



Inventor of the Year 2014

Better Cooling Systems for Wind Turbines

Uffe Eriksen

“An initial step towards a better main bearing performance is to be able to control the temperature for a grease lubricated main bearing,” explains Eriksen, who has been conducting research into wind power at Siemens for ten years. The main bearing of a wind turbine is subjected to high loads. Until now, it has only been possible to control the bearing performance by cooling for an oil lubricated bearings but now it’s also possible for grease lubricated bearings.

“My job is to scrutinize the status quo to simplify our products,” says Eriksen. “We can offer a simpler product at a lower price and thus make it more attractive to our customers,” the engineer continues. And that’s why Eriksen and his team in Brande, Denmark spent a year and a half working on the development of an air cooling system for high-performance wind turbines.

In the new generator cooling system, the ambient air is passed through the nacelle into the generator. “High humidity levels or salt can lead to corrosion and cause damage to the machine,” explains Eriksen. This is why the air is filtered and dehumidified first before it is blown by a fan to the temperature-sensitive generator parts. The cooling air flows back out again through an outlet channel without necessitating any additional openings to the outside in the generator housing.

Compared to a conventional air-water-air heat exchanger, there’s a better heat transmission in direct air cooling, and the design itself is much simpler. “The great advantage of ambient air cooling, however, is that the generator produces more power thanks to the improved cooling,” stresses Eriksen. With a heat exchanger there is always heat loss, he explains. This means that the lowest temperature achievable in the generator will always be higher than the ambient temperature. This is why air cooling is superior to conventional cooling systems. Thanks to the lower temperature, the generator can operate under a higher load and thus produce more energy.



Eriksen sees himself as a team player. “Inventions are not created in isolation behind closed doors,” says the engineer, adding: “It is important to me to work with colleagues I can exchange ideas with.” That is the benefit of working at Siemens, believes Erikson. “There are a lot of very knowledgeable people here with whom I can discuss things and they have very good simulation tools and skills,” he says. And it seems to be working – Erikson has registered a total of 30 inventions that are protected in 50 individual patents in 25 IPR families.