in all sizes.

Multiple sensor pockets at all levels provide straightforward integration of controls or BMS sensors. An inspection/clean-out flange allows for ease of service or maintenance.

www.adveco.co



FUJITSU'S NEW CONTROLLER IS BETTER BY DESIGN

Fujitsu General Air Conditioning UK is introducing a sleek new local controller for Airstage systems designed to blend seamlessly with any installation space.

A Good Design Award winner in 2022 and selected as a finalist in the 2023 IDEA awards,

the UTY-RVRY model is mounted on a frosted panel and uses mirrors and glass to create a unique floating appearance which complements the interior design. Information is only visible during operation, with the controller appearing as a mirror at other times.

Coloured LED lighting indicates different modes of operation and the light can be switched off to eliminate glare at night, making it an ideal option for hotel rooms. The screen can also display branding or corporate logos when not in use; images are sent via Bluetooth and saved in the flash memory built into each controller.

The controller is intuitive to use, with swipe motions rather than buttons. The screen is resistant to smears due to an anti-fingerprint coating and offers exceptional visibility from any angle.

Visit <https://www.fujitsu-general.com/uk/> or email sales@fgac.fujitsu-general.com



BLACK GRILLE ADDED FOR CIRCULAR FLOW CASSETTE

Fujitsu's Circular Flow Ceiling Cassette is now available with the option of a black grille, giving architects and designers more choice when specifying equipment for different indoor environments.

The 360 Cassette Grille louvres can be controlled individually from the touch panel (controller UTYRNRZY5 required) for direct or indirect airflow, reaching every corner of the room for superior comfort. Enhanced energy savings are possible via the optional human sensor, with auto-off when the room is unoccupied.

Further information is available at <https://webstore.uk.fujitsu-general.com/360-cassette-grille-black-no-controller-utgukyab>



CAREL'S NEW PROGRAMMING TOOL OFFERS 'COMPLETE SOLUTION'

CAREL is introducing STone, its new programming tool designed to meet the specific challenges of software programmers in the HVAC/R market. The manufacturer says that fast, continuous validation means teams can reduce the time it takes to complete complex projects, eliminating the frustration that comes with constant software revalidation.



STone is compatible with a wide range of CAREL programmable controllers. This is said to optimise software investments by ensuring flexibility over the long term. By anticipating future programming needs, it offers a future-ready foundation to support advanced technologies such as artificial intelligence and advanced simulation systems.

The tool is not limited to simply managing the development, testing and validation of application software, but rather is designed to support the system throughout the entire unit life cycle, simplifying commissioning and maintenance, both local and remote. It also features specific focus on IT security, protecting CAREL programmable controllers against unauthorised access and unwanted tampering, thus safeguarding industrial processes and ensuring the security of everyday operations. “STone is not just development software, but rather a complete tool for responding to the challenges of modern programming,” said Simone Grisenti, CAREL Group Marketing Manager, HVAC Commercial. “With STone, programmers can focus on higher value-added tasks and embrace new technological trends, improving teamwork and developing high-quality software solutions efficiently.”

www.carel.com

CLIVET UK PARTNERS WITH LOGICOOOL

Clivet UK has added Derbyshire-based Logicool to its distributor line-up. Kevin Harrison-Ellis, Head of UK Sales at Clivet, said: “We are delighted to be partnering with one of the leading independent wholesalers in



From left, Paul Tobin (Sales Manager) and Kevin Harrison-Ellis (Head of UK Sales) from Clivet with Karl Richardson (Managing Director) and Ken Hood (Technical Manager, Heat Pumps) from Logicool

the UK. Karl and his team have an excellent business which looks at maintaining strong relationships with their customers and going that extra mile with their service.

“We feel that Logicool is a perfect partner for Clivet UK and we look forward to working closely with them now and in the future.”

Karl Richardson, Managing Director of Logicool, said: “We are excited to be partnering with Clivet. We have been searching for a new product for some time to allow us to offer a broader range of product to our client base without diluting our overall product offering.

“Key to us is the UK-based relationships, support and enthusiasm that Kevin and his team bring to their product. There are a vast number of products in what is becoming a very cluttered and confusing market. Our strategy is to sell well and sell professionally rather than simply selling boxes.

