CIBSE JOURNAL

CPD SPECIAL

CPD DIRECTORY

The latest company listings from CIBSE

Two new CPDs:

Designing building services for maintenance

Exhaust air heat pumps for homes in temperate climates

altecnic ACADEMY

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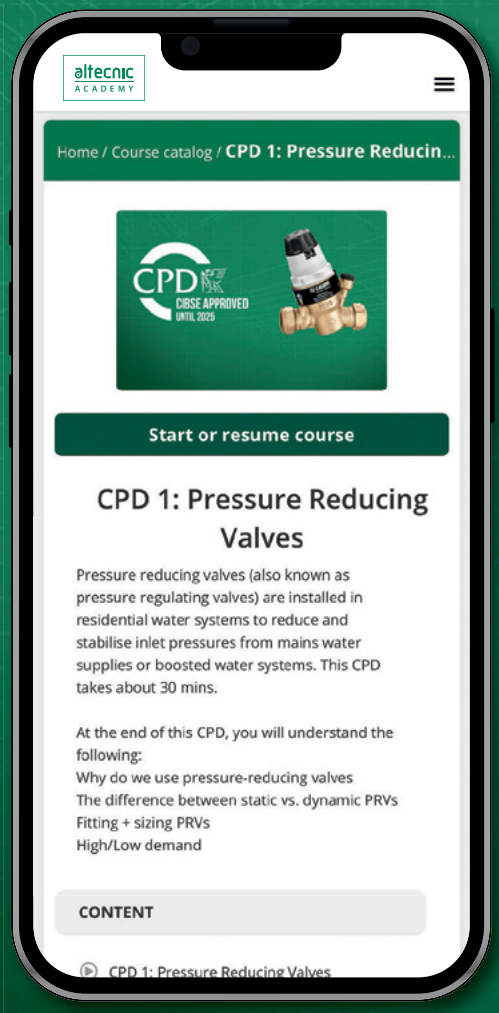

Altecnic Academy is our new digital learning platform, where you can access FREE CIBSE Accredited CPDs, delivered by industry experts at a time that suits you!

Latest topics include:

- System Design For Efficiency For Using Electronic Intelligent HIUs
- Legionella Considerations When Reactivating Buildings
- System Balancing
- Pressure Reducing Valves

Scan QR code for more information

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Renewed focus

The annual CPD audits are upon us once again. Many of you would have been selected for the CPD audit or know someone who has, but there is nothing to fear.

This is a reminder that we should all regularly maintain a log of our continuing professional development activities, whether via CIBSE's **mycareerpath** or in your own personal format. The importance of recording activities and reflecting on them has a positive impact on your own professionalism. It allows you to identify knowledge gaps and helps you to grow your career development.

The building services industry is undergoing a paradigm shift, as it strives to improve the energy efficiency of new and existing buildings and make them inherently safer.

This change is being driven by two factors: the government's target to reach net zero by 2050 and the introduction, in April 2022, of the Building Safety Act.

As a result – and after consultation with CPD panel members and other CIBSE groups – from January 2024, all CIBSE Licentiates, Associates, Members and Fellows will be required to undertake and reflect on two mandatory semi-structured activities, one each on the subjects of sustainability and building safety.

Semi-structured activities include supplier webinars, CIBSE events, or internal company presentations. This will help focus learning and development on these two key industry issues, ensuring building services engineers deliver more efficient building designs and stay informed on the latest technology and techniques in building safety. This will not only improve engineers' competence, but will also be beneficial to our clients and, ultimately, the future occupants of the buildings we design.

As a panel, we review CPD presentations submitted by external organisations. We ensure the CPD material focusses it attention to learning objectives and technical content, rather than a sales pitch, and offers valuable CPD to our members. All seminars/courses that have been reviewed and assessed by the panel can be located in the CIBSE CPD Directory, bit.ly/CIBSECPD.

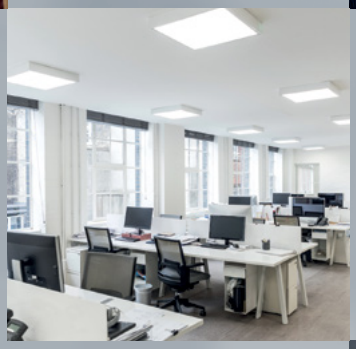
CIBSE members must abide by the CIBSE Code of Conduct, which includes recording their CPD activities in a log. The activities undertaken each year should be planned around development objectives and, often, the easiest way to set these objectives is to base them on your company's internal development reviews.

STEPHEN PAGE MCIBSE is CPD panel chair and associate mechanical engineer, AtkinsRéalis

CONTENTS

For a list of all companies on the CIBSE CPD Directory, visit **www.cibse.org/cpddirectory**

CIBSE Journal **has more than 200 CPD modules available to complete at www.cibsejournal.com Our website makes it easier than ever to continue your professional learning online**



CIBSE CPD DIRECTORY

This directory lists all the accredited organisations providing modules on a range of areas, including electrical, fire, lighting and sustainability

All the CPD courses in this directory have been approved by CIBSE. They are reviewed and assessed to ensure that the technical content is of a high standard and offers valuable CPD to delegates.

The directory of CPD course providers has been compiled to assist members of the Institution in identifying suitable courses in respect of their CPD needs.

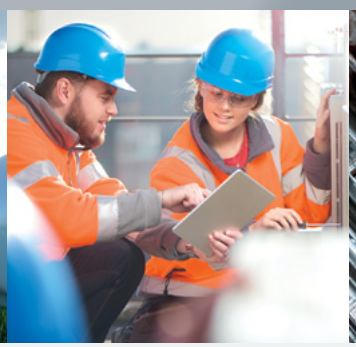
The directory embraces many different areas suitable for CPD and will continue to be updated to incorporate new entries and revisions.

Members of CIBSE are required by the Code of Professional Conduct to maintain their professional competence, but this should also apply to any professional working in the industry.

The directory will help you find suitable CPD to assist with your ongoing career development.

For guidance on what constitutes as different CPD activities and how to go about recording your CPD, visit **www.cibse.org/cpd**

Here you will find CIBSE's online portal – mycareerpath – which lets you record your CPD in one place and link your progress to set objectives.



2G Energy

Phone: 01928 718533
Email: sales@2-g.com
Web: www.2-g.com

2G Energy is a leading manufacturer of Combined Heat & Power (CHP) systems, producing and installing thousands of CHPs worldwide. The firm specialises in the supply of high-efficiency CHP systems for natural gas, biogas and hydrogen, with a power range between 20 and 4,500 kilowatts.

It is widely known that hydrogen as a fuel source provides one of the most viable pathways to a net zero world. It is possible to ensure the energy supplied is net zero by changing the gas input to green hydrogen.

2G Energy has been installing and operating 100% hydrogen CHPs worldwide since 2012, providing large proportions of an organisation's electricity and heat, while helping them reach their net zero goals.

Learn about how our pioneering technology works and how our technology has helped industry reach net-zero by signing up for our live and virtual hydrogen CPD approved by CIBSE. Email or call us directly to arrange a time suitable to you.

Advanced Air UK

Phone: 01842 765 657
Email: sales@advancedair.co.u
Web: advancedair.co.uk

Advanced Air has been designing, developing, manufacturing, and distributing fire safety and air distribution systems for over 50 years. We're passionate about our industry, and love sharing our insight, knowledge, and ideas.

We offer two CIBSE-accredited CPD seminars – available in-person or online – ideal for construction contractors, specifiers, installers, and other industry professionals.

- **Fire & smoke damper legislation, installation and CE marking**
  Covering fire dampers under BS EN15650/EN1366-2, smoke dampers under BS EN12101-8/EN1366-10, and an in-depth look at classification codes.
- **Electronic pressure independent control in fan coil units**
  Covering motor technology, ECM vs Epic, the benefits of pressure independence in FCUs, and hints towards better FCU system design.

AIC Heating UK

Phone: +44 0300 303 4169
Email: sales@myaic.co.uk
Web: myaic.co.uk

AIC is a specialist in stainless steel and offers a complete range of commercial heating and hot water products up to 840kW output from a single boiler. This can be cascaded for higher output projects.

AIC also manufactures fully stainless steel hydraulic cascade systems up to 900kW to compliment the Nesta Chrome wall-hung boiler.

AIC boilers and water heaters are built around our stainless steel fire tube heat exchanger, which have been designed and manufactured in-house.

The design ensures highest efficiency and reliability, and achieves NOx class 6 with high modulation ratio.

