



Functionalisation of the sliding surfaces of mechanical seals

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UP TO 25% FRICTION REDUCTION AT MINIMAL LEAKAGE IN MECHANICAL SEALS BY MICROSTRUCTURING

Using microstructures for the tribological functionalisation of surfaces is an important object of modern research. It is proven that microscopic structuring of sliding surfaces can improve the macroscopic friction behavior. Together with our cooperation partners, we could achieve a friction reduction of 25% without any leakage in a mechanical seal by a targeted laser microstructuring of the sliding surfaces. It was the first time that the functionalisation of the surface was realised by the combination of three different microstructures with various effects. While cup structures lead to a focused shift in the frictional state, converging structures limit the occurring by their repulsive behavior. Dirt-repellant structures minimise the intrusion of particles into the treads

Figure 1: Mechanical seal with microstructured functional surfaces

Figure 2: Function geometry, adapted for the function

ECONOMIC MICROSTRUCTURING BY USP LASER PROCESSING

The use of ultrashort pulse lasers for the processing of the slide rings allows a microstructuring of the sealing surfaces without reworking. The fundament for economic laser structuring of the functional surfaces is a high productivity as well as a solid system technology. The implementation of the Multi Beam Scanner allows to produce the periodic structures with a significantly higher process speed and by that an economical laser processing can be achieved.

Together with our partners in Research and Development, we cover the entire process chain from the simulative design of suitable microstructures with CFC simulations, through the laser structuring to the application-oriented test at the tribometer testing bench. The feasibility and the benefit have already been successfully demonstrated in the tribological optimisation of mechanical seals.

KONTAKT

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