

Press Release

9. Juli 2026

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Technology Platform for New Tire Formulations

TERIS Reaches Milestone: Fraunhofer Consortium Develops New Standards for Tire Analysis

In the “TERIS” project, the Fraunhofer institutes ICT, IGD, and IWM - led by the Fraunhofer Institute for Structural Durability and System Reliability LBF - have reached a decisive milestone. For the first time, the teams aim to generate, analyse, and predict tire wear in the laboratory in a standardized and practical manner. As part of this milestone, results are now available on reference abrasion, particle analysis, tribological models, AI-based surface analysis, a test bench concept, and methods for accelerated aging and VOC detection. The tire industry, testing services, and environmental agencies will in future benefit from reliable, rapid laboratory procedures for emissions assessment.

The project “Technology Platform for Tire Abrasion and the Identification of Its Emissions in Road Traffic (TERIS)” is making significant strides in tire and rubber-compound development. With the first milestone achieved and the project reviewed, the first important step has been successfully completed. This was also confirmed by the advisory board, composed of industry experts, which typically oversees such projects.

New Standards for Laboratory Analysis and Prediction of Tire Wear

The combination of different collection and measurement methods enables precise analysis of both suspended and settling particle fractions. In parallel, tribological models were developed that shed light—both experimentally and theoretically—on the relationship between load parameters, material properties, surface structure, and particle formation. This enables real-world abrasion processes to be specifically replicated in the laboratory.

A test chamber specialized in accelerated aging enables preconditioning of samples in a targeted and reproducible manner under environmental stress, thereby also investigating the influence on abrasion behaviour.

A major advancement is the development of an optical detection system that uses artificial intelligence to precisely identify and classify surface structures. The approach has already been validated using substitute materials and will be applied to real rubber samples in the next phase.

The consortium has also designed a test bench concept that combines the generation of rubber abrasion under multiaxial loading, targeted particle detection, and the integration of optical sensors in a laboratory setup.

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A combination of weathering and chemical analysis of volatile organic compounds (VOCs) generated by tire abrasion enables assessment of the environmental impact of particles.

The results provide the basis for an accelerated, practical, and well-founded evaluation of new rubber compounds in the laboratory. Tire manufacturers, testing services, and environmental agencies are thus provided with tools that enable them to specifically reduce emissions, evaluate new products more quickly, and meet the requirements of the Euro 7 standard.

Keywords:

Tire wear, particle analysis, test bench development, material development

More information: www.lbf.fraunhofer.de/teris-en

Technical contact at Fraunhofer LBF:

Ivo Krause, ivo.krause@lbf.fraunhofer.de



Improved emissions assessment: Fraunhofer expert teams aim to generate, analyze, and intelligently predict tire wear in a standardized and practical manner in the laboratory.

Photo: AI-generated by Fraunhofer LBF

The Fraunhofer-Gesellschaft, headquartered in Germany, is one of the leading organizations for applied research. It plays a central role in the innovation process—with a research focus on key technologies relevant to the future and the transfer of research results to industry to strengthen Germany's position as a business hub and for the benefit of society. Founded in 1949, the organization currently operates 74 institutes and research units in Germany. Its nearly 30,000 employees, most of whom have backgrounds in natural sciences or engineering, generate an annual budget of €3.6 billion. Of this, €3.2 billion is allocated to contract research.

Contact

Contacts

Anke Zeidler-Finsel

Fraunhofer Institute for Structural
Durability and System Reliability LBF
Press and Public Relations
Tel. +49 6151 705-268

anke.zeidler-finsel@lbf.fraunhofer.de

Scientific Contact

Ivo Krause

Fraunhofer Institute for Structural
Durability and System Reliability LBF
Phone: +49 6151 705-480
ivo.krause@lbf.fraunhofer.de

www.lbf.fraunhofer.de

