Are you familiar with our industrial-grade accredited inspection services?

- Test laboratory accredited according to DIN EN ISO / IEC 17025 and competent to issue certificates for qualifying and validating (new) nondestructive testing (NDT) processes for industrial testing
- Accelerated time-to-market and opportunity for qualified, standard-compliant deployment in industrial applications both for new in-house developments and for custom adaptations of innovative NDT technologies in fields where standards have not yet been established
- Certification of the corresponding quality management system in accordance with DIN EN ISO 9001

Fraunhofer IZFP Saarbrücken

SIMPLIFYING THE COMPLEX – NONDESTRUCTIVE TESTING AND CHARACTERIZATION OF LIGHTWEIGHT CONSTRUCTION MATERIALS

Robot-based testing of a CFRP component

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Given the need to conserve resources and increase efficiency while simultaneously improving functional characteristics, the development of lightweight systems has gained enormous importance. This applies not only to “conventional” lightweight construction industries such as aerospace, but also to the automotive industry and the entire field of renewable energy.

Lightweight construction is possible only if nondestructive testing (NDT) processes are a consistent and integral part of the product and process development chain.

For this reason, methods and systems for testing lightweight structures represent an important focus of the Fraunhofer IZFP R&D activities, which are supplemented by research into targeted life cycle management (the correlation between component faults/defects and aging mechanisms such as characterizing the development of damage in a material).

Fraunhofer IZFP thus relies on an innovative, holistic approach that takes into account the entire value chain, from development of the materials, components and production processes, to operation, service and recycling.

**Lightweight-specific adaptations, new technologies and the institute’s own developments**

- **X-Ray**
  - Computed tomography (CT) as an imaging process for inspecting single prototypes
  - Computed laminography (CL) as an universal approach for high-resolution, 3D testing of large flat lightweight components

- **Ultrasound**
  - Established processes in a variety of applications such as the standard for approving safety-relevant aerospace technologies
  - Sampling phased array - ultrasound tomography
    Using synthetic reconstruction algorithms, fiber-reinforced components can be inspected for defects by means of ultrasound-based 3D imaging (tomography). The result is significantly better resolution and very high testing speeds.

- **Active thermography**
  - Imaging system for the detection of near-surface flaws and defects, such as delaminations in FRP components

- **Micromagnetics**
  - 3MA (micromagnetic, multiparameter microstructure and stress analysis) for characterizing new high-performance steels
    With this process, parameters such as yield strength, tensile strength and hardness can be determined in a nondestructive manner by exploiting the correlation between magnetic and mechanical material properties.

- **Other processes and methods**
  - Multiphase eddy current system
  - Microwave
  - Shearography (speckle interferometry)

In addition to its focus on certifying technology, Fraunhofer IZFP offers a series of courses designed to educate technical specialists and managers and to sensitize them to the area of lightweight technology quality assurance.

Close cooperation with the Chair for Lightweight Systems at the University of Saarland gives Fraunhofer IZFP in-depth insights into basic research involving the entire lightweight construction value chain, from initial design to prototype applications.

In order to deploy reliable nondestructive testing technologies in industrial applications, they must be certified. Fraunhofer IZFP’s flexibly accredited test laboratory is fully equipped to validate test methods and applications to determine if the underlying processes and corresponding instruments are suitable for carrying out defined inspection tasks.