

Maximise space to meet demand

By John Staunton, room comfort brand manager for SAS International

The British Council for Offices updated Guide to Specification has introduced a design target for mixed mode and naturally ventilated offices of not more than 25°C for more than 5% of the occupied hours, and 28°C for not more than 1%.

Many in the industry see the likely consequence of this being many more of the next generation of office buildings adopting a mixed-mode approach to cooling and ventilation, with probably greater use of free-cooling systems.

This, along with the demand for energy efficient buildings prompted by tougher requirements in Part L of the Building Regulations (currently also under revision), means that chilled ceilings and beams are increasingly being given higher priority by clients and consultants.

This easy fit with mixed-mode strategies, energy efficiency and aesthetic considerations are key trends and there have been a number of interesting recent installations which exemplify this. Particularly noticeable in a series of recent projects has been the specification of active chilled beam technology, and the incorporation of active chilled beams within Integrated Service Modules.

Chilled beams

An active chilled beam is an air-water system that uses the energy conveyed by two fluid streams to achieve the required cooling or heating in a space.

The higher the temperature differential between the air in the occupied space and the water flowing through a chilled beam, the greater the amount of cooling provided. This is particularly important during peak summertime temperatures, when the temperature differential is greatest. Active chilled beams can provide up to 500W/m (150 W/m²) of cooling capacity.

A particularly innovative and holistic approach was taken at a recent new build development in Central London. SAS International designed, supplied and installed 231m of active chilled beams for the project. Interestingly in this project the chilled beams were installed in conjunction with a geothermal bore.

The environmental systems were designed from the outset to balance the building's significant thermal gains with inherent passive construction and renewable sources. In this case ground water abstracted from 70m below existing pavement vaults provides for a totally renewable form of cooling for the building.

Heating is provided via a District Heating Main routed from a Combined Heat and Power plant. With heating and cooling, as the two major energy consumers for the building, both being provided via renewable and highly efficient sources, the total building's energy CO₂ emissions are minimised.

The active chilled beams feature throughout the building, in open plan office areas,

teaching spaces and IT suites.

On the office floors the striking design of the active chilled beams and other ceiling elements complement that of the surface mounted luminaires, a bespoke concept developed by the lighting consultants. Thus aesthetics and function were designed in to work very much hand in hand.

Reduce demand

Another recent example utilising a renewable solution at its core features in a new operations centre in Essex. Here, the three-storey building boasts a water source heat pump, utilising water from a nearby reservoir to provide heating and cooling throughout the building via a passive chilled beam solution. The surrounding landscaping has been designed to harvest rainwater for use within the building and water efficient appliances have been specified with special panels to provide solar shading for the building. The building itself has been specifically oriented on the site to reduce the energy demand for cooling.

The challenge was to design and build a structure that wasn't compromised by its commitment to environmentally sustainable technologies: setting high expectations and a benchmark for future sustainable buildings, and to achieve an excellent BREEAM rating.

Chilled beams are also featuring significantly in refurbishment projects. Whilst enhancing internal conditions



and occupant comfort are increasingly important considerations in modernising a building, balancing this against low energy consumption and constraints of existing plant and structure can be a challenge.

Visual appeal

Energy-efficient Integrated Service Modules (ISMs) featuring both active chilled beams and Micro Prism Optic (MPO) luminaires were installed as part of a significant refurbishment project at Places for People's Headquarters in Central London.

The ISMs, designed and supplied by SAS International, are both innovative and visually striking, and mark the first major UK project that combines active chilled beams with MPO technology.

In specifying the ISMs, Fulcrum Consulting's project engineer, Chris Puttick, commented: "The ISMs helped us to achieve a number of key design considerations; particularly the exposure of the existing concrete soffit by elegantly combining the electrical and mechanical systems such as the cooling, ventilation and lighting.

"This helped maximise the space and reduce the peak cooling loads. The energy efficiencies and low maintenance requirements of ISMs will significantly reduce the whole life cost for the system."

The building utilises the exposed soffit as part of the ventilation strategy by providing night purging through the ISMs,

further reducing the cooling load requirements. Cool night air is circulated around the building, cooling the concrete soffit enabling the thermal mass to be exploited.

Featuring throughout the three-storey building, the ISMs have been positioned above desks and meeting room tables to match the architectural aesthetics and achieve correct environmental comfort and illuminance (lux) levels.

MPO technology minimises direct and reflected glare in conformity with both EN12464 and CIBSE LG7. The luminaires are linked to a DALI lighting system and a combination of passive infra-red absence detection and daylight sensors ensure lighting energy consumption is kept to a minimum.

Integrated Service Modules (ISMs) featuring both active chilled beams and Micro Prism Optic (MPO) luminaires were also installed as part of an iconic refurbishment project off Oxford Street, London.

Over 200 metres of SAS International's, energy-efficient ISMs for the recently completed futuristic design were supplied for this striking, 1300m² office refurbishment.

The SAS International active chilled beams were used on the additional three floors of the newly built extension to provide both cooling and heating to the internal envelope.

Again, the units integrate luminaires bringing the design concept to reality for the ceiling fit-out. The ISMs, which feature throughout the three-stories

match the architectural aesthetics and achieve correct environmental comfort and illuminance (lux) levels.

Due to the narrow nature of the site, the design concept maximises the amount of natural light into the office spaces by orientating the windows skyward. The facade is fabricated using curved aluminium profiles assembled on-site. The fine faceting of the aluminium strips creates beautiful and complex reflections of sky and street, making the building highly visible from Oxford Street.

Increased comfort

ISMs also generate minimal air movement and noise, thus providing a flexible solution increasing the comfort and well being of occupants. Again this is increasing their popularity as the links between occupant comfort and productivity is becoming increasingly recognised. And, because they are unobtrusive installations, they free up much more valuable office space for occupation and use.

This is often overlooked but is of increasing importance as space provision particularly in offices in the current climate demands that the use of the floorplate is maximised. With sustainability high up the building engineer's agenda, choosing a system such as chilled beams that uses minimal energy to achieve excellent comfort conditions and provides for increased use of space is gaining attention.



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