



MECHANICAL AND AUTOMOTIVE ENGINEERING

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The “Mechanical and Automotive Engineering” business division at Fraunhofer IKTS offers conventional wear parts and tools as well as components subjected to specific loads – made from high-performance ceramics, hard metals, and cermets – that are used in mechanical, systems and automotive engineering. Optical, elastodynamic and magnetic test systems for the monitoring of components and production facilities constitute a new area of focus.

The rising costs of energy and raw materials – combined with intensified competition in the global markets and escalating demand for sustainability – collectively represent the tremendous challenges involved in mechanical and systems engineering. Ever-stricter exhaust standards add a further dimension to the factors that automotive engineers face today. Using high-performance ceramic components helps engineers to achieve dramatic improvements to existing and new systems.

Fraunhofer IKTS supports its customers with the application-oriented selection and development of materials, while utilizing both established material systems and new combinations as well. The IKTS team has decades’ worth of experience in designing components that leverage the best qualities of ceramics and hard metals. It is also a veritable font of knowledge regarding the most economically feasible production processes and their successful integration into the user system. Thus, new application concepts are both swiftly and affordably implemented in prototype and small-scale series production. When selecting a production process, the team can choose from among a broad range of ceramic manufacturing processes that, from an international scale, is truly outstanding in terms of its sheer breadth and depth. The existing equipment and installations facilitate the institute’s holistic approach: from upscaling processes on the pilot-plant scale to transferring these processes into industrial production.

Test and monitoring systems track the operational status of components and systems. They detect and localize defects early on. In doing so, staff members have access to a broad portfolio of unique methods for the non-destructive detection of critical material parameters, such as fiber structures and microstructures, mechanical stress, porosity, crack formation and delaminations. Signals are detected, processed through high-performance hardware components, then visualized and interpreted by IKTS’,s in-house developed software.