

Nominee: SmartCool™ CW SD/SN/SR by Airedale International Air Conditioning Ltd

Nomination title: SmartCool™ CW SD/SN/SR dedicated CW PAC system

Introduction

The SmartCool™ CW SD/SN/SR was developed to meet demand for a high performance, ultra energy-efficient, dedicated chilled water (CW) precision air conditioning (PAC) system in a wide range of capacities and sizes to cater for the needs of space-critical and large data centre applications.

Fresh approach to design

Whereas chilled water PAC units have traditionally been derivatives of mechanical cooling (DX) systems, Airedale took a fresh approach in the design of the SmartCool™ CW.

This resulted in more efficient use of internal space when redundant DX components which were not needed in dedicated CW units were removed. Also key to the design brief was to offer choice of models to suit both small computer room and large data centre applications which, in addition to maximising energy efficiency, would also provide a large number of important installation and operational benefits.

Differentiating features

The SmartCool™ CW offers a large number of differentiating features including:

- Industry-leading energy efficiency for footprint - EER up to 52.4, a 13% increase in EER and up to 30% more cooling kW/m² when compared with competitor units which means that the footprint is kept to a minimum and valuable IT space is preserved. This is achieved through a number of important design features including:
- SmartCool™ SN/SR units use an innovative V-frame heat exchanger arrangement (patent pending), positioned across the width rather than the depth of the unit. This configuration provides a high coil face area on which the filters are placed, improving air distribution across the full height and width of the cooling coil, reducing air velocities and therefore significantly reducing the air-side pressure drop. Ensuring more airflow passes through the full coil area increases the total heat transfer and fan efficiency.
- Slab coil arrangement: The location of fans in the floor void on the SmartCool™ SD allows for a larger slab coil arrangement which provides a 15% increase in surface area for improved air flow. Efficiency is further increased by locating the filters on

the face of the coils, increasing the surface area and reducing air-side pressure drop when lowering fan power. The SmartCool™ SD also features both high and low flow coil options to suit different customer applications especially when operating in the most modern data centres that take advantage of raised return air temperatures and elevated water temperatures – a method often employed to promote free cooling.

- Cutting-edge EC fan technology: SmartCool™ SN and SR units feature fans within the case and offer a kW/m² ratio greater than any PAC unit of its size and type within the marketplace. The backward-curved centrifugal EC fans are up to 50% more efficient than their AC equivalents, and use variable speed control matched to load to eliminate unnecessary energy usage which can be further improved by integrating Airedale's intuitive controls. The fans allow units to be configured to customer needs according to whether they require high airflow/high capacity or low airflow/ high efficiency. This makes units extremely competitive when considering both cooling capacity per footprint and efficiency
- Increased customer choice to meet varying applications from smaller computer rooms to large-scale data centres:
 - Nominal capacities from 11 to 233 kW: SmartCool™ SN/SR (11kW–91kW); SmartCool™ SD (54kW- 233kW)
 - 42 models
 - 12 case sizes including a 600mm deep case for space-critical applications (SN)
 - 3 power supplies as standard (400V/50Hz, 380V/60Hz & 220V/60Hz)
 - High and low flow coil options - SD variants (54kW–233kW)
- Fans integral to the case: Ideal for individual computer rooms as well as large data centres the SmartCool™ SN/SR delivers a high density cooling solution for environments where space or logistical constraints make it difficult to install fans within the floor void
- Fans in floor void: Where space and logistics permit, the SmartCool™ SD allows fans to be located below floor level. This design offers premium efficiency, enhances the air path, increases air flow and reduces noise. Each fan module can be configured to individual customer needs
- Numerous installation and maintenance benefits including:
 - Reduced requirement for commissioning: due to intelligent two-way valve system
 - Direct drive motors on EC fans: remove the need for belt replacement
 - Rapid and full access to components such as filters and coils: via 'saloon' style hinged doors with EMKA locks; removable internal mullion and internal panels (SmartCool™ SN/SR)
 - Comprehensive commissioning, warranty and service arrangements with national coverage: to ensure systems perform to specifications and minimise downtime and interruption to service levels

- Ability to adapt the SmartCool™ to suit individual customer needs. In the case of the order for Optimum Group Services (see 'Market acceptance') this was a key factor in Airedale winning the order. The ability to provide units to fit within the existing footprint of the data centre also simplified installation and minimised installation costs
- Design allows for common coil assemblies across all case sizes leading to economies of scale and associated price competition against comparable units; because coil assemblies are common across the range, components are more readily available from stock leading to shorter delivery leadtimes
- Integration of Airedale's intelligent controls to meet precise customer needs provides visibility and accurate control over cooling plant
- Free-cooling for up to 95% of the year: In a 24/7 data centre with a typical room temperature of 24°C, total life cycle costs can be significantly reduced when SmartCool™ CW units are integrated with an Airedale free-cooling chiller

Market acceptance

The SmartCool™ outperformed four leading competing products to win a significant order for 68 systems from Optimum Group Services (OGS) for a major UK data centre (customer testimonial provided).

Suppliers were assessed on unit performance, cost, energy efficiency and space restrictions.

The Airedale solution produced the best results, with predicted savings against the existing system of 54% (£206,596)*. Subsequent witness testing, under robust laboratory conditions, produced even more impressive figures, resulting in further reductions in power consumption and actual savings of 69% (£260,417) against the original system.

* Savings are based on energy costs of 10p/kWhr and units running at full design capacity

Why nominee should win

The SmartCool™ is an exemplar of:

- British engineering expertise acquired over 40 years in the cooling sector
- Commitment to helping data centres achieve their objectives in terms of reducing carbon footprint and their total costs of ownership
- Unparalleled choice in terms of capacities, models, case sizes and options and the ability to tailor systems to meet precise needs
- Solution-based approach encompassing class-leading IT cooling systems, advanced BMS technology and nationwide after-sales expertise designed to provide data centres with high resilience systems offering industry-leading energy efficiency for footprint. In this case, EER up to 52.4, a 13% increase in EER, and up to 30% more cooling kW/m² compared with competitor units