

Comfort cooling with 30% less energy consumption

Michael Hamill explains why an evaporative wet cooling system is the ultimate 'green machine'.

For over a century evaporative cooling has been recognised as the most energy efficient method of rejecting heat from air-conditioning, refrigeration and process-cooling systems. The current version of Part L of the Building Regulations requires at least a 20% improvement in the energy performance of the services installed in an air-conditioned building. An evaporative cooling system, operating in conjunction with a water-cooled chiller has the ability to make a significant contribution to this saving.

Energy savings

For too long the issue of legionella has overshadowed the inherent feature benefits of evaporative cooling systems — none more so than the energy savings available to end-users.

Energy savings are linked to the cooling capabilities of an evaporative cooling system and the dependency on the ambient wet-bulb temperature — rather than the dry-bulb temperature, which determines the condensing temperature of air-cooled systems.

For example, every 1 K reduction in condensing temperature reduces the power consumption of a chiller by 3%. Since the wet-bulb temperature is typically 6 to 12 K lower than the dry-bulb temperature, energy savings of as much as 30% are achievable. In comparison to an equivalent air-cooled system, a water-cooled plant can be designed with a 15 K lower condensing temperature. Further, should the compressors be turned off, an evaporative cooling system can also provide free cooling, resulting in even more energy-saving opportunities.

Smaller footprint

One of the major considerations for M&E

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consulting engineers at design stage is how to fit all the plant into a restricted space. Where space is at a premium, the heat-rejection capabilities of an evaporative cooling system will offer the best solution compared to air-



cooled alternatives. Indeed this is one of the main reasons so many evaporative cooling systems are now installed to serve systems in central London. The smaller footprint that is

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associated with evaporative cooling systems has resulted in numerous installations on large office buildings where rooftop space for plant is generally at a premium. An example of this is in the London area where evaporative cooling systems have been supplied by SPX with a total heat rejection capacity of 100 MW.

Risk assessed

The prime advantages have been tarnished by the fundamental shortfall associated with evaporative cooling systems — the potential outbreak of Legionnaires' Disease. Indeed the high-profile case recently documented at Barrow-in-Furness in 2002 put cooling towers in the news for all the wrong reasons.

However, such situations need not arise so long as a strategic maintenance program is in place and adhered to. Indeed there are no documented cases of a legionella outbreak associated with a well maintained ACOP L8 compliant evaporative cooling system; when one does occur, it is always linked to a lack of cleanliness or maintenance regime.

My company, for example, specialises in the manufacture and contract maintenance of evaporative cooling systems. Our focus is to offer clients an engineered solution, from design stage through to inception of the system and beyond.

We help clients manage the risk by offering our SPX Plan, which ensures the system will conform with ACOP L8 and adds value by enveloping preventative maintenance. We ensure our clients are aware of the necessity to implement a competent, risk assessed maintenance regime throughout the life-span of the system.

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