AIC has introduced a hybrid heat pump system including the unique Thermal Management Unit (TMU), which has been added to the product portfolio to help decarbonise existing buildings.

We can offer a CIBSE accredited presentation on firetube technology, which also explains why we exclusively use stainless steel in our heat exchangers.

Airedale by Modine

Phone: 0113 2391000
Email: connect@airedale.com
Web: airedale.com

At Airedale by Modine we offer a choice of free-of-charge, hour-long, CIBSE-approved CPDs, covering a wide range of legislative, environmental and technological topics related to cooling, ventilation and general HVAC.

We have significant experience in the data centre, healthcare, pharmaceutical and telecoms industries and our courses are suited to consultants and engineers in the HVAC industry, or looking to join the industry.

Delivered by our experienced HVAC engineers, we can tailor courses to specific needs and can offer a mixture of practical and theoretical courses. Our CPDs are free, available at a time to suit you and are available remotely. We have listed below a selection of our most popular courses, but feel free to contact us to discuss your needs:

- **F Gas Level 1 (Legislation & A2Ls)**
- **Data centre advanced cooling technology**
- **Ecodesign: Chillers and Tier 2**
- **BS EN 1886: 2007: testing and classification criteria**
- **Optimising data centre cooling system performance using dedicated controls platforms**
- **F Gas Level 2 (Global implications and alternative refrigerants**
- **HTM 03-01 (2021): Revised guidelines CPD**
- **Energy efficient design of air handling units**
- **Data centre chiller design/optimisation**

CPD PROVIDERS

For a list of all companies on the CIBSE CPD Directory, visit **www.cibse.org/cpddirectory**

Altecnic UK

Phone: 01785 218200
Email: marketing@altecnic.co.uk
Web: www.altecnic.co.uk/technical-hub/training-and-cpds

Altecnic, part of the Caleffi Group, is the UK's top provider of hydronic solutions for commercial and domestic applications, exceeding industry standards for trade merchants, OEMs, engineers, and specifiers.

We proudly present the Altecnic Academy, an innovative online learning platform tailored to professionals in the plumbing and heating industry. This platform offers various e-learning courses, prioritising key industry subjects.

For face-to-face CPD bookings, please reach out to us at marketing@altecnic.co.uk.

The Altecnic Academy is invaluable, allowing industry members convenient access to relevant courses. Our current CIBSE accredited CPD course offerings include:

- **Efficient system design using electronic heat interface units (HIUs)**
- **Expansion vessel**
- **Pressure reducing valves**
- **Legionella considerations for building reactivation**

Andel

Phone: 01484 845 000
Email: help@andel.co.uk
Web: andel.co.uk

Andel is an environmental company at the cutting edge of water, oil and gas resource control and management within the built and natural environments. Founded in 1992, Andel has steadily grown to become one of the global market leaders in specialist leak detection, water sustainability, flood defence, oil storage compliance and drainage solutions.

Andel provides a range of innovative, sustainable and cost-effective products to both the UK and overseas markets with international exports growing year on year and accounting for a significant proportion of total sales.

Andel offers two free CIBSE-approved CPD seminars:

- **Water and oil leak detection**
- **Gas leak detection**

Andel leak detection systems are the 'de facto' standard for many engineering consultants, architects and specifiers. This puts Andel in an excellent position to provide sound advice and support for any project that requires sustainable leak detection and alarm systems. A one-hour presentation over the course of a lunch break via Microsoft Teams will show the different technologies and techniques for sustainable leak detection to prevent damage, disruption and loss. The courses are ideally suited to groups of between five and 20 people.

Armstrong Fluid Technology

Phone: 0161 223 2223
Email: uksales@armstrongfluidtechnology.com
Web: armstrongfluidtechnology.com

Armstrong Fluid Technology is a leading global player in HVAC. It designs and manufactures innovative fluid flow equipment and high-efficiency energy solutions for a broad range and scale of applications, including district energy, data centres, fire systems, gas transmissions, high-rise, and mixed commercial buildings.

The firm's solutions deliver optimum lifetime building performance combined with the lowest first cost and life cost. Armstrong is committed to helping building owners, consultants, specifiers and energy managers find low-cost solutions for reducing energy consumption and carbon emissions. Its expertise comes from an understanding of end-to-end fluid systems and the integration of fluid dynamics, heat transfer, variable speed and demand-based controls, which is the focus of its CIBSE-approved CPD programmes:

- **A whole-life sustainable approach to pump and equipment selection without compromising on redundancy**
- **Meeting the needs of the building life-cycle through innovative approaches to variable speed pumping**
- **Pump basics and variable speed pumping**
- **Why district energy? Guaranteeing performance and where it is heading**

The company can provide free, one-hour 'lunch and learn' sessions at your offices or at any of its UK sites.

Arrow Valves

Phone: 01442 823123
Email: marketing@arrowvalves.co.uk
Web: arrowvalves.co.uk

Arrow Valves manufactures and distributes innovative water-associated products designed to conform to the requirements of the latest water regulations. All of its team are BPEC qualified in water regulations, and its resident experts – Adrian Reeve and Richard Medlicott – have combined knowledge spanning more than 20 years in the industry.

During the free Arrow Academy training days, Arrow Valves delivers its two CPD-accredited **Water Regulations** and **Heating** seminars on rotation. In-house attendees also benefit from a factory tour and product demonstrations.

The seminars have been adapted for Zoom. Alternatively, the seminars can be delivered free of charge from the comfort of your own offices.

Both seminars explore system design: the Water Regulations seminar covers interpretation and backflow prevention selection, while the Heating seminar covers hot water efficiency and safety.

Belimo

Email: sales@belimo.co.uk
Web: www.belimo.com/uk

Belimo is the global market leader in the development, production, and sales of field devices for the energy-efficient control of heating, ventilation, and air-conditioning systems. The focus of our core business is on damper actuators, control valves, sensors, and meters.

We offer a range of CIBSE accredited CPDs to develop further knowledge on HVAC and fire and smoke products. All our speakers are highly experienced in their specialist fields, many having spent 20 - 30+ years in the HVAC Controls industry.

CPD seminars can be held online or at a company's premises or at the Belimo Customer Experience Centre at our Shepperton offices.

- **Fire dampers in HVAC systems**
- **Improving performance; saving energy in heating; cooling systems**
- **Evolution of pressure independent control valves**
- **Sensors in HVAC systems**

Carrier UK

Phone: Paul Stack 07423 005 209
Email: paul.stack@carrier.com

Carrier is a global leader in the design and manufacture of innovative HVAC solutions. In the UK the Commercial HVAC business is represented by two market-leading brands, Carrier & CIAT, suppling air conditioning, heating & air handling equipment solutions and support services. Willis Carrier invented modern air conditioning 120 years ago, launching an industry that would fundamentally improve the way we live, work and play. CIAT has over 80 years of expertise in manufacturing air handling solutions for the commercial, residential, healthcare and industrial sectors. Through Carrier & CIAT we offer a wide range of hydronic & airside CPD courses covering topics such as:

- Application & design of heat pumps, chillers
- FCU & AHU indoor air quality
- HVAC industry legislation

All our presenters have a wide knowledge base and experience in the HVAC industry to enable them to deliver our range of CIBSE-approved CPDs with a consistent high quality delivery of the material. Our CPD material is regularly reviewed to make sure they continue to be engaging, of the latest relevance to the industry subject matter we are presenting and support learning to enable attendees to achieve the highest levels of information retention.

Condair

Phone: +44 (0)1903 850200
Email: uk.sales@condair.com
Web: condair.co.uk/CPD

Manufacturer of commercial and industrial humidity control systems, Condair is offering a selection of three CIBSE-approved CPD training sessions – either face-to-face, in a client's office, or via an online presentation.

The three CPD seminars are:

- **Humidification and psychrometrics –** offering an overview of humidification, an explanation of psychrometric calculations, and detailed analysis of humidifier product selection, demonstrating the pros and cons of each technology.
- **Dehumidification and drying psychrometrics –** covering dehumidification processes and calculations using a psychrometric chart, an explanation of dehumidifier types and technologies, product selection and sizing information, and a comparison of different technologies.
- **Using humidifiers for evaporative cooling in AHUs –** learn the psychrometrics of evaporative cooling, the benefits and limitations of using evaporative cooling in AHUs, and the three main AHU evaporative cooling strategies. Also analyse the energy consumption figures behind three real-life case studies, and compare the different technologies available.

