

Nominee: Emerson Network Power

Nomination title: Liebert® AFC: Adiabatic Freecooling Chiller with Top-Tier Availability

With the aim of increasing the energy efficiency of new generation data centers, while keeping cooling availability at its highest, Emerson Network Power has developed Liebert AFC, the first adiabatic freecooling chiller in the market. This unit provides the extremely high energy efficiency reached by adiabatic freecooling, together with the 24/7 availability of multiple scroll backup compressors.

Liebert AFC solves all at once two major problems face by today's data centers: energy consumption and the need for a continuous cooling availability. Other adiabatic solutions available in the market cannot provide 100% cooling availability under all conditions within a single product. The design is thus definitely innovative: optimized for applications following the new standards, in accordance with ASHRAE guidelines (the American Society of Heating, Refrigerating and Air Conditioning Engineers), in terms of temperatures required by the new generation of servers: guaranteeing maximum efficiency at high cooling liquid temperatures such as 26°-20°C. Liebert AFC, in fact, ensures 100% cooling capacity 70 seconds after a power failure, as a result of its fast restart sequence; while its multi-scroll compressors ensure 100% cooling capacity up to 50°C ambient temperatures and also when the adiabatic water is not available.

Moreover, its innovative solution iCOM™ Control exploits the function of a single unit operation as well as multiple units working together (teamwork mode). This is extremely important to maximize energy efficiency within a data center environment. In addition to teamwork, on Liebert® AFC the user-friendly iCOM Control also exploits the management of energy and water. The system collects information from the different units' key parameters and operating modes (adiabatic, freecooling and mechanical cooling) while taking into account water and electricity costs. The control predictively calculates and then implements the combination, which optimizes operating costs.

In addition to this, its LIFETM, a remote diagnostics and preventive monitoring service, delivers increased uptime and operational efficiency by enabling continuous monitoring of customers' equipment, combined with expert data analysis and field engineering expertise.

The Liebert AFC has thus been designed to respond to recent market trends that have seen an increase in operating temperatures under which new IT equipment operates. The unit has been optimized for applications following the ASHRAE new standards in terms of temperatures required by the new generation of servers: guaranteeing maximum efficiency at high cooling liquid temperatures such as 26°-20°C. Addressing the need of continuous

cooling availability, Liebert AFC ensures 100% cooling capacity 70 seconds after a power failure, as a result of its fast restart sequence; while its multi-scroll compressors ensure 100% cooling capacity up to 50°C ambient and also when adiabatic water is not available.

Liebert® AFC provides a significant increase in terms of energy savings when compared to any competitor's most efficient chilled water system available in the market. The graphs in the attached supporting document show the operating modes of Liebert® AFC throughout the year and the resulting energy savings compared to a high efficiency freecooling chiller, cooling a 1.4 MW data center located in London.

The advantages of the adiabatic and hybrid designs are even more effective at partial load, where the compressor operation throughout the year is further minimized. Moreover, with the Supersaver, that is the software logic embedded in the iCOMTM Control, Liebert AFC leverages on the communication with floor mount units to maximize efficiency at system level. Efficiency is further optimized at partial load, as a result of a real-time adjustment of the data center load conditions.

The first step of the development of the Liebert AFC has been the analysis of the needs of our Customers while designing new data centers. There started to be a discrepancy between the solutions they could find on the market: either maximum efficiency with pure adiabatic freecooling solutions, or higher availability solutions such as freecooling chillers. The Liebert AFC has started as an idea to cover this market gap, then it has evolved to a highest level product by introducing new technologies to increase its benefits (such as the new control logic, the flexible design and the top efficiency components). The validation of the idea has been done first internally with the detailed tests done on the first prototype, and then also externally with the first projects developed for big data centers for example, **Digital Realty**, the world's largest wholesale colocation services and data center solutions provider, results achieved during the Integrated Site Test (IST) supported Emerson's projected efficiency.

To achieve the highest targets, the best technologies have been adopted into the product, such as microchannel coil, multiple scroll compressors, top efficiency EC fans, and the technology to ensure the fast start procedure after a power failure, thus avoiding the need for an external UPS line.

For sure the integration of the three cooling technologies (adiabatic + freecooling + compressors) into one product significantly differentiate Liebert AFC from its competitors while the intelligent management done by the electronic controller, which constantly finds the most efficient combination between water and electric power consumption in order to reduce total running costs that further differentiate our solution.

Emerson Network Power also takes meticulous effort to identify the actual customer needs and, most importantly, the future needs and technology trends. This has allowed it to ensure appropriate product development and guarantee that it truly satisfies its customers' needs. It does not stop at offering a competitive product but also provides its customers with thorough support on the best tailor-made unit selection. Emerson Network Power also provides commissioning and service facilities with predictive maintenance through remote monitoring. It supports the entire critical infrastructure and enhances the network availability with the largest global service organization.

Emerson Network Power also has a reputation of delivering products with quality of the highest magnitude. Its processes are regulated by the current international standard ISO9001, which includes the following phases: design, production, service, and product review. The company's product life cycle phase follows 2 processes, an internal procedure, known as the New Product Development Process, and an external one, known as ECAM. The former one is divided into 8 phases and 8 gates, where in order to move from 1 gate to another, the approval of the 1st step is necessary. The latter process, on the other hand, involves a 3rd-party entity that annually examines a project and provides it with the indications to improve the product under examination. Finally, the Thermal Management Customer Experience Center includes 5 validation areas where it carries out acceptance and R&D testing. This enables its customers to witness their units being tested first hand prior to shipment.

Why nominee should win

- Liebert AFC solves two major problems face by today's data centers: energy consumption and the need for continuous cooling availability.
- Other adiabatic solutions available in the market cannot provide 100% cooling availability under all conditions (ie. water shortages, extreme ambient temperatures and power outages) within a single product, but Liebert AFC makes this possible.
- The iCOM™ Control optimizes Liebert AFC operating modes in the most efficient way (adiabatic, freecooling and mechanical cooling) according to the external temperature and humidity conditions.
- Emerson Network Power's Thermal Management division has an extensive industry-leading product portfolio, covering any customer needs in terms of efficiency and energy savings. It covers the entire application, with products that match and exceed customer expectation.

- To conclude, Emerson Network Power's global network ensures that industry expertise, technology, and resources are made globally available to address our customers' growing business challenges. With over 3,500 service professionals, Emerson Network Power offers customer support 24/7 anywhere in the world.