“Clivet’s philosophy matches our own which puts the customer first and acknowledges the challenges that they face. It is about them, not about us. We share this principle, and we cannot wait to get started”.

www.clivetgroup.co.uk
www.logicool-ac.com/

BRUNO ORFAO, ANDREW KEEGAN, EXI-TITE

HVAC equipment supplier Exi-tite has strengthened its technical team with two key appointments. **Bruno Orfao** joins as Group Engineering Manager, while **Andrew Keegan** has become Technical Applications Manager for HVAC products at Exi-tite Ireland.

After beginning his career in South Africa, Orfao moved to the UK and spent a decade with Fridgetech UK, progressing to the position of Technical Manager. He gained extensive experience of LG VRF systems and later spent time at LG Electronics as a Technical & Commissioning Engineer.

In 2021 he established his own service and maintenance company and began working with Ex-tite on a wide range of equipment, followed by a year in New Zealand as an engineer working on various VRF systems, chillers, transcritical CO₂ and commercial refrigeration.

He said: "Joining this innovative team represents a real opportunity for growth and collaboration. I look forward to

contributing my skills and expertise to further enhance Exi-tite's success in delivering cutting-edge solutions."

Keegan has more than 35 years' experience in the Irish market, including 14 years as National Specifications Manager for Mitsubishi Electric Ireland Living Environmental Systems. He joins from his most recent role as Senior Design Engineer at specialist contractor Principal HVAC in Dublin.

He said: "Building on the company's ability to combine extensive engineering solutions with products from leading manufacturers such as LG Electronics, my aim is to introduce a wide range of advanced solutions to the larger HEVAC engineering market."

Andrew Robinson, Managing Director of Exi-tite Group, said: "We continue to invest in the business, and we are delighted to welcome Bruno and Andy to the team."

<https://exi-tite.com/>



Victoria Robinson, Exi-tite Group Financial Director, Bruno Orfao, centre, and Andrew Robinson, Exi-tite Group Managing Director



Andrew Keegan, centre, with Andrew Robinson and Exi-tite Ireland Regional Director Joe Nolan

MARK OXLEY, REGIONAL TECHNICAL SALES MANAGER, CONEX BÄNNINGER

Leading fittings, valves and accessories manufacturer Conex Bänninger has appointed **Mark Oxley** as its new Regional Technical Sales Manager for London and the East.

With extensive experience in the plumbing and heating industry, Oxley brings a wealth of knowledge and expertise to Conex Bänninger, having previously worked for tooling manufacturer REMS in sales. He will be responsible for maintaining and strengthening the company's relationships with existing customers, as well as driving brand awareness and developing new opportunities.

Ged Grimes, Business Unit Director for Conex Bänninger in UK & Ireland, said: "This is an exciting appointment as we look to continue to increase our share of the UK fittings market. Our extensive range of fittings solutions, from compression, solder ring and end-feed, right through to our innovative >B< Press, are renowned as some of the highest quality products on the market."

Oxley said: "Having developed my plumbing and heating experience with REMS over the last six years, this is a fantastic opportunity for me to expand my knowledge into fittings and valves and work for a brand that is the global leader in this sector. I'm really looking forward to developing relationships with our customers and delivering growth for both Conex Bänninger and our partners."

www.conexbanninger.com



Mark Oxley

STACEY LUCAS, PRESIDENT, BCIA

The Building Controls Industry Association (BCIA) has announced **Stacey Lucas**, Commercial and Marketing Director at Sontay, as its new President. She takes over from Graeme Rees, who has held the role for the past two years, with Jen Vickers stepping into the role of Vice-President.

Lucas has been working in the building controls and BEMS sector for over 20 years, starting her career at Sontay in 2001 as a Customer Service Advisor. She has since built lasting relationships with many of Sontay's customers and made a real impact on the industry. The knowledge and insight learned over the years has given her a brilliant knowledge base and high level of technical understanding of the building controls sector which has already served her well in position as Vice-President, a role she took on in November 2022.

Lucas said: "It is a real honour to be taking over the role of BCIA President from Graeme Rees who has done a fantastic job in increasing member engagement and setting us onto a clear path as an organisation carrying recognition, respect and influence in the building controls industry. Over the next two years I aim to continue the good work carried out by my predecessors and I am relishing the opportunity."