Crane Fluid Systems

Phone: 07713781806
Email: ngibson@cranebsu.com
Web: www.cranefs.com

Crane Fluid Systems (CFS) is a leading brand of Crane Building Services & Utilities. Crane FS provides a range of dynamic control valves alongside general valves suitable for chilled heating and domestic services. CPDs include:

- **Proportional balancing:** to give an overview of proportional balancing within the commissioning process. This process applies to both constant and variable flow heating and chilled water systems.
- **Thermal circulation valves – protection against legionella:** An overview of how to eliminate the bacterium Legionella Pneumophila, which causes Legionnaires' disease, from our domestic hot water systems. Covers history, high-risk systems, growth considerations and counteractive processes and measures that can be taken, primarily the use of thermal circulation valves.
- **Variable volume system**: utilising DPCVs to give an overview of variable volume systems within the scope of differential pressure control valves. Covers history, application, selection and commissioning.
- **Variable volume system**: utilising PICVs to give an overview of variable volume systems within the scope of pressure independent control valves. Covers history, application, selection and commissioning.
- **Variable Volume System:** utilising DPCVs and PICVs. A combination of the DPCV and PICV modules.

CPD PROVIDERS

For a list of all companies on the CIBSE CPD Directory, visit **www.cibse.org/cpddirectory**

Daikin Applied

Phone: 0345 5652700
Email: info@daikinapplied.uk
Web: www.daikinapplied.uk/cpd

Our CPDs are relevant, up-to-date and technical, and can take place at your chosen premises, or virtually. The CPD seminars from Daikin Applied UK are:

- **Air handling unit compliance to HTM-03-01 (2021):** CIBSE approved
- **The benefits of air handling unit refurbishment in healthcare facilities**: CIBSE approved
- **Heat pumps and chiller market trends:** CIBSE approved
- **Virtual factory tours of our European chiller, inverter and AHU factories**

Dehn UK

Phone: Sean Passant or Robin Earl on 01484 859111
Web: dehn.co.uk

Dehn UK offers a wide range of lightning protection, surge protection and safety equipment, all meeting the high requirements of BS7671 and *BS EN 62305 Lighting Protection Standards*. Lightning risk assessments, designs and site surveys all meet relevant standards for accredited designers and Compex trained personnel.

Dehn UK now offers CPD on surge and lightning protection to upskill attendees and remain up to date on the latest changes to the standards. CPD can be delivered on site or via MS Teams online.

The Dehn UK office also has a dedicated training academy to offer a hands-on interactive experience and a chance to meet the experts from several standards committees. The two main seminars are up to four hours long covering BS7671 and BS EN 62305, with a shorter seminar covering lightning as a source of ignition for owners and operators of ATEX /COMAH sites.

Delmatic

Phone:020 3184 2000
Email: cpd@delmatic.com
Web: delmatic.com

Delmatic are leading international suppliers of smart DALI-2 lighting management systems. Our wired, wireless and hybrid solutions leverage the latest IoT open protocols: DALI-2, MQTT, Lon, BACnet, IP and BLE – to deliver unmatched management, monitoring and data sharing across physical or cloud networks.

Systems conserve energy, enhance sustainability, increase comfort, simplify installation, reduce costs, and continuously analyse, adapt and optimise lighting and connected building services performance. Delmatic's CIBSE-approved CPD modules range from an overview of lighting management to focus sessions providing in-depth study of individual topics, technologies and applications. Topics include:

- **DALI-2 technology, features and application**
- **DALI-2 emergency light testing and monitoring**
- **Open protocols – DALI-2, BACnet, MQTT**
- **Biodynamic tuneable-white control DT8 control**
- **Graphical management and analytics**
- **IOT, wired, wireless and hybrid solutions**
- **DALI-2 certification and qualification**
- **IP DALI to the Edge technology**
- **Smart sensors and smart data sharing**
- **Multi-discipline sensing and BLE beaconing**
- **Heatmaps, spatial occupancy maps, dashboards**
- **Futureproofing, sustainability and reuse**

Domus Ventilation

Phone: 03443 715523
Email: megan.bennett@domusventilation.co.uk
Web: domusventilation.co.uk

Established more than 30 years ago, Domus Ventilation manufactures high-quality and solution-based ventilation products for the domestic and light commercial building industry.

At the heart of the company's product range are high-performance mechanical ventilation systems, including HRXE-HERA and HRXE-AURA mechanical ventilation with heat recovery (MVHR) and the energy efficient CMX mechanical extract ventilation (MEV) units, which boast the best specific fan power on the market.

Domus Ventilation is also renowned for its award-winning ducting systems, which offer improved system performance through their exacting tolerances and engineered fit, which minimise pressure drops and virtually eliminate air leakage.

The company's reputation for quality products is further enhanced by excellent technical support from a dedicated, in-house team offering a range of services – from duct take-offs and estimations, to Revit MVHR and MEV system drawings – all free of charge.

Domus Ventilation also provides a detailed Specification Guide and offers several CIBSE-accredited CPD courses, including **Residential ventilation principles and building regulations**.

Enwa Water Technology UK

Phone: 01530 830354
Email: uksales@enwa.com
Web: www.enwa.co.uk/cibse-approved-cpd-seminar

Enwa's CPD is on **The importance of effective filtration and water treatment for heating and cooling systems**. The seminar focuses on water quality requirements for modern HVAC systems and includes the following:

- Key issues that threaten new build and refurbishment projects and a demonstration of how to identify and reduce these risks
- The positive impacts of effective water treatment and filtration on performance, resilience and lifespan illustrated through case studies
- The role of automation, effective control and management and how shortcomings in design and procurement can adversely affect project commissioning, completion, warranty, and legacy stages
- The impact on life cycle costs, energy efficiency and the environmental implications of failing strategies.

We provide a free, one hour lunch and learn session at your office or via online sessions.

FloControl

Phone: 01282 564425
Email: CPD@flocontrol.ltd.uk
Web: www.flocontrol.ltd.uk

FloControl has been providing CPDs across the UK, both remotely and at your place of business for over a decade. FloControl excels in the education and information of valve sets, hydronic valves and building services applications. The most popular CPD is the **Detailed exploration of variable flow systems**, looking at the design and operation of pressure independent control valves (PICVs) and efficiency within a system.

In recent months, a second CPD was accredited by CIBSE and a course on **Commissioning hydronic systems with ultra-low flow PICVs** is now available from FloControl.

The CPDs from FloControl help refresh your knowledge of balancing and control principles of constant and variable flow systems, understand dynamic valve terminology and technology and develop strategies to deal with common building services hydronic design challenges. The second CPD goes into further detail about PICV functionality, the definitions, practices and challenges of ultra-low flow systems, and the exploration of the three system components that influence ultra-low flow application commissioning.

Both CPDs are bookable on the FloControl website, with more to come in the future.

Ideal Heating Commercial Products

Phone: Richard Brown, head of specification sales, 07718 192161
Email: richard.brown@idealheating.com
Web: idealheating.com

Ideal Heating Commercial Products is the UK's leading commercial heating manufacturer of high efficiency commercial heating solutions. Operating from our Hull manufacturing plant since 1906, we are one of the few true British manufacturers left in the heating industry. Our CPDs can be delivered online or in person, either at your premises or at one of our Centres of Excellence in Hull, Leeds and Dalgety Bay.

- **Heat pumps: technology and principles (commercial) – NEW FOR 2023** Topics covered include the principles underpinning the mechanics and operation of heat pump systems; the types of heat pumps available; and understanding the importance of correctly sizing heat pumps.
- **Heat networks and heat interface units – NEW FOR 2023** Understanding heat networks and the role that HIUs play in ensuring the thermal comfort of the end user and the efficient operation of the network.
- **An introduction to plant room surveys** Looking at the various stages involved in surveying a plant room with particular focus on surveys for retrofit boiler installations.
- **Review of commercial boiler heat exchanger materials** A focus on materials and their maintenance. Covering not only the different materials for heat exchangers but also how to look after them.

Jaga UK

Phone: 01531 631 533
Email: cpd@jaga.co.uk
Web: jaga.co.uk/cpd

Jaga UK is the go-to company for dynamic heating and cooling convectors that optimise renewable energy. Providing high outputs with low flow temperature systems, Jaga UK's compact, energy-efficient emitters are the perfect heat pump partner. It runs three free CIBSE-accredited CPD seminars delivered in-person or via Teams:

- **Emitters: considerations for low flow temperature heating (1 hour)** Launched in response to England's Building Regulations uplift, which stipulates a maximum flow temperature of 55°C for new and replacement wet space heating systems, this seminar offers guidance on selecting efficient heat emitters for heat pumps and low-temperature systems and avoiding large radiators.
- **Design and specification of trench climate convectors (1 hour)** This seminar covers the theory behind the design and specification of trench convectors for heating, cooling and ventilation. You'll learn the types of trench available, how they work, their applications, and how to select the right unit.
- **Ventilation in schools (1 hour)** In light of the Covid-19 pandemic, this seminar outlines the importance of maintaining effective ventilation in schools, universities and other educational settings, the legislation around indoor air quality and the various ventilation solutions available.

