

Special report

Chilled beams and ceilings

Latest chilled beams are 'products of the age'

The question asked of all technology is whether it uses less energy than alternatives. Yes, say the industry's chilled beam suppliers

The fitting of chilled beams provides an energy-efficient, cost-effective alternative to traditional cooling systems, says Arcade UK managing director Mike West. They fit both new builds and refurbishment projects, are flexible and versatile and are also simple to install and maintain.

He adds that it is proven technology that has been around for many years and the systems benefit from the Part L legislation changes over recent years, as the client now works with the severe restriction to air movement round buildings. Combine that with the need to cut CO₂ emissions and carbon footprint and you have a product of the age, says Mr West.

While offering lower running and maintenance costs, chilled beam systems are almost noiseless, require little maintenance and are highly efficient. Traditional fan coil systems create somewhat higher air velocities, which some people find uncomfortable, he continues. They also have more components, filtration, condensate drainage and often take up valuable floorspace.

Chilled beams do not require a secondary fan or use higher water temperatures and thereby blend in with chiller manufacturers' free-cooling options. In the UK climate, they will have greatly reduced operating times and also require less ceiling space/height than forced-air systems, which

can lead to lower building heights and higher ceilings. The systems are also described as attractive for the retrofit market and offer the 'plug and play' method of installation, which will reduce downtime and ensure that the revenue stream is not unduly effected.

Considering all the features and benefits of chilled beam systems, it is hardly surprising that the market has bucked the wider trend, enjoying significant growth in recent years, even before the new legislation started to take effect. Mr West adds that he expects this growth to continue as the requirement for comfort cooling continues.

Growing popularity

SAS International non-executive director David Leatherbarrow agrees that specification of chilled beam and ceiling technology is becoming an increasingly popular choice to answer cost-effectiveness and energy-efficiency demands.

Chilled ceilings incorporate a single piece copper or aluminium element into the rear of a standard suspended metal ceiling tile. Flow and return temperatures are typically between 14 and 17 deg C, making them ideal for linking with ground-source heating and cooling systems. Building zones can be individually controlled, allowing unoccupied areas to be isolated and shut down, adds Mr Leatherbarrow.

Chilled beams can also be



“Chilled beams are best suited for applications such as office buildings, hospitals and schools”

installed in conjunction with chilled ceilings and can be applied to a range of projects, he continues. Passive beams use natural convection, cooling warm air drawn through the beam and returning it downwards into the space. Fresh air can be introduced to the space via floor-based ventilation system, or ceiling diffusers.

Range of considerations

Trane EMEA product manager of terminal systems Yves Raimbault says the choice for active chilled beams hinges upon on a number of factors, such as cooling loads, building and room specifications. Chilled beams are best

sued for applications with lower cooling loads that must provide high comfort with proper ventilation and high humidity control, including office buildings, hospitals and schools.

Active chilled beams require rooftop room for an air handling unit and a chiller, as well as a ducting system throughout the building. Active chilled beams take up more ceiling space than other terminal solutions, so room planning should respect the units' throw distance to optimise air diffusion and leave space for associated equipment, says Mr Raimbault.

They deliver maximum benefits when the system is tailored for energy savings, he continues. One example is the use of two chillers for dehumidification chilled

beam operation. This allows the chilled beam chiller, which delivers 60 to 70 per cent of the cooling load, to run about 15 per cent more efficiently.

In this case, the dehumidified primary air is cooler than required and can be reheated with heat recovery from the chiller and the exhaust. Well water can also be used as a source of primary cooling without refrigeration.

Active chilled beams can offer a highly energy-efficient and reliable terminal solution that avoids excessive fan energy and noise.

They require higher chilled water and lower hot water temperatures, which allows for primary airflow temperatures closer to ambient and leaves the possibility of free cooling for part of the year.

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