



Industry solutions for wind turbines

Your Technology Specialist

simrit[®]

Simrit, Your Technology Specialist for Seals and Vibration Control



Simmerring®



Fluid Power



Hydraulic Accumulator



O-Rings



Liquid Silicone Products



Special Sealing Products



Vibration Control

Our unique service package sets standards in quality, functionality and cost effectiveness throughout the industry.

With its comprehensive product range and large number of services, Simrit provides a service package unique in the market for almost every application. Simrit employs its leading technological expertise so that you benefit: We analyse your entire system and fine-tune the individual components to each other in an optimum way. This means you get exactly the solution that best fulfils your requirements – cost effective and dependable. Reinforced by single sourcing, saving time and cost, you will find that Simrit is your ideal partner for all sealing- and vibration-related applications when it comes to complex systems.

We have been the leading experts in materials for decades, and this is a significant factor for success, exceptional performance and continuous technological advancement of our products. Famous product names such as Simmerring®, Fluid

Power, Hydraulic Accumulator, O-Rings or Liquid Silicone Products underpin this. Together with the fields of Special Sealing Products and Vibration Control, they are intrinsically connected with the Simrit brand name and constitute the world's largest product range for all applications throughout industry.

As part of the Freudenberg Group, we draw upon established research, development and production expertise within the Group to continuously extend our technological lead through innovative solutions for the purposes of – and in the service of – our global customers with their local market requirements. The close international cooperation of Simrit in Europe and America with our Japanese partner, NOK, in Asia provides you with consistent quality standards wherever our solutions are required. And with Simrit Service Centres in all industrial markets, our global sales network supports you and more than 100,000 other customers dependably and on a basis of mutual trust and cooperation at sites on every continent.

The Simrit service package at a glance:

- **World's largest product range**
Comprehensive solutions from a single source
- **Continuous innovations**
Technological prominence for the competitive advantage of our customers
- **Unique expertise in materials and high quality standards**
Leading know-how for safe and cost-effective applications
- **A huge number of integrated services**
Support from development up to continuous product deployment
- **Globality**
Global expertise with the knowledge of local market requirements



Innovative package solutions for protecting wind turbines

With solution packages especially designed for wind turbine power units and components, Simrit offers the highest product performance in every application for functional reliability, weather resistance, and performance.

Ever higher performance and the economic necessity of reliable and maintenance-friendly systems demand specially designed seal and vibration control solutions. Not only the design and dimensioning of drive or bearing seals must be taken into account but also the design of materials for thermal stability and resistance to ozone, salty air, and mineral oils. With the package solutions from Simrit, you can implement all these requirements from a single source.

Solutions for main rotor seals and tower and blade bearings

Simrit offers specially designed Simmerrings and profile rings in especially wear-resistant materials for large bearings and rotary assemblies. The form-pressed Radiamatic® Simmerrings cover diameters up to 3,000 mm and are distinguished by their high sealing function thanks to integrated tension springs.

Tailored hydraulic solutions

Hydraulic applications in braking systems and for pitch adjustment in particular demand uncompromising functional reliability. Hydraulic components from Simrit are perfectly designed for high pressures and regulating powers, as Omegat piston and rod seals, Guivex guides and wipers. Accumulators from the latest generation provide lasting support for hydraulic applications and, at the same time, act as energy storage for emergency supply.

Solutions for vibration and noise reduction

We have the indispensable solution for the low-loss transmission of forces and torques from the rotor to the generator and reliable protection of motors. Simrit vibration control is precisely tuned for use in wind turbines and is especially effective at insulating vibrations in every dimension. Perfect noise protection is built in and highly elastic, age- and weather-resistant elastomer materials provide a long life.

Solutions for drives and auxiliary units

With the Simmerring programme, Simrit has the world's best known technology to reliably protect motors, and machine elements such as drives, electric motors, and generators in wind turbines. The extensive standard programme has almost no limits in the design of construction or materials. Innovative function enhancements such as leakage sensors make the Simmerring especially valuable for use in wind turbines.

The Simrit product programme for wind turbines

Simmerring® – the original

Our brand-name seal is one of the world's leading quality products and meets and exceeds the DIN 3760 standard for seal function and lifespan. Available in over 3,500 different dimensions, the Simmerring is the first choice for protecting your motors and machine elements both in the original equipment and for maintenance. Preferred standard designs in NBR and FKM materials are available especially for wind turbines.

Added value through functional integration: Simmerrings from our standard programme can be equipped with a leakage sensor. Thus, any leaks which occur are measured in a non-woven material depot, electronically analysed, and the results automatically sent to a PC, a telephone, or other medium. Your advantage: the seal function of the Simmerring can be inspected via remote diagnosis and exchanged within the normal maintenance interval. Your motor can thus be more economically and more reliably protected.