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CPD PROVIDERS

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Kohler Uninterruptible Power

Phone: 01256 386700
Email: uksales.ups@kohler.com
Web: www.kohler-ups.co.uk/ups-academy-cpd

Kohler Uninterruptible Power (KUP) has extensive knowledge and experience of designing, specifying, configuring, installing, commissioning and servicing power protection solutions across a wide range of applications. It offers a number of free 'lunch and learn' technical seminars – aimed at consultants and electrical engineers – that can be held at a client's site or virtually. KUP also runs full-day UPS Training Academy courses across the UK, which are free to attend and CPD-certified. These are suitable for graduate engineers and those looking to refresh their knowledge of UPS. The courses are designed to improve understanding of the most recent power protection specification and selection requirements, and the latest technology available, while also offering invaluable CPD hours and points. Available lunchtime CPD modules include:

- **Designing resilient UPS systems**
- **UPS room planning and considerations**
- **Using a UPS as secondary source for safety services – NEW FOR 2024**
- **Emergency lighting**
- **UPS for healthcare – NEW FOR 2023**
- **UPS – fault clearance and neutral earthing**

Lochinvar

Phone: 01295 269981
Email: info@lochinvar.ltd.uk
Web: lochinvar.ltd.uk

Lochinvar manufactures and distributes a wide range of equipment for commercial and industrial heating and hot-water applications. The current product range includes heat pumps, solar thermal systems, gas-fired water heaters and boilers as well as associated ancillaries.

Lochinvar has provided CIBSE-accredited CPD seminars for many years, and its aim is to maximise the value to its audience by frequently reviewing and acting upon attendee feedback.

Current sessions include:

- **Heat pumps for commercial heating and hot-water and cooling applications**
- **Sizing and selection of direct gas-fired water heaters**

Lochinvar is working on new CIBSE-accredited CPD content to offer insight into the latest industry trends and technologies. Keep an eye on the training section of its website to sign up for existing sessions and be the first to know about new content. Visit **lochinvar.ltd.uk/training/cpd-seminars**

Munters

Phone: 01480 432243
Email: info@munters.co.uk
Web: munters.co.uk/ukseminars

Munters' CIBSE-approved CPD seminar gives a comprehensive introduction to humidity theory and dehumidification. Learn about the impact of moisture, combating seasonal fluctuations and how to achieve the most cost-effective and energy-efficient climate solution for you or your customer. The seminar lasts approximately one hour and covers:

- **Dehumidification theory**
- **Methods of dehumidification and its benefits**
- **Dehumidification in industry – case study examples**
- **Introduction to the psychrometric chart**
- **Calculating moisture loads**
- **Energy-saving technology and applications**

Suitable for consultants, architects, specifiers, installers and industry professionals, delegates can choose to hold this seminar in person at their own office or at Munters' UK office in Wyboston, or online via Microsoft Teams. If delivered in person during a lunchtime, Munters can provide a free lunch (subject to conditions – ask for details).

Socomec

Phone: 0333 015 3002
Email: info.uk@socomec.com
Web: socomec.co.uk

Regardless of industry or sector, everyone is now required to undertake CPD. The updating of skills and knowledge is critical in keeping abreast of industry changes, maintaining professional competence and ensuring that qualifications do not become obsolete.

Socomec offers seven comprehensive professional development seminars delivered by highly experienced critical system application engineers.

Hosted at your offices and including participants from four to 40, the seminar takes about one hour and you will receive an individual presentation pack and a certificate on completion. Topics include:

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Designing building services for maintenance

This module focuses on the essential role of the design team in the effective maintenance of operational building services systems

Reliable building services systems are key to building user and occupant satisfaction, health and safety, energy efficiency, operational dependability and longevity, as well as delivering environmental performance. Reliability will also afford more intangible impacts on business reputation, client approval and the wellbeing of the wider population affected by the success of the building's integrity and dependability. Such reliability is contingent on numerous factors throughout the gestation and creation of the built environment as, come practical completion, the onus will shift to the facilities management (FM) team to maintain the high standards that were envisaged by the building design team.

The majority of decisions that determine the maintainability of a building's systems are made long before the building is finished. In the 1990s, Geoff Prudence of the CIBSE FM Group coined the phrase 'designing for maintenance' to highlight the importance of actively considering maintenance requirements at the earliest stages of a building project.

As noted in last month's *CIBSE Journal* article[1] by Joanna Harris, lead author of the recently revised CIBSE Guide M *Maintenance engineering and management*[2], the guide is considered the 'go to' reference for providing industry guidance to ensure appropriate building services maintenance management. The recent revisions provide a significant update and restructure to the previous versions, particularly reflecting recent changes in building use and performance expectations. This article has drawn on some of the key aspects of the guide that are most relevant to designers. However, the full document – which is freely downloadable to CIBSE members – covers these and other topics in greater depth, providing a comprehensive guide to successful building services systems maintenance engineering and management.

The design team needs to create systems that not only work well, but which can also be easily maintained within the physical, financial, and ethical constraints of the building operator. And – as noted in the recently updated CIBSE Guide M – they must meet the primary interest of most clients, which is to have a building that works without any problems. While most people accept that engineering services need to be operated safely and efficiently, they also expect that the building operator will have trained, competent staff to do this. Designers should consider designs that avoid the need for a proliferation of specialist service companies, as this can improve the overall cost of the facility over its lifetime. Designers must, in any case, ensure that their designs can be safely installed and maintained, and should identify any areas where there is any risk associated with these activities.

Designers play a critical role in the performance of building services systems and, regardless of project size, will be well advised to start by considering the questions in Table 1, which are taken from CIBSE Guide M. These questions aim to promote inquiry that is contextualised to the particular project and help ensure that the final installation meets its goals. Designers should maintain a good understanding of other construction disciplines, and be willing to share ideas with other specialists and »

relevant stakeholders early on in the process to get input before designs are finalised.

Clients may view running costs as being marginal when assessed against accommodation costs and staff wages, and simply accept operation and maintenance (O&M) expenditure. However, some may challenge even modest running costs to keep these under continuing review, and to seek cost-effective means of improving efficiency and reducing expenditure. In any case, they will not expect the maintenance demands to infringe unduly on their usage of the facility. Client attitudes to the environmental impact of buildings and their services can also vary widely.

When offering recommendations to clients, designers should employ clear, non-techy language. They should present various courses of action, highlighting both pros and cons. A preferred choice should be suggested along with the rationale and cost estimates for each option, encompassing total ownership expenses and expected replacement cycles. Additionally, designers should indicate direct environmental effects and, if appropriate, ways to mitigate them. In cases where the client hasn't specified their project requirements, the designer must clarify their assumptions and design parameters, and secure the client's approval. This especially pertains to redundancy levels for engineering components. There should be a conversation about standby capacity, ensuring the client understands how failures could affect their operations and align expectations with their business strategy. Where designers are encouraged to consider alternatives, they should clearly specify their requirements and make sure that clients understand the potential consequences. Similarly, it is the designer's responsibility to provide the installer with enough information to make informed choices so that procured materials and equipment do not subvert the design intent.

Building information modelling (BIM) can be used to reduce the cost of changes during the concept, outline, and detailed design stages. This provides a significant opportunity to help ensure that clients and operators remain informed of maintenance and asset information throughout the building's life-cycle, minimising maintenance and life-cycle costs, as well as the total cost of ownership.

Sustainability and net zero requirements are key considerations, and designers can play a significant role in this area, particularly by designing for flexible operation, maintainability and energy efficiency. Eliminating maintenance concerns, known as 'designing-out' maintenance, is increasingly common with the advent of 'maintenance-free' assets such as pumps and motors. The careful assessment of the impact of such assets on system level reliability is far more effective than attempting to integrate them post-installation. While manufacturers may tout component reliability, the focus should remain on overall system reliability. This involves integrating support systems for cost-effective operation and maintenance, considering factors including the layout and accessibility of plant rooms; asset reliability; redundant systems; specialised maintenance knowledge; spare parts availability; after-sales support; and asset standardisation. Built-in monitoring systems – typically referred to as computer-aided facility management (CAFM) – for real-time feedback on systems status often incorporate features for scheduling maintenance tasks, managing work orders, tracking asset information, and generating reports to aid in decision-making and efficiency improvements.

