

What to consider when installing commercial heat pumps?



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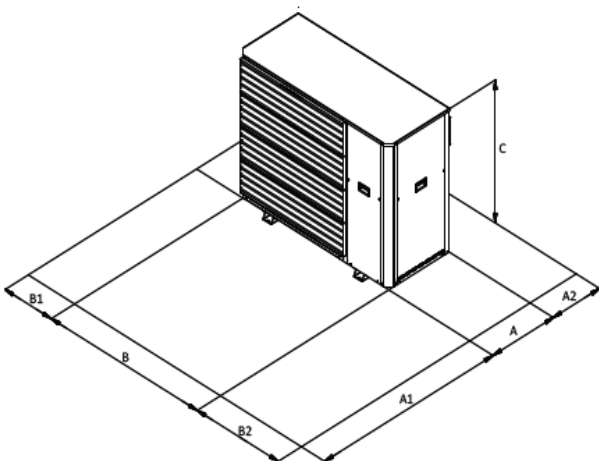
The commercial heating sector is undergoing a significant transition as organisations look to reduce carbon emissions, improve energy efficiency and future-proof their buildings. Air source heat pumps are increasingly at the forefront of this shift. However, while the technology itself is well-established, successful outcomes rely heavily on correct system design and installation.

A well-planned and professionally executed installation allows heat pumps to deliver the performance and carbon savings they are designed to. Conversely, poor installation practice can undermine efficiency, increase operating costs, shorten equipment lifespan and, in some cases, invalidate warranties. For specifiers, system designers and heating engineers alike, understanding the practical considerations of heat pump installation is therefore essential.

In practice, many of the issues encountered on site stem from a small number of recurring oversights that can be addressed through better planning and adherence to guidance. These include ensuring adequate space and airflow around the unit, carrying out accurate heat loss calculations, considering pipework layout and potential heat losses, managing condensate and defrost water effectively, and understanding the specific safety and electrical requirements associated with modern refrigerants. By exploring these areas in more detail, it becomes clear how relatively straightforward decisions at the design and installation stage can have a significant impact on long-term system performance.

How restricting space and airflow around a heat pump will affect performance?

One of the most common challenges encountered on site relates to space. Commercial heat pumps require sufficient clearance on all sides to enable access for safe maintenance and even more importantly proper airflow. Unlike boilers that are typically concealed within plant rooms, heat pumps are external units that depend on a continuous movement of ambient air to operate efficiently. Restricting this airflow - for example by boxing in the unit for aesthetic reasons, positioning it too close to walls, fences or even other heat pumps, or surrounding it with stored materials - will cause performance issues, icing-up, pressure faults and eventual system shutdown.



Why are performance clearances important when positioning heat pumps?

Adequate clearance is not simply a recommendation but a functional requirement for optimum performance. Manufacturers' installation manuals, specify minimum distances at the rear, sides and front of the unit for both airflow and servicing. **These dimensions should be treated as non-negotiable clearance parameters rather than optional guidelines.** Installations that disregard these clearances may appear aesthetically pleasing or space-saving in the short term but will result in operational problems, including insufficient heat or increased running costs.

When choosing where to position the heat pump, height and accessibility are critical factors. Units installed at excessive height without permanent safe access will create long-term maintenance challenges.

Servicing and commissioning must be considered from the outset, ensuring that future engineers can safely reach the equipment without the need for repeated scaffolding or specialist access solutions.

What needs to be considered when a heat pump defrosts?

Condensate and defrost water drainage must be planned carefully to prevent slip hazards, surface damage or water ingress into buildings. During normal operation - and particularly during defrost cycles in colder weather - heat pumps can discharge significant volumes of water. If this is allowed to run freely onto surrounding surfaces, it can quickly create slip risks for pedestrians, especially in winter when standing water may freeze. Poorly managed discharge can also lead to long-term deterioration of paving, tarmac and building fabric, while repeated water run-off against walls or thresholds increases the risk of moisture ingress.



Condensate management should be considered for all installations.

