

SEALING SOLUTIONS FOR AGRICULTURE



FREUDENBERG
SEALING TECHNOLOGIES

 **FREUDENBERG**
INNOVATING TOGETHER



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FREUDENBERG SEALING TECHNOLOGIES – GLOBALLY UNIQUE IN SEALING TECHNOLOGY

Freudenberg Sealing Technologies is a global market leader focused on providing its customers with innovative sealing technology, optimized product solutions and excellent customer service partnerships across a variety of industries. For decades, these have included manufacturers of mobile machinery for construction, mining, agriculture and forestry. With a robust global footprint, Freudenberg Sealing Technologies can offer customers regional applications and support no matter where they are going business in the world.

Freudenberg Sealing Technologies combines market-specific know-how with unique materials and technology expertise to engineer products and services that address

unique industry requirements. Its global sealing portfolio is complemented by a complete range of hydraulic accumulators.

In fiscal year 2018, Freudenberg Sealing Technologies generated sales of EUR 2.3 billion with 15,000 employees. The company is the largest operating group of the globally active Freudenberg Group. In 2018, Freudenberg as a whole employed nearly 50,000 people in 60 countries and generated EUR 9.4 billion in sales.

Further information can be found at www.fst.com.

HARVESTING RELIABLY

When crops are ready to harvest, time is of the essence. Weather becomes critical and machinery must operate flawlessly even when wind and rain threaten. Equipment reliability is a must – downtime due to a mechanical breakdown can threaten months of hard work. From engine to wheel bearing, the driveline, transmission, chassis, hydraulics and braking systems must be impervious to failure at this critical time of year.

Sophisticated sealing solutions from Freudenberg Sealing Technologies ensure this functional reliability. In wind and weather, they offer maximum reliability on adverse terrain – in dusty heat, freezing cold and snowy

slush. Functional effectiveness also includes resistance to aggressive media. Economic efficiency includes simple installation, low friction, high abrasion resistance, low wear and a long service life.

Driver comfort is also important and hydraulic systems with robust diaphragm accumulators optimize suspension and improve cornering stability in tractors. In addition, Freudenberg know-how contributes to driving safety and efficiency on and off the road with modern tire pressure control systems (CTI).

PROTECTION AGAINST DIRT

Freudenberg Sealing Technologies offers agricultural machinery manufacturers a wide range of sealing solutions that can withstand constant contact with dirt and other challenging media. Whether operating in mud, sand, stones, rubble or water, machinery equipped with Freudenberg's combination seals, cassette seals and multi-lip Simmerrings® provide robust dirt protection, material durability and seal longevity under the toughest environmental conditions.

The new cassette seal S4 is a prime example of long-term durability. A further refinement of the of Freudenberg's S3 cassette seal, the S4 was developed to

provide best-in-class sealing against contamination and oil leakage in the wheel bearings of heavy machinery used in wet, muddy conditions. The S4 employs a complex, three-component design that protects all functional parts – the sealing lips, the optimized lip working surface, dirt exclusion lips, dedicated counter-surfaces and internal lubrication – inside a closed housing that prevents dirt and water from getting in, and oil from leaking out, of the axle system even when completely submerged under water.



COMFORT ON ALL FIELDS

Hydraulic solutions from Freudenberg Sealing Technologies protect farmers from vibration and acoustic disturbances at the wheel of agricultural vehicles. At the same time, damping shocks and vibrations increases the service life of agricultural machinery.

Axle, wheel and cab suspension systems optimally tailored to customer requirements provide driving comfort and smooth operation. Accumulators made by Freudenberg form the energetic heart of the control systems.

The statistics are impressive: 20 percent better traction, 20 percent less tire wear, up to 10 percent fuel savings, and up to 6 percent higher crop yields thanks to lower soil compaction. These are the advantages that Freudenberg's tire pressure control systems (CTI) can provide to customers. The system is operated conveniently from the driver's seat and enables agricultural machinery to perform its work optimally on all fields – or subsoils – and on road surfaces like asphalt. The patented CTI Seal from Freudenberg ensures the right tire pressure with its special two-seal lip design made of different materials.

