

Smoother than Silk

New Technology for Transmission Seals from Freudenberg Sealing Technologies Reduces CO₂ Emissions

Berlin (Germany), December 7, 2016. Freudenberg Sealing Technologies is presenting a new generation of low-friction transmission seals at the 15th International CTI Symposium, the meeting place for transmission experts. Levitas seal rings are suited for installation in all forms of automated transmissions. A special seal design produces a hydrodynamic oil film between the seal ring and its dynamic counter surface. This reduces friction to the point that merely replacing conventional transmission seals in an automatic transmission reduces the vehicle's CO₂ emissions by 0.8 grams per kilometer. If a million new vehicles were equipped with Levitas seals, the total emissions over their entire operating life would decline by 192,000 tons.

Whether it is automatic, double-clutch or continuously variable, the transmission is one main determinant of the efficiency of a vehicle's powertrain. That's why every transmission manufacturer is working on minimizing frictional losses. Seals are responsible for about one-quarter of all the lost mechanical energy in automatic transmissions. They keep the oil pressure in the transmission at the prescribed level, making it possible to shift gears perfectly. The key is to keep the amount of oil that flows past the seal very low. "Today low leakage and minimal friction are the most important target conflicts in the development of new seals," said Hikaru Tadano of Freudenberg Sealing Technologies' Advance Development. So far, the problem has been handled by giving the sealing rings a T-shaped profile. The reduced contact surface between a shaft that is rotating and the stationary seal rings already decreases friction significantly. "The solution has proven to be successful," Tadano said. "But it is no longer possible to further reduce friction by even smaller contact surfaces."

With Levitas, Freudenberg Sealing Technologies is now pursuing a completely new approach: During operation, the seal floats on a hydrodynamic oil film that it generates itself. Small pockets are incorporated across the entire circumference of the ring seal. When the shaft begins to rotate, the dynamic pressure in the pockets generate axial forces, creating the oil film. As no physical contact remains between the shaft and the seal ring, only fluid friction remains, causing torque levels to decline by up to 70 percent, depending on the applications conditions. Since the pockets are bi-directional, the effect occurs irrespective of the shaft's rotational direction. This makes installation easier and more secure for the transmission manufacturer.

Volume production of the Levitas transmission seals is beginning in 2017. "The technology also appeals to European car and transmission manufacturers due to increasingly strict CO₂ limits," said Dr. Eberhard Bock, Director of Strategic Product Development at Freudenberg Sealing Technologies. "With the combination of Levitas and the friction-free Levitex seals for internal combustion engines, we are demonstrating the potential for further CO₂ reduction in conventional powertrains." Levitex seals for engines operate on a similar principle, but ambient air functions as the "lubricant" instead of oil. This nearly reduces frictional torque to zero. The production of Levitex engine seals for a European customer is also due to begin in 2017.

Both Levitas and Levitex are products of Freudenberg Sealing Technologies' „LESS“ initiative. The acronym stands for "Low Emission Sealing Solutions" and thus for sustainability and environmentally friendly mobility: in engines, transmissions, auxiliary equipment and alternative powertrain concepts such as electric mobility. <http://less.fst.com>

About Freudenberg Sealing Technologies

As the leading specialist in sealing applications and their markets, Freudenberg Sealing Technologies is a supplier as well as a development and service partner serving customers in a wide variety of sectors including the automotive industry, civil aviation, mechanical engineering, shipbuilding, the food and pharmaceuticals industries, and agricultural and construction machinery. In 2015, Freudenberg Sealing Technologies generated sales of about €2.3 billion and employed more than 15,000 people. More information at www.fst.com

The company is part to the global Freudenberg Group which, with its Business Areas Seals and Vibration Control Technology, Nonwovens and Filtration, Household Products as well as Specialties and Others. In 2015, the Group generated sales of more than €7.5 billion in and employed approximately 40,000 associates in around 60 countries. More information is available at www.freudenberg.com.

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