Best practice is to incorporate a controlled drainage solution at the design stage, such as a suitably sized drip tray connected to a trapped and insulated drain, or an appropriate purpose-designed soakaway. The fall of the discharge pipework, freeze protection, and safe routing away from walkways, fire escapes and access routes should all be considered. In commercial environments such as schools, healthcare settings and public buildings, these measures are particularly important to support health and safety compliance and to avoid costly remedial works after handover.

Why is the heat loss calculation important when sizing a heat pump?

Heat loss calculations are arguably the most important technical consideration in any heat pump project. Unlike traditional boilers, which can often tolerate oversizing, heat pumps operate most efficiently when matched closely to the building's actual heat demand. A detailed heat loss calculation is therefore essential before equipment selection begins.

Under-sizing can result in insufficient heating capacity during colder weather and extended run times. Over-sizing, meanwhile, may lead to short cycling, reduced efficiency and unnecessary capital expenditure. The heat pump must be sized not only for peak winter demand but also with consideration for buffer tanks, domestic hot water requirements and the building's insulation levels.

Commercial properties frequently present complex load profiles, with differing demands across zones and time periods. Careful analysis at the design stage allows for the correct combination and size of heat pumps, buffer capacity and control strategies to be specified, ensuring reliable performance throughout the year.



Why insulation is important to heat loss?

Installation efficiency extends beyond the heat pump unit itself. External pipework, buffer vessels and ancillary components can introduce significant inefficiencies if poorly positioned or inadequately insulated. For example, locating a buffer tank outdoors without sufficient thermal protection will lead to considerable heat losses, particularly in colder conditions.



Ensure buffer tanks and pipework are sufficiently insulated

What may appear to be a convenient placement decision can, in practice, negate much of the system's efficiency gains.

Pipe-runs should be minimised where possible and insulated to a high standard. Consideration should also be given to the route of pipework in relation to pedestrian areas, fire escapes and drainage paths. The goal is to ensure that heat generated by the system is delivered effectively into the building rather than lost to the surrounding environment.

What are R290 refrigerant safety considerations?

The growing adoption of natural refrigerants such as R290 (Propane) brings additional safety and compliance considerations. While these refrigerants offer ultra-low Global Warming Potential (GWP) – a GWP of just three in our best selling ECOMOD 290HT range - and strong environmental credentials, they are classified as flammable and must be installed in accordance with relevant safety standards and ATEX zoning requirements. This includes appropriate positioning away from ignition sources, correct electrical isolation placement and clear signage where necessary. Installers must understand the defined hazardous zones relating to the equipment and ensure that switches, sockets and smoking areas are not located within these boundaries.



ATEX zoning requirements are displayed on all heat pumps featuring R290 natural refrigerant.

Is the electrical capacity of the project sufficient?

Electrical infrastructure demands early attention. A site may physically accommodate several heat pumps yet lack the electrical capacity to operate them simultaneously. Discovering this limitation during installation can lead to costly delays and redesign of the system. Realistically this needs to be identified at the design stage of the project not at commissioning.

Why training, support and ongoing maintenance is important?

The shift from boiler-centric systems to heat pump-led solutions represents a learning curve for many professionals. While the underlying principles of heating remain familiar, heat pumps introduce new considerations around flow temperatures, system controls and longer operational cycles. Training is therefore a key enabler of successful adoption.



At Ideal Commercial Heating, we provide structured commercial product training programmes to assist installers and consultants, as well as providing technical support and guidance.

Our lunch-and-learn sessions and CIBSE-approved CPDs all contribute to raising industry confidence and competence.

Planning for performance

Ultimately, successful commercial heat pump installations are the result of careful planning rather than reactive decision-making. Adequate space, accurate heat loss calculations, correct heat pump sizing, safe positioning, electrical verification and professional training collectively determine whether a system performs to its potential.

As the industry continues to decarbonise, heat pumps will play an increasingly prominent role in commercial heating strategies.



Two correctly sited ECOMOD 290HT 27kW commercial heat pumps in cascade.



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