Reflecting on his spell as President, Rees said: "These last two years have been extremely rewarding both on a professional and a personal level. I would like to thank everybody who has supported, guided and helped me move the BCIA forward in a number of areas. I have been very proud to serve as President and I am delighted to now hand over to Stacey and wish her the very best of luck in this extremely prestigious role."

<https://www.bcia.co.uk/>



Stacey Lucas

PHILIP ORD, CEO, QVANTUM ENERGY TECHNOLOGY

Swedish heat pump company Qvantum has named **Philip Ord** as CEO of its UK operations at Leicester-based Qvantum Energy Technology.

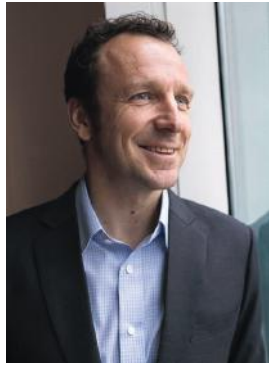
Ord has extensive experience in the heating and cooling sector through his sales and marketing roles in more than two decades with Mitsubishi Electric.

Qvantum says there is an increasing need for modern, connected, and modular low-carbon heating and cooling systems in the UK and throughout Europe. It hopes Ord will help it to be a secure energy partner for new developments and retrofitting projects.

Head of Commercial Jesper Jarnhäll said: "Qvantum provides innovative heat pump systems that go beyond traditional offerings. I am certain that Philip will help us fulfill our vision to empower many people to live a life free from fossil fuel dependence."

Ord said: "Being part of a company as forward-leaning as Qvantum makes me incredibly excited. To use the heat pumps as thermal batteries as Qvantum does — both individually and in groups — is, to me, something revolutionary. Who does not want to be part of such a journey?"

<https://www.qvantum.com/uk/>



Philip Ord

CLAIRE MORGAN, GARY STANLEY, TQ ENVIRONMENTAL

Claire Morgan has joined gas detection and monitoring specialist TQ Environmental as Business Development Manager. Although a recent recruit to the industry, Morgan has a wealth of experience in sales and TQ believe she is well placed to help drive the business forward.

Morgan said: "This is a perfect way for me to learn new skills in a new environment. Although there is a lot to learn I am very keen and excited about this opportunity. I am looking forward to getting out there and meeting our existing customers and forming relationships with potential new customers."

Alongside this appointment, **Gary Stanley** has changed roles from Business Development Director to Operations to reflect his increasing involvement in the day-to-day running of the business.

Gary Hall, TQ owner and Managing Director, said: "This is a great opportunity for the company to move forward. Claire is a great acquisition for TQ and is very keen to expand her knowledge and help increase both sales and customer relationships. This also allows Gary to take on a new role which will see him get more involved with the other aspects of the business."

<https://tqplc.com/>



Claire Morgan

DOMINIKA LÖRINCOVÁ, MATEO RIOS LÓPEZ, SAMON

SAMON has made two new appointments in its marketing and sales teams to help meet growing customer demand for its refrigerant gas detection solutions.

Dominika Lörincová joins as Product Manager, based at SAMON's HQ in Vellinge, Sweden. She brings significant experience in coordinating complex technical projects, working internationally with internal and external stakeholders.



Dominika Lörincová and Mateo Rios López

She said: "I am excited to be joining SAMON and being part of the growth journey we are on. Gas detection is a diverse area, and being able to focus in on the specific demands of refrigerant leak detection is a great way of ensuring that, rather than something generic that doesn't quite fit, our customers truly get the products they need."

SAMON says it is pleased to continue championing the role of women in STEM, with Lörincová joining Johanna Sepulveda Fajardo in taking prominent external-facing roles in the gas detection and refrigeration industries.

Fajardo, Business Development Director Iberia, welcomes **Mateo Rios López** to her team in the role of Key Account Manager for Spain and Portugal. Following his MBA studies, López joins to add depth to the commercial team located in SAMON's Madrid office.

He said: "Joining the SAMON team is a wonderful opportunity for me. I am passionate about developing partnerships and relationships with customers that give them real results. As our business has rapidly grown in Spain, I am looking forward to working closely with our distributors and end-users and becoming a go-to resource for them that they can trust in."

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