The decision as to the best design solution to fit maintenance and other organisational needs is often a subjective judgement based on a comparison between qualitative and quantitative aspects. The starting point for a maintenance strategy should always be at the client's briefing stage, when the operation of the building is being defined. It is crucial to involve experienced O&M professionals early in the design process to ensure that practical and effective solutions are developed. While this may be seen as an additional cost, it can add significant value by resulting in a more effective final design that may also reduce life-cycle costs. For projects within an existing facility, feedback should be sought from the local FM. For new developments, it may be possible to identify locations with similar requirements and discuss the design implications with an experienced FM. Early engagement with the facilities management team can significantly reduce the costs of poor designs, since the cost of making changes increases dramatically as the project progresses towards detailed design and construction.

The choice of technology in the design will also be influenced by the maintenance policy, encompassing techniques that might include advanced building management system (BMS) monitoring, data analytics, protection of critical systems, and alarm monitoring. One of the fundamental principles in designing for successful maintenance is ensuring that all active system components are readily and safely accessible. Accessibility simplifies and encourages routine inspections, repairs, and component replacements, reducing labour costs and minimising disruptions to building operation. It is important that designers ensure that they keep aware of decisions being taken on other

Briefing	Do I clearly understand my role and responsibility for the installation? Do I really know what the client wants and what the brief is? Have I examined all the options? What redundancy is required (ie, what standby facilities in case operating units fail)? What is the return on investment (ROI) on strategic design decisions? What is the handover strategy, is a Soft Landings approach advantageous?
Materials	Have I thought about the materials to be used and their suitability and life expectancy? Consideration of whole life carbon, circular economy, recycle and reuse? Have I selected materials that are safe to work with?
Installation and commissioning	Have I thought about how practical it is to install my designs? Do I have the necessary information to make that judgement? Will the installation be easy to commission? Can tolerances on design parameters be relaxed? Impact on the existing building and engagement from FM team?
Operation and maintenance	Will my design work consistently and reliably achieve the design objective under a wide variety of conditions? What is the overall strategy for building services – what will be the requirement/ potential impact on business of maintenance/shutdowns? Are there any specialist or high risk environments? Can the installation be operated and maintained safely by personnel with normal skill levels?
Costs	Have I established the client's requirements in respect of first costs; operating costs (including energy and maintenance); and whole life costs/implications?

Table 1: Typical questions for a designer to consider throughout the construction project (Source: CIBSE Guide M1 2023)

constructional elements during the design process, to ensure that the building services systems design can be effectively installed in the final building, which is likely to have evolved significantly throughout the design process.

Designers must consider the suitability and life expectancy of materials being proposed and, where appropriate, should carry out whole-life costing studies. As well as operational performance, analysis should also include environmental dangers, risks and safety issues associated with the installation or maintenance. Thoughtful system design is crucial for both system efficiency and maintenance. This should not only focus on high-profile 'normal' maintenance items of equipment or front-line services exposed to the day-to-day user, but also include all the underlying systems. A truly holistic approach should consider granular items. So, for example, when considering a ducted air system, this should include appropriate consideration of materials, fabrication and jointing techniques that provide cost-effective, suitably insulated ductwork that minimises air leakage but also creates a system that is internally smooth, accessible and readily cleanable. Unobstructed, labelled, suitably gasketed access panels and inspection points should be included at strategic locations, appropriately and safely accessible to simplify inspection, cleaning and maintenance tasks.

Appropriate inclusion of sensors and monitoring systems can enable predictive maintenance systems, track the performance building services components in real-time and provide alerts when maintenance is needed. Predictive maintenance helps prevent unexpected breakdowns and optimises the timing of service interventions – an area that will undoubtedly be enhanced with the further development of artificial intelligence (AI) tools. Remote monitoring and predictive diagnostic capabilities enable on- and off-site technicians to assess system performance, identify issues and make adjustments, reducing the need for physical visits and minimising disruptions.

Designers need to establish maintenance expectations for their installations, whether through specifications or written guidance. Additionally, they should factor in warranty maintenance in the construction contractor's agreement. This could involve citing recognised maintenance standards or procedures, such as the UK's SFG20: Standard Maintenance Specification (SFG20[3]), to ensure comprehensive attention to critical maintenance concerns.

A designer's involvement with O&M is often limited to specifying and reviewing O&M manuals delivered to clients upon project handover. However, it is essential to provide information that enables building operators to run facilities efficiently, incorporating expected operational energy standards for individual systems and the facility as a performance benchmark. It is considered best practice to define the projected replacement strategy for components throughout the facility's life-cycle. This entails creating an 'asset replacement strategy' as part of the design requirement, particularly for substantial essential equipment such as chillers, generators, and electrical switchboards. Additionally, during the design phase, designers should consider repair and reuse approaches, as well as contemplate decommissioning and replacement methodologies for installed assets. This is not always a straightforward reversal of the installation process, so an asset replacement plan with a method statement should be developed and documented.

The main contractor or building services contractor is usually responsible for producing and coordinating the handover information, which – in terms of O&M – include the operation and maintenance manual, and statutory and other prescriptive requirements, including those related to health and safety. The design and operation strategy should be clearly explained to communicate the rationale behind decisions made during the design process, including the software algorithms underpinning the building control system, as these define how the systems are to operate.

Handover information in the form of 'as-built' records are vital information assets that owners and FMs require to establish baseline facility performance benchmarks and reference information to maintain and optimise performance. Requirements for handover information will need to be agreed well in advance of the expected date of completion and must identify individual responsibilities for producing information. Guidance such as BSRIA *Soft Landings Framework*[4] can be applied by the whole building delivery team across all project phases to ensure that buildings not only meet the needs of their occupants, but are also documented and commissioned in a timely manner so that they may be operated and maintained effectively.

Where BIM has been implemented, some or all the information, including the model, can provide a useful resource for the building owner and operator. In the UK, the Building Safety Act 2022[5] requires information around building safety to be provided – referred to as 'the golden thread'. The intent is to provide a robust trail of key information across to future owners to underpin more effective safety management throughout the building life-cycle.

Cost, space constraints, and the pressure to reduce project delivery times can lead to 'value engineering' of maintenance considerations and resilience aspects, which can have long-term consequences when the building is in use. An appendix to CIBSE Guide M1 provides a design guide to maintainable facilities, summarised by the section headers in Figure 1. This checklist can be used to ensure that essential steps are maintained, and key items identified and addressed, moving towards Prudence's vision of 'designing for maintenance'.

Turn to page 16 for references

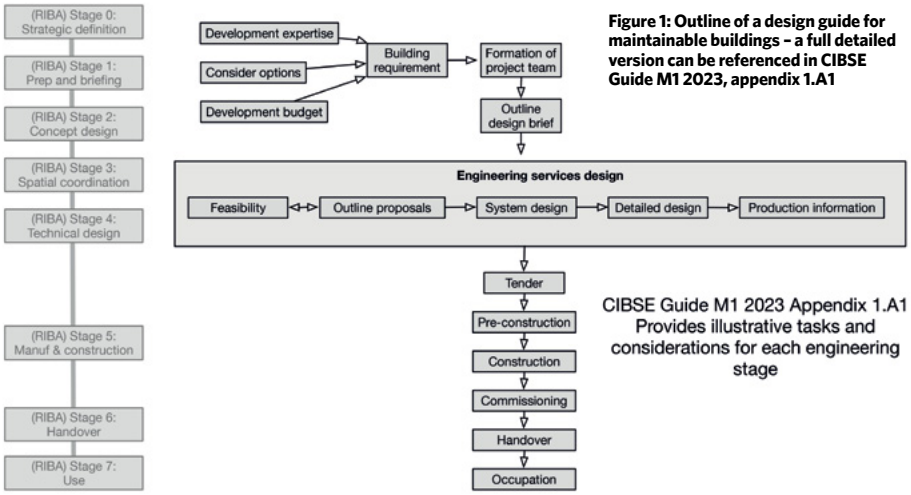

Figure 1: Outline of a design guide for maintainable buildings – a full detailed version can be referenced in CIBSE Guide M1 2023, appendix 1.A1

Module 224

November 2023

1. In the article, what is quoted from Guide M as the actual primary interest of most clients?

- ☐ A To adopt a hands-on approach to control maintenance
- ☐ B To employ specialist service companies for maintenance
- ☐ C To ensure that building services engineers take the project lead
- ☐ D To have a building that works without any problems
- ☐ E To take recommendations of alternative systems based on capital costs

2. In the typical questions for a designer to consider throughout the construction project, what section includes consideration of tolerances on design parameters?

