

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

- Accredited laboratory in line with DIN EN ISO / IEC 17025, to qualify and validate new non-destructive testing (NDT) processes for industrial applications
- Accelerated time-to-market and opportunity for qualified, norm-compliant deployment in industrial applications as well as for complete new in-house developments or custom adaptation of innovative NDT technologies, even in fields where norms have not been established
- Certification of the corresponding quality management system in accordance with DIN EN ISO 9001

## Contact

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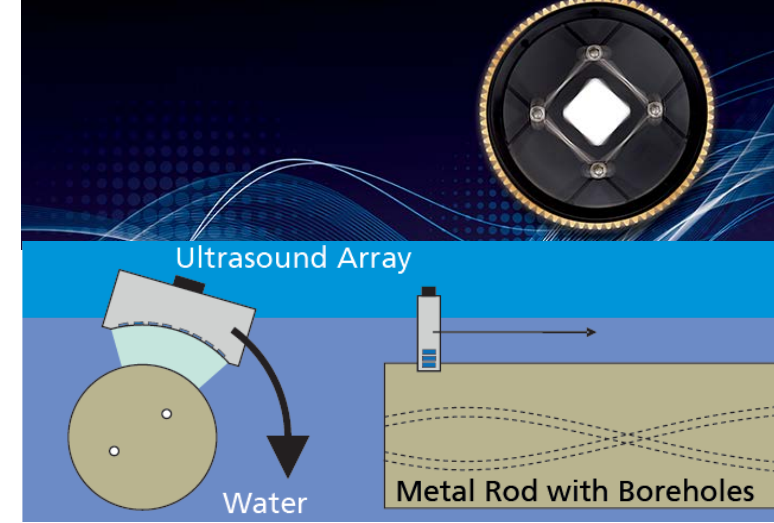
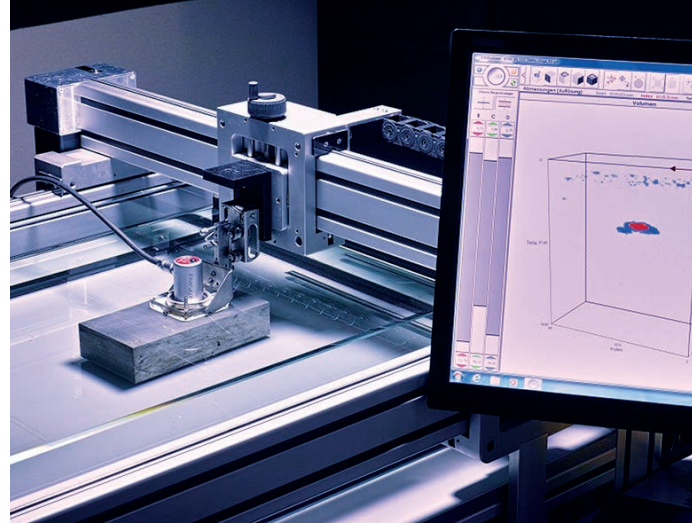
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Sensor and Data Systems  
for Safety, Sustainability and Efficiency



# Ultrasound technologies at Fraunhofer IZFP



left: Ultrasound sensor for sampling small radii using a contact method; middle: Setup for manipulator-controlled ultrasound testing using a contact method

right: above: EMAT (artist drawing), below: principle of ultrasound testing a metal rod with bores

## Available ultrasound technologies at Fraunhofer IZFP

Ultrasound testing with its versatile methods is one of the crucial procedures used in nondestructive testing and as such, an essential part of many quality assurance measures. It provides established methods – in particular for the realm of production processes – whose manifold applications allow ensuring the safety of the components manufactured.

Novel, anisotropic or heterogeneous materials such as fiber-reinforced plastics, high-strength steels or lightweight metals increase the requirements for ultrasound testing, especially since this method more and more is also used for hybrid components.

Besides the characteristics of the materials,

there are additional requirements – such as the needs of progressively more complex component geometries, high-resolution defect inspection, or the implementation of higher testing speed – that can be addressed by the technologies used at Fraunhofer IZFP. We focus primarily on the areas of materials inspection, process control, inspection of parts and components, as well as on condition monitoring.

For meeting client-specific needs, Fraunhofer IZFP can deploy a broad range of operational technologies, competences and expertise for

- building customized ultrasonic transducers,
- inspection systems, including hard- and

- software development, and
- performing qualifying manual and robot-supported ultrasound inspections.

Moreover, the Institute counsels and / or supports its customers with regard to generating individualized inspection instructions, as well as performing and analyzing inspections.

### Available ultrasound technologies

- Piezoelectrically excited ultrasound
- Electromagnetically excited ultrasound
- Air-coupled ultrasound
- Phased array / total focusing method
- Ultrasound microscopy

### Applications

In addition to their classic applications – such as testing weld seams, purity grade, and wall thickness – the various ultrasound methods are increasingly used in defect inspection focusing on corrosion, inclusions, pores, and cracks in:

- Heavy cast and forged parts
- Fiber-reinforced plastics (carbon/glass fiber)
- Hybrid materials / composite materials
- Concrete testing in the construction industry

In addition to traditional defect inspection, materials inspection is of special significance for

- characterizing discontinuities,
- determining existing internal and load strains,
- characterizing microstructures,
- examining microstructural fatigue processes,
- monitoring cracks induced by operating processes, and
- monitoring crack propagation.