

Media Release

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Page 1 of 4

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Voith SafeSet Coupling Protects Test Rig for Wind Power Nacelles

- **Voith SafeSet coupling protects EUR 35 million Dynamic Nacelle Testing Laboratory (DyNaLab) from critical torque overloads**
- **With the DyNaLab the Fraunhofer Institute for Wind Energy and Energy System Technology IWES offers nacelle testing under realistic conditions**
- **The world's largest SafeSet coupling weights 16,900 kg and has a diameter of 1.9 meters**

Bremerhaven/Hudiksvall: The volume of wind power installed globally rose from 198 GW to 487 GW between 2010 and 2016. This trend is set to continue. For the first time the EUR 35 million Dynamic Nacelle Testing Laboratory (DyNaLab) provides a large-scale test system for wind power systems. This test system comprehensively simulates all the forces occurring during real operation. A Voith SafeSet coupling protects the system against damage caused by torque overload.

Thus far, manufacturers needed to erect a completely operational prototype for each new system. This delayed the market launch and resulted in high costs. With the new DyNaLab, the test phase can be completed significantly faster, more reliably and thus more cost-effectively than in a field test. The unique test site is located at the Fraunhofer Institute for Wind Energy and Energy System Technology IWES in Bremerhaven, Germany. The system allows for testing onshore and offshore nacelles of up to 8 MW in power under realistic conditions. More than 600 synchronized, high-resolution measuring channels, real-time models and control algorithms facilitate determining the wind load on the individual components with precision.



The test rig speeds up the certification process for newly developed systems as situations related to approval can be initiated specifically and as often as desired. In addition, the accurate measurement of the loads on all components provides further potential means for optimization; for example to save weight and increase availabilities.

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The World's Largest SafeSet Coupling Protects the DyNaLab Against Overloads

Page 2 of 4

The basis for realistic test runs of wind turbine nacelles at DyNaLab is provided by two synchronous motors in a tandem configuration. Each machine provides an input power of 5 MW. They introduce a rated torque of 8,600 kNm into the nacelle.

The realistic test conditions with a variety of displacements place large loads on the test unit. In order to protect the system in the event of any electrical faults or damage, the largest SafeSet coupling from Voith to date has been installed between the drive system and the downstream driveline in the direction of the nacelle. The SafeSet SR-F 1300 weighs 16,900 kg and has a diameter of 1.9 meters. It rotates at a speed of up to 25 revolutions per minute.

The maximum release torque, at 15,000 kNm, is significantly more than the torque introduced by the two synchronous machines. However, the design of the SafeSet makes it possible for the Fraunhofer IWES to adapt the desired torque on a case-by-case basis. Consequently, a precise value at which the valve system releases and prevents an overload can be defined for each test run. As a result, the SafeSet safety coupling prevents expensive damage to the system and components while, on the other hand, reducing the downtime of the DyNaLab following an incident to a minimum.

SafeSet – A Reliable Principle

Using a simple operational principle, SafeSet couplings protect against torque spikes in the driveline: The SafeSet contains a double-walled hollow sleeve. Hydraulic oil is pressurized in this sleeve to achieve the friction required for a non-positive connection. A shear tube maintains the oil pressure and ensures a constant force transfer that can be easily adjusted. If the release torque is exceeded, the SafeSet slips and disconnects the head of the shear tube from the rest of the coupling, allowing the oil to escape. The pressure drops abruptly and the friction surfaces separate. Thus, the SafeSet rotates solely on the bearings and does not transfer any



further torque. Following a release it can be immediately pressurized again and put back into operation.

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Voith Turbo, a Group Division of Voith GmbH, is a specialist for intelligent drive solutions, systems and comprehensive services. Customers from highly diverse industries such as oil and gas, energy, rail and commercial vehicles, ship technology, mining and mechanical engineering rely on the advanced technologies and solutions-driven expertise of Voith Turbo.

Page 3 of 4

For 150 years, Voith's technologies have been inspiring customers, business partners and employees around the world. Founded in 1867, Voith today has around 19,000 employees, sales of €4.3 billion and locations in more than 60 countries worldwide and is thus one of the largest family-owned companies in Europe. Being a technology leader, Voith sets standards in the markets of energy, oil & gas, paper, raw materials and transport & automotive.

Welcome to the Next 150 Years



Fraunhofer IWES operates the large-scale test system DyNaLab for wind power nacelles in Bremerhaven, Germany. (Source: IDOM)



A Voith SafeSet coupling protects the DyNaLab from damage in case of an incident during test runs. (Source: IDOM)





The world's largest SafeSet coupling has a diameter of 1.9 meters and allows for a maximum release torque of 15,000 kNm.



The Voith SafeSet coupling minimizes downtimes and offers driveline safety in case of critical torque overloads.

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Page 4 of 4

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