- ☐ A Briefing
- ☐ B Costs
- ☐ C Installation and commissioning
- ☐ D Materials
- ☐ E Operation and maintenance

3. What is the meaning of the acronym CAFM?

- ☐ A Computer AI facility management
- ☐ B Computer-aided facility management
- ☐ C Connected augmented facility management
- ☐ D Construction adapted facility management
- ☐ E Control assisted facility management

4. What is explicitly referred to as a resource to ensure comprehensive attention to critical maintenance concerns?

- ☐ A BIM
- ☐ B Building Safety Act 2022
- ☐ C Guide M1
- ☐ D SFG20
- ☐ E Soft Landings Framework

5. What RIBA stage is most likely to coincide with the completion of the engineering services design?

- ☐ A Stage 2
- ☐ B Stage 3
- ☐ C Stage 4
- ☐ D Stage 5
- ☐ E Stage 6

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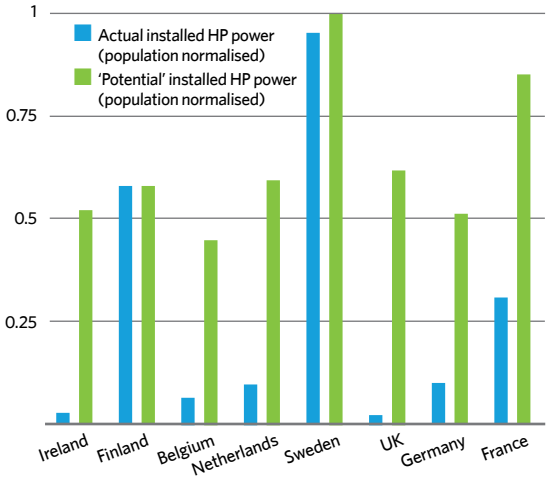
Exhaust air heat pumps for homes in temperate climates

This module explores the potential for the application of air source heat pumps and exhaust air heat pumps in the UK and other countries with similar climates

In a recent UK government research briefing,[1] heat pumps were reconfirmed as a key technology for achieving net zero emissions from domestic heating. However, the UK government target of 600,000 installations per year by 2028 still appears somewhat ambitious, being that just 72,000 were installed in 2022. The research briefing asserts that heat pumps are technically suitable for most UK homes if installed appropriately. However, although the supply chain has significant growth potential, stakeholders indicate it is currently constrained by a lack of consumer demand and government policy uncertainty. Some of this uncertainty and lack of demand is doubtless the result of heat pump trials undertaken earlier this century that, in many cases, suffered from poorly or inappropriately applied installations and lack of understanding, variously by designer, installer and operator.

This reluctance to apply heat pumps is not apparent in many European states – many of which have climates that are similar, or more extreme, than those of the UK. An interesting set of data was produced by the European Heat Pump Association (EHPA),[2] based on sales intelligence and methodology from EU Decision 2013/114/EU.[3] This explored how many heat pumps were technically feasible across other European countries if heat pumps were as popular as they are in Finland. These are reflected in the chart in Figure 1 – the green columns indicate the potential and the blue columns indicate the actual amount of renewable energy produced by the current stock of heat pumps. This data reflects all heat pump sales, and although the comparisons may not be absolute in their methodology, the strong indication is that there is much untapped potential still to be exploited in many countries. The UK has[4] around 412 heat pumps per 100,000 people, compared with a European average of 3,068 heat pumps per 100,000 people. The Climate Change Committee projects[5] that to reach net zero, domestic heat pumps will be needed in at least half – but likely closer to 80% – of UK homes by 2050. There are approximately[6] 27 million homes in the UK and 68 million people.[7]

Air source heat pumps (ASHPs) employ an air-to-refrigerant evaporator coil to directly extract heat from a fan-assisted airflow. This coil features fins on the airside and is typically situated outdoors, utilising the surrounding ambient air as a heat source, or potentially in an air stream that is warmer »



Source data : https://stats.ehpa.org/home/ehpa-dashboard/ – accessed 30 September 2023.

Figure 1: An estimate of the installed power of technically feasible heat pumps if heat pumps were as popular as in Finland

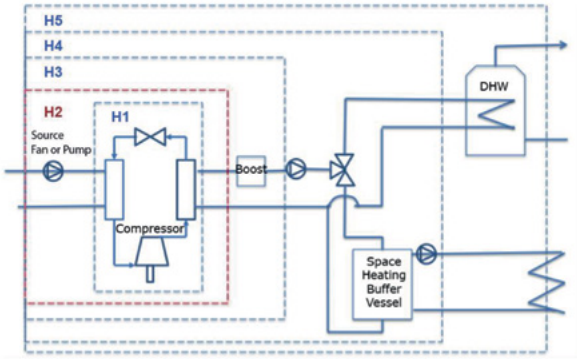


Figure 2: SEPEMO (SEasonal PErformance factor and Monitoring) system boundaries – when used to define the SPF boundaries, these are typically referred to as SPF_{H1} to SPF_{H5}. Boundary H1 is the heat pump itself[11]

» than outdoor, ambient temperature, such as an exhaust air duct.

The condenser is often a compact plate heat exchanger that draws heat from the condensing refrigerant to increase the temperature of water that is being employed to supply the heating load. (Such an ASHP would be known as an air-to-water or air-to-brine heat pump.) The coefficient of performance (COP) provides an instantaneous measure of refrigeration cycle performance. To achieve the best COP, the source (air passing over evaporator) should have as high a temperature as possible and the condenser temperature – governed by the temperature of water returning from the heating load – as low as practicably useful. To allow comparisons between systems and regulatory limits, the conditions for the measurement of the COP are typically standardised – for example, Approved Document Part L of the England Building Regulations (AD L England) refers to the methods of BS EN 14511-2.[8] The seasonal COP (SCOP) is an aggregated COP over a year and, again, the calculation employs prescribed sets of external climate (temperature) bins and operating hours – these are defined in BS EN 14825:2018.[9] SCOP values typically range from 3.0 to 5.0 for modern ASHPs. The seasonal performance factor (SPF) is often employed to assess the performance of the whole defined heat pump system aggregated and averaged across yearly operation. This accounts not only for the changes in COP as the evaporator and condenser temperatures vary, but also other de-rating factors – such as the de-icing cycles required to keep the evaporator clear of ice at low outdoor temperatures, and parasitic power used in fans and control systems. Therefore, the SPF value includes all the relevant ancillaries associated with the particular building, whereas COP is associated with the heat pump unit itself. There are various defined sets of assumptions for 'boundaries' (of the equipment/environments to be included) in SPF assessments that will impact the calculated value. These are illustrated in Figure 2.

For air-to-water heat pumps, ADL England requires a COP of at least 3.0 for space heating, and 2.0 for domestic hot water (with prescribed sets of standard inlet and outlet conditions both for internally and externally located heat pumps). Heat pumps designated as low-temperature would not typically deliver heating water higher than 52°C, and medium- and high-temperature heat pumps are characteristically capable of typically delivering water at higher temperatures.

Where a heat pump is providing useful cooling as well as delivering heating, the overall performance will be significantly higher.

The UK government-funded 'Energy Systems Catapult' electrification of heat demonstration project[10] installed 742 heat pumps in existing homes across Great Britain in 2020/21. The recently published interim findings found that ASHP SPFs have significantly improved, by ~0.3 to 0.4 compared with earlier trial installations reported[11] in 2017, with the median SPF_{H4} for ASHPs being 2.80 (median SPF_{H2} = 2.94). It is noted that heat pumps using the 'low-GWP' refrigerants R290 (propane) and R32 generally performed better than those using the older R410a refrigerant (which is currently being phased out in the UK). This result may also suggest that the design (and installation) of heat pump systems has also improved. However, it also found a need to improve the quality and consistency of heat pump designs and installations to support a large-scale rollout of heat pumps in existing homes, and deliver positive energy, carbon and consumer outcomes. Median ASHP efficiency fell to 2.44 on the coldest day (-0.4°C), which quantifies the expected degradation in performance resulting from low temperature, and could be used to inform modelling of peak winter demand. Notably, the best-performing installations had the largest proportion of the annual load met solely by heat pumps (with lower use of supplementary systems).