HYDRAULIC AND STATIC SEALS

We optimally match our materials and designs to every application. The result: flat seals, O-rings, hydraulic cylinder seals, rod seals, precision piston seals and the latest polyurethane material, all engineered for superior sealing performance and long service life.



VALVE STEM SEALS

Our high-performance valve stem seals increase engine efficiency and reduce oil consumption and emissions. Their sophisticated design features a back pressure lip that optimizes the lubrication of the valve body and offers protection against blow-by gas in diesel engines.



ENCODER

Precisely measuring the position of the camshaft and crankshaft at all speeds, our multiple encoders help optimize fuel injection and drive efficiency and reduce emissions in today's more powerful engines.



RADIAL SHAFT SEALS

As the foundation of Freudenberg's product reliability, operational excellence and value, the Simmerring® has evolved to encompass an entire range of advanced seals, from the engine to the tire pressure control system. Low-friction variants such as CASCO seal also reduce diesel consumption and carbon deposits.



AXLE SEALS

Thanks to their unique seal design, cassette seals and SF combi seals offer the ultimate protection against dirt for bearings and rotating shafts. Even on difficult or wet terrain, they keep prevent dirt contamination and oil leakage from impacting machine performance or affecting surrounding forests and fields.



SPECIAL SEALS

Plug & Seal connectors connect housings, -hoses and other units to safely manage the flow of fluids and other media through the system. Diaphragms provide the power required to pump, control, switch, collect and separate under even the most demanding conditions.