Simmerring Radiamatic® – Excellent protection on a grand scale

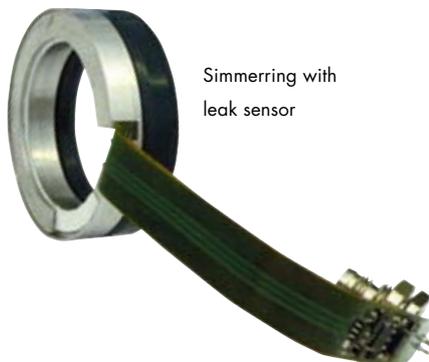
Outstanding material properties, high dimensional accuracy, and all of that in large dimensions: Simmerring Radiamatic is a form-pressed infinite ring, whose seal function is perfectly adapted to the dimensions in wind turbines through a rust-proof tension spring which presses permanently against the seal rim. It's available in numerous sizes from 200 mm to 1,700 mm diameter and dimensions up to 3,000 mm can also be realised



Simmerring



Simmerring
Radiamatic



Simmerring with
leak sensor

through a special joining process without additional tool costs. A flexible static part made of rubber fabric also allows easy installation and disassembly. Fast. Uncomplicated. Economical. During maintenance, on-site installation is easy and simple with the bonding set RK 15. The high requirements for abrasion and media resistance are met by the Simmerring Radiamatic with a wide range of materials. Depending on need, it's available in NBR or HNBR with corrosion-proof Aramid fabric. The resistance to aggressive media

such as mineral oil, ozone or salt water is thus extraordinarily high.

Profile rings – the special solution for large seal areas

Rotary units in wind turbines require special sealing technology and Simrit is your specialist. Our profile rings are batch vulcanized in a unique manufacturing procedure and offer lasting advantages over glued rings. They are available in all standard materials, such as NBR, CR and others. Simrit profile rings

guarantee long lifetimes, low torques, high resistance, and security against press out for the wind industry. Simrit profiles are the market standard for sealing pivoting bearings; Simrit also offers its profile programme sold by the meter for repairs.



Accumulators – indispensable in wind turbines

Economy and safety make Simrit accumulators an indispensable component of modern wind turbines. The energy and volume storage offers a constant, uninterrupted pressure supply for hydraulic blade positioning and for braking systems. Thus, there is sufficient energy for peak requirements and reserves for emergencies. In order to guarantee these functions without compromise, our accumulators are precisely adapted to the individual applications.

Thanks to our support and integrated design of the complete system, you also benefit from clearly lower system expenses in terms of pump size. That's an advantage that pays.

Conical mounts and layered springs: innovative damping and noise insulation

Vibrations in wind power plants can cause more than just increased wear; they can also cause disturbing structure-borne noise. At the same time, the reliable transfer of forces from the

rotor to the generator is indispensable for the efficient use of energy. The Simrit product range includes a large selection of conical mounts, ultra bushes, layered springs, circular mounts, Mo-mounts and V-mounts especially for these applications. Simrit conical mounts prove themselves in generator in wind turbines with an especially high damping effect on vertical vibrations, while at the same time absorbing high vertical forces and providing outstanding insulation of structure-borne noise.



Layered spring



Conical mount



Integral accumulator



Profile rings



System safety is our driver



If the wind didn't exist, we would have invented it for you. Simrit uses the full technological expertise of our sealing and vibration control solutions to operate wind turbines as efficiently and safely as possible.

Wind turbines require not only extremely reliable system protection against weather and mechanical forces, but also solutions which are as long-lived as they are robust. No one wants to provide maintenance for an offshore system twice a week. Our industry solutions for wind turbines are thus consistently oriented toward the highest functional safety and long service life. And they can be used in all sensitive components.

An integrated safety package at the highest level of quality

From hydraulic seals for brake systems and cylinders to mounting seals to vibration dampers for drives and generators – the broad range of products from Simrit allows reliable protection of all important systems at a uniformly high level of quality. From standard solutions to customised components. And we keep thinking: with innovative solutions like Lube & Seal from Simrit and Klüber Lubrication – two specialists within the Freudenberg Group. Lube & Seal stand for the perfect compatibility of sealing material and lubricant. This technology expertise is used to prevent malfunctions, extend maintenance intervals and to keep systems productive.

We will support you wherever the wind blows

Whether on-shore in the Californian mountains or off-shore in the northern German Wadden Sea, we are there where you need us as the world's leading technology specialist – and very quickly. Our international application specialists will directly solve your Individual requirements for materials and dimensions. The development and manufacturing processes for customised applications are started with services like Simrit Xpress, which quickly and reliably accelerates machining production. Thus, you can be sure of quickly having the right solution at the right location.

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The logo for Simrit, featuring the word "simrit" in a bold, blue, lowercase sans-serif font. A registered trademark symbol (®) is positioned to the upper right of the letter 't'.