Exhaust air heat pumps (EAHPs) are a specific application of ASHPs, combining an ASHP with a mechanical ventilation system. As noted in BSRIA BG 7/2009,[12] exhaust air is an alternative heat source to outdoor air for buildings designed with mechanical ventilation. The exhaust air is always at the indoor air condition, and so the source-to-load temperature difference is relatively small. The evaporator also gains from the latent heat in the exhaust air. The exhaust air may be drawn through the dwelling via transfer grilles or ducted from different areas including wet areas (but not from cooker hoods).

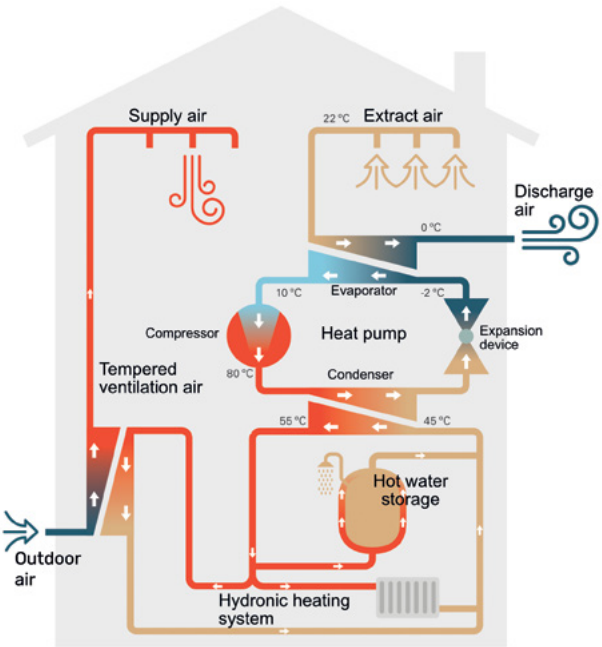


Figure 3: Schematic of 'four-pipe' exhaust air heat pump installation applied to a house with balanced supply and extract mechanical ventilation system (Source: NIBE)

INCLUDING HYBRID SOURCE EAHP IN SAP

Within SAP modelling, an EAHP can be entered under multiple categories in order for the model to recognise all the different aspects of the system. This includes a listing as a ventilation device, and also a listing as a heat pump for main heating and hot water production. EAHPs are a recognised technology under the UK's Microgeneration Certification Scheme[13] (MCS).

EAHPs are a form of mechanical heat recovery, but are many times more effective than simple air-to-air heat exchangers or runaround coils. EAHPs may be employed to provide heating, domestic hot water (DHW) and mechanical ventilation in domestic and small commercial applications, via a single integrated unit that requires no external plant or equipment. They are best suited to buildings with high thermal performance and low leakage envelopes. If required, complementary heating can be provided from either a supplementary heating system or through resistive-electric heating.

The associated mechanical ventilation system will likely be one of two types – centralised mechanical extract ventilation or balanced supply and extract ventilation. For centralised mechanical extract ventilation-based systems, background ventilation is required through purpose-designed background ventilation devices that are intended to perform with EAHPs. There is a common misconception that EAHPs – when operating as 'four-pipe' balanced ventilation devices, as illustrated in Figure 3 – follow the same principles as mechanical ventilation with heat recovery (MVHR) systems. However, unlike MVHR, where heat recovery and energy transfer is achieved by employing an air-to-air heat exchanger, the most common EAHP systems use an air-to-water heat exchanger to deliver heat from the heat pump condenser.

In a 'four-pipe' balanced ventilation system, the incoming outdoor air is tempered using another water-to-air heat exchanger that is fed from the heating system. The efficiency afforded by the heat recovery is therefore incorporated into the overall SCOP for the heat pump, and not as a thermal efficiency rating that is commonly assessed for an MVHR system.

The amount of available heat will be proportional to the extract airflow rate. To avoid over-ventilating the property – and, in turn, increasing air changes leading to higher heating loads – the ventilation system should be designed to meet the ventilation rates required to meet compliance with the local regulations (for example, in England, Approved Document Part F1, 2021). To achieve higher EAHP heating outputs, it is possible to incorporate an additional, dampered, outdoor air duct that can be used to selectively draw outdoor air across the heat pump evaporator. Such hybrid source systems are recognised by the UK standard assessment procedure (SAP) PCDB (product characteristics database) as 'mixed exhaust air and outside air heat pumps'. (See 'Including hybrid source EAHP in SAP' boxout.)

EAHPs require a hydronic heating emitter system, and most commonly incorporate an indirect unvented hot water cylinder. They work most efficiently at lower heating flow temperatures – as with other heat pump technologies – with distribution systems designed for delivering the required heating load at a maximum supply temperature of 55°C; this coincides with the most recent requirements in ADL England. Most EAHP systems incorporate weather compensation control for the heating system and, potentially, inverter-driven compressors to modulate outputs. By employing refrigerants such as R290, EAHPs (such as in Figure 4) can deliver temperatures up to 70°C for the provision of hot water, allowing for legionella cycles to be carried out without relying on top-up electric heaters. The heating delivered through either a hydronic heating system – such as underfloor heating or radiators – or, where balanced supply and extract mechanical ventilation is employed, potentially through both tempering the incoming air and supplying a hydronic heating system (as shown in Figure 3).

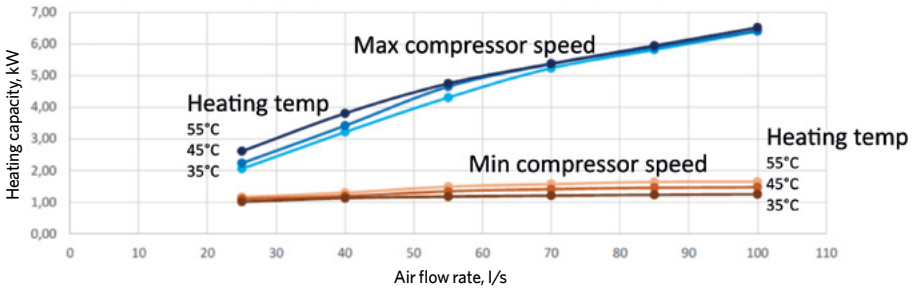


Figure 5: Example heating output capacity of a EAHP (operating using only exhaust air at 20°C as heat source), showing variation between flow temperature and airflow ventilation rate, tested to BS EN 14511 (Source: NIBE)

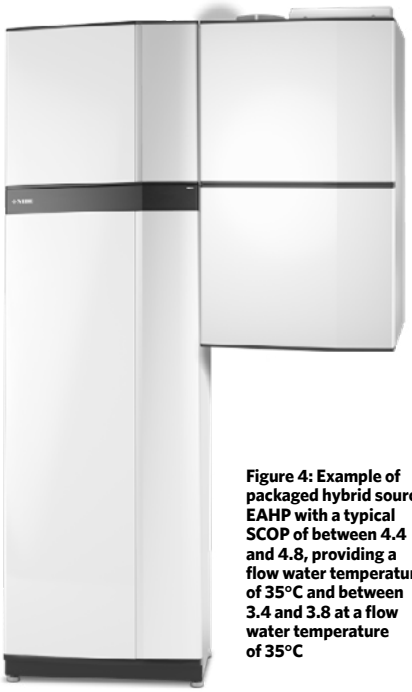


Figure 4: Example of packaged hybrid source EAHP with a typical SCOP of between 4.4 and 4.8, providing a flow water temperature of 35°C and between 3.4 and 3.8 at a flow water temperature of 35°C

The specification and design of an EAHP system is critical to ensure that it operates efficiently and can provide 100% of the required heating and hot water demand. There have been several historic examples of trialled systems that were inappropriately matched to homes, which resulted in installations that were incapable of meeting loads without undue use of 'backup' direct electric heating. A full heat-loss assessment should be undertaken and the DHW demand should be carefully assessed prior to considering any heat pump application. Based on current Building Regulations fabric standards, and depending on appropriate configuration, commercially-available packaged hybrid source EAHPs – with outputs such as those illustrated in Figure 5 – may be applied to meet the heating demands for new dwellings up to approximately 150m^2; in the UK this is a typical three (or more)-bedroom house.

