Article from the Vestas publication “The Window” no. 11/2003.

New Oil Filter Reduces Wear and Tear

In collaboration with C.C. Jensen, Vestas has developed a new oil filter system that reduces wear and tear on components because of improved oil cleanliness and enables monitoring of existing in-line filters. The new filter is now being introduced as an option in the 600 kW and 660 kW turbines.

Oil cleanliness is essential to the health and lifespan of the machine components in a wind turbine. If the oil is clean it reduces the wear and tear on components. This is especially true for the gearbox and its bearings, one of the most vital components in a wind turbine. Because the gearbox is so important, the oil filters in Vestas turbines until recently were changed quite frequently—to ensure optimum oil cleanliness. Oil filters frequently had to be changed and the change itself was time-consuming.

As a result, Vestas began to explore the possibility of developing a better oil filter; one that was faster to install and one that needed to be changed less frequently. At the same time, the price of such an oil filter had to be competitive.

The development process

In collaboration with C.C. Jensen, Vestas started the development of a new oil filter. A field test was initiated on four Vestas turbines, each equipped with an off-line filter of the type HDU 15/25. The result of these tests lead to the introduction of an additional off-line filter system to all Vestas turbines from the V52-850 kW and up. Then in December 2002, Vestas started testing a simpler by-pass system in a number of V44-600 kW turbines.

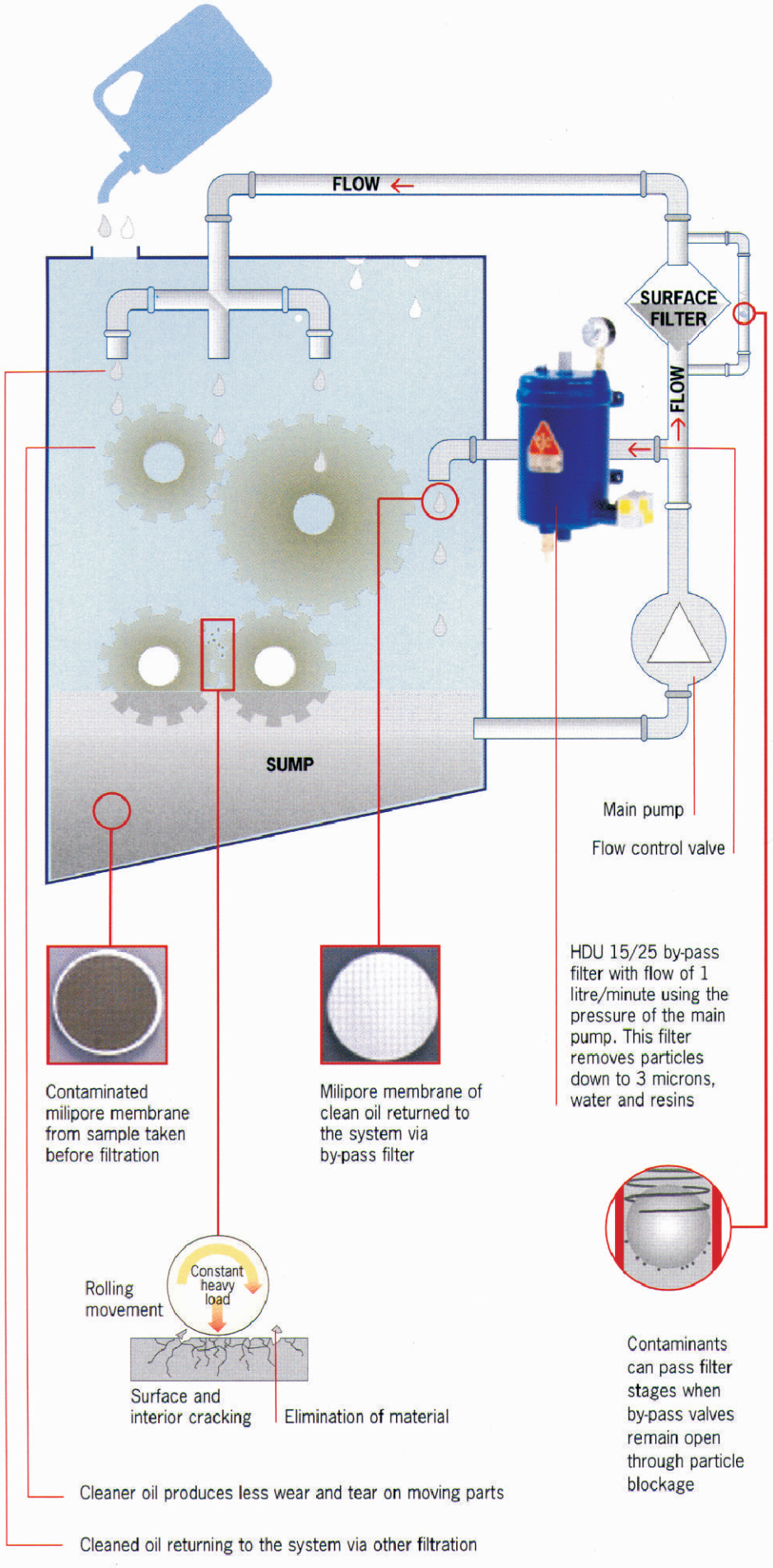
Thomas Møller Andersen, Key Account Manager at C.C. Jensen A/S, describes the process: “To meet the demand for a simple, fast and cheaper installation, we removed the independent pump and motor, which is a part of the more complete off-line system. The oil is then pressed through the filter by the pressure from the cooling and lubrication system in the turbine’s gearbox. We then used a 3-micron fine filtering technology that filters out all particles over 3 micron. This means that small particles plus water and resin can be removed.” It only takes a few hours to install this by-pass system.

The result of this innovative technology, which has now been designated as the HDU 15/25 VY, is that the filtration quality is better than the ISO standard 17/15/12. The improved filtration quality not only reduces the wear and tear on a turbine’s components, it also means that the oil filters need to be changed less frequently, now only once every 12 months. What is more, with this new system, Vestas has added the monitoring of high-pressure drops (which indicate clogged filters) in the existing in-line filter. This monitoring is integrated into the VMP wind turbine controller.

The new filter now an option in the 600-660 kW range

After finalising the development of the new off-line oil filter technology

A diagram of a typical by-pass filter installation



in December 1999, the next step was extensive testing of the filters at Vestas. The results of the tests, which were completed in 2002, were so successful that Vestas has decided to offer the modified by-pass version of the new filter in its 600 kW and 660 kW turbines.

"So far the new by-pass filter has been installed in a limited number of Vestas turbines in the product range from V42-600 kW to V47-660 kW—but mostly in the V47-660 kW turbines," says Steen Andersen of the Vestas Service Department who has worked closely with C.C. Jensen throughout the whole development process. "In the future, we expect more than 3,000 by-pass oil filters to be installed in these types of turbines."

The new filter system is introduced to the customers as an option.