

Keeping wind turbines cool

Wind turbine manufacturers face a continuous battle to improve output and efficiency, both of which are affected by heat generation and the ability to keep the equipment in the nacelle at optimum temperature. While several solutions are available, some manufacturers are looking for a simple approach that will deliver performance while minimising the complexity of maintenance procedures for operators.

Application Engineer at Svendborg Brakes, looks at the requirements of the wind energy sector and how they can be delivered.

In power generation, heat has a significant effect on efficiency; so, keeping the powertrain components at optimum temperature is a key objective for manufacturers. At the same time, the location of wind turbines is often remote and, in many cases, offshore, which can greatly increase the complexity and cost of delivering maintenance services. Therefore, it is important that all of the components within the wind turbine are reliable as well as cost-effective.

Cool efficiency

Cooling systems are a necessity in wind turbine construction to ensure efficiency and reliability of performance. For OEMs, who generally provide the first 10 years of maintenance support for their turbines under contract, it is important to have all of the necessary technical support and parts from their suppliers.

As the turbines come out of contract, the maintenance burden is handed to the operators, who are actively seeking suppliers that have experience in the wind turbine market to deliver maintenance solutions. In both cases, simplicity and reliability hold the key to trouble-free operation, backed by the knowledge that, should the need arise, expert advice and support is always close-by.

Reliability is a major factor for manufacturers of wind turbines, who also hold the initial responsibility for maintenance. However, once the operator assumes responsibility for maintenance, issues such as spare parts availability, technical support, component complexity become more important issues.

Taking up the challenge

Svendborg Brakes, which is part of the Altra Industrial Motion Corporation, is already a well-regarded supplier to the industry. With its innovative solutions for brakes, hydraulic power unit (HPU) parts and rotorlocks, the company has taken up the challenge of creating a cooling system for wind turbines. The aim is to deliver a compact, simple to operate, effective and reliable system that will meet the objectives of both the manufacturers and the operators.

Specifically designed for cooling the generator and converter, the new system developed by Svendborg Brakes uses materials that are both lightweight and offer excellent corrosion resistance. By concentrating on the needs of the operator, the designers have also delivered a system that meets the criteria set out by the turbine manufacturers – for both on and offshore applications globally.

The pump unit has a simple operating principle and maintenance is easy to perform and well within the capabilities of engineers employed by operators. In contrast, multi-stage pumps are more complex in terms of both operation and maintenance.

Minimizing support

The water/glycol cooling system is controlled by a mechanical thermostatic mixing valve which allows the cooling package to run all the time without the need for complex sensors and control circuits. The concept of using simplicity to achieve improved reliability also ensures a cost-effective approach that requires a minimum of technical support.

In addition, Svendborg Brakes has taken account of the variable environmental temperatures and included a heating system that can be used to avoid condensation forming in the components. The system is designed to operate across a wide temperature range, from -20 °C to +50 °C.

As an example, one model offers a cooling capacity of 248 kW and the flow rate of 650 litres/min are designed for mid-sized turbines, but the system can be easily tailored to suit different applications. Every system is comprehensively tested for leaks, pressure settings, flow rates and general operation before being delivered. Furthermore, Svendborg Brakes' technical support is always available to provide advice on specifications and installation if necessary.

Photo captions:

Image 1: Cooling systems such as the one developed by Svendborg Brakes are a necessity in wind turbine construction to ensure efficiency and reliability of performance.

Image 2 + 3: Svendborg Brakes has taken up the challenge of creating a cooling system for onshore and offshore wind turbines.

Keywords: Svendborg Brakes, Altra Industrial Motion, wind turbines, wind turbine cooling system, cooling wind turbine generator, cooling wind turbine converter, wind turbine maintenance, brakes, hydraulic power unit (HPU) parts, rotorlocks, compact cooling system, simple to operate cooling system, effective cooling system, reliable cooling system,