As noted in in the UK parliament guidance,[1] heat pump installation costs are higher than gas boilers, and large cost reductions are unlikely; however, heat pumps currently have similar running costs to gas boilers. With more creative tariffing, additional government initiatives, or greater energy security the relative gas and electricity cost differential may eventually erode – but, regardless, there is a prerogative to install heat pumps. For domestic and small commercial applications, properly integrated packaged EAHPs can provide one of the options to meet the ambitious target of 600,000 installations per year by 2028.

Turn to page 24 for references »

Module 225

November 2023

1. Compared with the European average per person, approximately how many heat pumps are associated with the UK?

- ☐ A Between 0% and 10% of the European average
- ☐ B Between 11% and 20% of the European average
- ☐ C Between 21% and 30% of the European average
- ☐ D Between 31% and 40% of the European average
- ☐ E Between 41% and 50% of the European average

2. In the simplified illustration of the feasible heat pumps in different states, which of those named appears to have the greatest opportunity to increase heat pump installations?

- ☐ A Belgium
- ☐ B France
- ☐ C Ireland
- ☐ D Netherlands
- ☐ E UK

3. Which SEPEMO boundary does not include the hot water storage vessel?

- ☐ A H1
- ☐ B H2
- ☐ C H3
- ☐ D H4
- ☐ E H5

4. For the example EAHP shown in the schematic, what is flow water temperature?

- ☐ A 10°C
- ☐ B 22°C
- ☐ C 45°C
- ☐ D 55°C
- ☐ E 80°C

5. Approximately what maximum size of a new UK home is suggested as being potentially suitable for an EAHP?

- ☐ A 75m²
- ☐ B 100m²
- ☐ C 125m²
- ☐ D 150m²
- ☐ E 175m²

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Questions you shouldn't be afraid to ask

Manufacturers have the experience and knowledge to ensure optimal specification and perfect system performance. Four suppliers answer questions on their areas of expertise and share their insights

Peter Double, managing director at Andel

www.andel.co.uk

"Sustainability is crucial for our own operations, our supply chain and the products and services we offer"

Which big trends do you see emerging in leak detection in 2024?

Sustainability, reducing emissions and increasing the use of renewables will continue to be a hugely significant trend in 2024 and beyond. Climate change poses a massive challenge to us all and the ambitious UK government target of net carbon zero 2050 will be a key consideration for all businesses in all industries.

Andel is a multi-disciplined company providing a range of sustainable solutions to protect both the built and natural environments. Demand for leak detection and water sustainability continues to grow year on year providing a great opportunity and driver for R&D, innovation and new smart technologies that deliver the optimum sustainable solutions to customers.

As an environmental company, Andel has taken the initiative to become net carbon zero by 2025. This means more energy efficiency, reducing carbon emissions, eliminating the use of fossil fuels, reducing waste and implementing a forensic approach to measuring the environmental impact of our business. Consequently, sustainability is crucial for our own operations, our supply chain and the products and services we offer.

Hybrid environmental monitoring systems and water sustainability have become important developments in our leak detection product portfolio. Enhanced, hybrid, multi-function control systems provide customers with a new level of leak detection and environmental monitoring providing simultaneous and automatic zonal isolation of water, gas and/or oil supply if an alarm is triggered. Protecting natural resources and reducing environmental impact are key to sustainability.

Water flow monitoring and motion sensor systems provide sustainable water conservation solutions, protecting natural resources, saving on costs and earning BREEAM credits. Digital gas leak detection systems can reduce environmentally damaging refrigerant gas escapes, earn BREEAM credit and provide environmental and H&S-compliant solutions for the full range of commercially used gases.

Matthew Blackmore, head of business development at Armstrong Fluid Technology

bit.ly/armstrongfluids

"Over-sizing at the outset to later accomodate full cooling load is hugely inefficient"

What developments have you seen in the use of packaged plant and off-site manufacture in UK HVAC?

An important development that we have experienced at Armstrong in recent years has been the use of off-site manufacturing approaches to deliver significant energy efficiency advantages, and to avoid technical challenges inherent in large-scale projects. In particular, projects which, by practical or financial necessity, need to expand incrementally over an extended period of time.

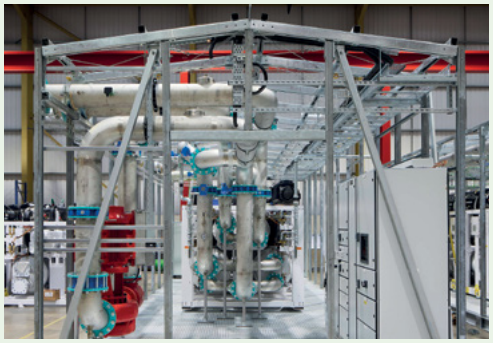
One example is the provision of cooling systems for data centres. Data centre applications present specific challenges in relation to the design and operation of chilled water systems, which are driven by higher-than-average cooling loads, the need to design for modular expansion, and shorter upgrade cycles.

Over-sizing at the outset in order to accommodate the full cooling load at a later date is hugely inefficient and does not align with the typical financing models employed in the data centre industry.

In these applications, options such as Armstrong's iFMS modular packaged pump solutions have proved highly successful as they 'bolt-on' additional cooling in line with expansion of IT processing capacity. In addition to avoiding the energy wastage of over-sized plant, this assists profitability by preventing the need to front-load capital investment, and guarantees reproducibility.

Another notable example is the district energy sector, where the energy requirements of schemes change significantly as sites are connected to the network. Armstrong's off-site manufactured temporary energy centres and scalable energy centres have revolutionised projects of this type.

Rather than relying on the traditional approaches of either installing for day one load, or pre-installing equipment ready for a future full load condition, temporary or scalable energy centres enable capacity to be scaled-up in line with the load profile of the site.



Stephen Woodnutt, managing director, Delmatic Lighting

https://delmatic.com

"Wired, wireless and hybrid solutions reimagine and redefine control in the IOT era"

What role can lighting control play in a smart building?

Today's smart systems go way beyond traditional controls to deliver extended lighting and environmental management, monitoring, analytics and data sharing – so much so that one of Delmatic's recent systems was awarded a BREEAM Innovation Credit described as 'unique on a global scale'. Lighting control sensors installed throughout a building are perfect for capturing real-time data not just on occupation and lighting levels but also other environmental data which can be shared with integrated building services.

Latest technology multi-functional sensors combine traditional presence detection and daylight linking with temperature, humidity and air quality monitoring. Real time intel shared with the BMS and BOS via BACnet and MQTT optimises energy efficiency by enabling all energy-consuming services to be linked to monitored occupation, while combining all environmental monitoring within a single smart sensor optimises sustainability by reducing duplication of hardware as well as reducing wiring and installation.

Wired, wireless and hybrid solutions reimagine and redefine control in the IOT era and encompass emergency light testing and monitoring, tuneable white biodynamic control, real-time energy monitoring with dashboard analytics, heatmapping, space occupancy optimisation, and BLE beaconing for smart wayfinding and asset tracking.

What are the advantages of DALI-2?

DALI was a game changer when it first came out enabling fully addressable and flexible control of interchangeable drivers along a network buswire.

The latest DALI-2 technology extends the original benefits of energy-efficient dimming and lamp and driver failure to include enhanced data gathering and energy monitoring, embraces sensors and local control devices within the standard, and includes independent product certification by the DALI Alliance to guarantee interoperability as part of a DALI ecosystem.

Richard Brown, head of specification at Ideal Heating Commercial Products

bit.ly/idealCB

"Speak to the manufacturer at the design stage and we can ensure mistakes don't happen"

What is the most common mistake in commercial heating specification and how can it be avoided?

There are a number of pitfalls when it comes to specifying a heating system in a commercial building setting, but most of these can readily be avoided by one simple action: use the manufacturer's product knowledge and wealth of experience in specifications.

I would therefore say the biggest single mistake is not to engage with the manufacturer when designing commercial heating systems. For example, a building services engineer might pick a bank of boilers and they want a plate heat exchanger on the end of the boilers to give them hydraulic separation.

Now, if you do that, that's all well and good, but often people forget that you're going to get a temperature loss across the plate. So, they're not going to get what they want to achieve on the secondary side.

This can go all the way through to tender without anyone realising the mistake. Speak to the manufacturer at the design stage and we can ensure that doesn't happen.

A further example is the assumption that despite a heating load for one building being very similar to another, this doesn't mean you can just copy and paste the technical details across from one specification to the other.

Fundamentally each building is different. Pick up the phone to the specification team if only to check to make sure; the chances are we may be able to reduce the load or offer a more versatile package or, even better, we may have brought out new, more efficient products that will use less energy and potentially save capital cost too. We really are here to help.

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