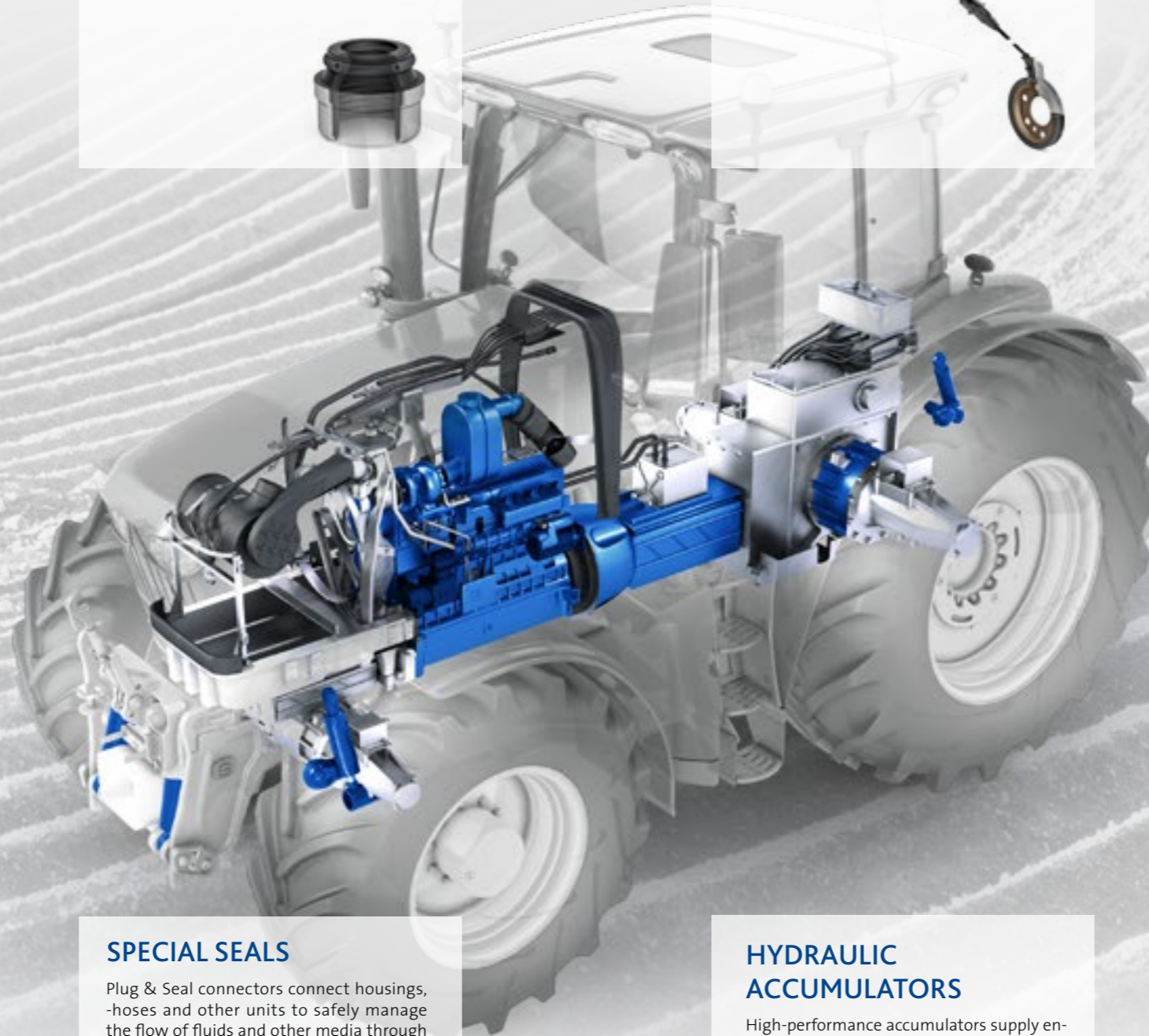
HYDRAULIC ACCUMULATORS

High-performance accumulators supply energy across a variety of applications. In agricultural machinery, they ensure greater driving comfort and a longer service life. Linear compensators, i.e. hydraulic cylinders with integrated piston accumulators, also ensure smooth running.



GEAR SEALS

Agricultural machinery also benefits from materials like PEEK, an automotive industry innovation. PEEK low-friction Levitas transmission seals and Levitorq thrust washers rely on hydrodynamic oil film technology to reduce transmission friction by as much as 70 percent. The result: lower fuel consumption and emissions and an extended industrial performance.



PERFECT SERVICE

With the new “Perfect Cylinder Program,” Freudenberg Sealing Technologies supports manufacturers of agricultural and construction machinery with a collaborative engineering and design approach that optimizes the performance and lifespan of their production equipment. The goal of the program is to maximize the performance and service life of existing machinery while eliminating the need for costly equipment replacement.

When a hydraulic cylinder is overhauled, Freudenberg Sealing Technologies puts together a customized, coordinated sealing system consisting of first-class high-performance seals. These include

high-performance Guivex® guide bands. The profiled piston and rod guides made of carbon fiber-filled polyamide material can replace standard piston guide bands in current housings. This allows the dimensions of the cylinder screw connections to be reduced and costs to be cut.

Other products in the Perfect Cylinder Program include optimized high-pressure polyamide piston seals and seals made from the latest generation of a polyurethane material developed by Freudenberg.



FROM A SINGLE SOURCE: FREUDENBERG AND DICHTOMATIK

Are industrial standard seals sufficient, or do you need a more specialized design to solve the application challenges you are experiencing? Freudenberg Sealing Technologies offers agricultural machinery manufacturers a choice with a complete range of seals and services tailored to deliver what is needed from a single, quality-focused source.

The company's premium brand of product solutions, branded as Freudenberg components, draws on its complete pool of sealing and materials technology experience and expertise to address customer-specific needs. Individual high-tech sealing solutions from the Freudenberg brand meet extreme sealing

requirements, especially in safety and function-critical applications.

In addition, the company offers agricultural machinery manufacturers proven Dichtomatik technology in the form of industrial standard seals and individually molded parts to address more common concerns. And for agricultural applications where cost-effectiveness, rapid availability and logistical services are paramount, the company's unique Freudenberg Xpress® express delivery service can supply urgently needed spare parts, prototypes and small series replacement components, often in less than a day.

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