

PRESS RELEASE

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The Fraunhofer IST at the Hannover Messe 2024

Pressure and temperature measurement in rolling contacts under mixed friction thanks to innovative thin-film multi-sensor

The measurement of pressure and temperature plays a crucial role in various technical applications from rolling bearings to gears and seals. In particular, there have been no solutions to date for measurements under mixed friction, i.e. the simultaneous occurrence of liquid and solid friction. At the Hannover Messe from April 22 – 26, 2024, the Fraunhofer Institute for Surface Engineering and Thin Films IST will be presenting a newly developed thin-film multi-sensor that enables pressure and temperature measurements even under mixed friction and high loads.

The innovative thin-film multi-sensor developed in collaboration with the Institute of Machine Design (IMK) of the Otto von Guericke University Magdeburg was specially designed for simultaneous, high-resolution pressure and temperature measurement in rolling contacts under mixed friction, even under high loads. Simulations and numerous tests on test benches confirm the functionality and wear resistance of the sensors. The measurement data obtained in the tests contribute to a significantly improved understanding of the frictional behavior of the rolling contacts. They also allow a critical evaluation and improvement of the calculation methods used to design the contacts.

The developed thin-film sensor technology is suitable for use on rolling and roller contacts in drive units and other machine elements. In the future, this sensor technology could also be utilized for condition monitoring and predictive maintenance in this area.

At the Hannover Messe 2024, the Fraunhofer IST will be showing various demonstrators such as rolling bearing washers and gears applied with the thin-film multi-sensor described above. At the Fraunhofer joint booth in the Smart Structures and Lightweighting area (Hall 2, Booth B24), interested visitors can get an overview of the pioneering technology of integrated thin-film sensor technology.

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Sensory roller bearing washers. © Fraunhofer IST, Ulrike Balhorn

The **Fraunhofer Institute for Surface Engineering and Thin Films IST** is an innovative partner for research and development in surface technology, with expertise in the associated product and production systems. The aim is to develop customized and sustainable solutions: from prototypes, through economic production scenarios, to upscaling to industrial magnitudes – and all this whilst maintaining closed material and substance cycles. The Fraunhofer IST is one of the seventy-six institutes of the Fraunhofer Society, Europe's leading research organization.