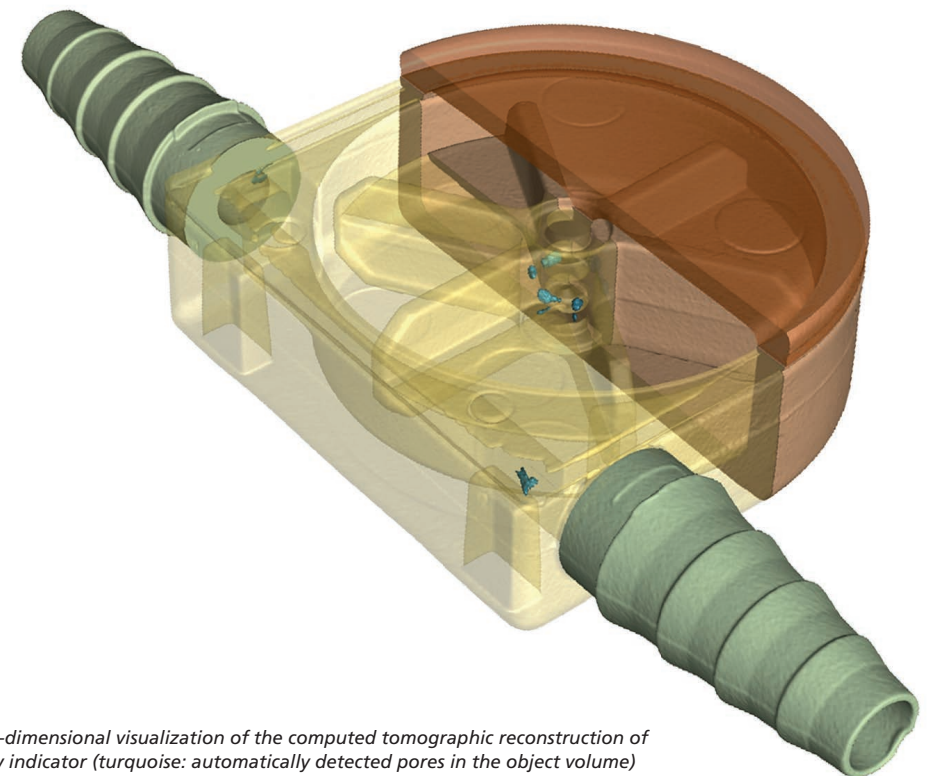




## SERVICES COMPUTED TOMOGRAPHY AND COMPUTED LAMINOGRAPHY

### By the way, are you familiar with our industrial-scale accredited 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



Three-dimensional visualization of the computed tomographic reconstruction of a flow indicator (turquoise: automatically detected pores in the object volume)

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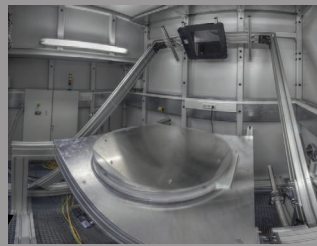




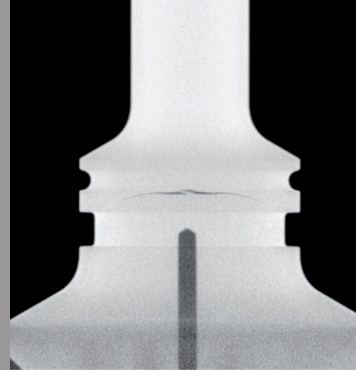
Tomolibri®



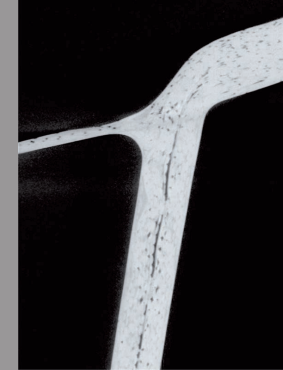
DAGE XD7600NT®



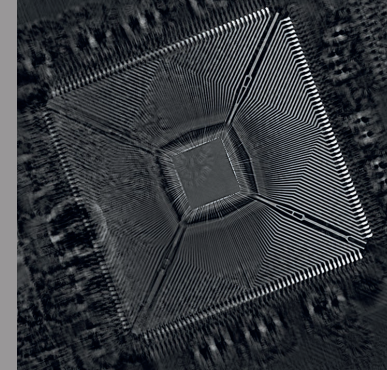
CLARA®



Crack in hardened turbine shaft (CT)



Delaminations in fiber reinforced plastics (CL)



Conductor paths on a printed circuit board (CT)

## Situation

Computed tomography (CT) is a contact-free inspection method to provide three-dimensional volume images by means of X-rays. Due to the underlying physics, CT is particularly suited to precisely determine the position of small defects inside the object volume, achieving superior accuracy compared to ultrasonic or thermographical results. Depending on object size, material, and geometry, resolutions up to a few microns can be achieved. Typical applications concern the inspection of components to find defects such as pores, cracks or inclusions. Another field of application is the determination of an object's volume structure with subsequent analysis of the material composition and functionality.

The use of image processing software allows the automated detection and evaluation of pores inside the volume. Our CT scanners achieve a resolution of 3 µm in case of components up to 30 cm in diameter and up to 8 kg in weight. Big planar parts up to 150 cm diameter and up to 300 kg weight can be analysed computed laminography (CL) at a resolution up to 20 µm. Smaller objects of this type (up to 40 × 40 cm<sup>2</sup>) can be inspected with a resolution up to 1 µm and an inspection area of 2 × 2 mm<sup>2</sup>.

The maximum resolution mainly depends on the geometry and the material composition of the object to be inspected. We will gladly provide you with detailed information on your specific inspection task.

Fraunhofer IZFP has over 30 years experience in the field of X-ray-based NDT. Among our customers global players from aerospace, automotive, and electronics industry, as well as numerous small and medium enterprises from Europe can be found. Our inspection lab is equipped with X-ray scanners covering a wide range of inspection tasks. Computed tomography and radiography are part of Fraunhofer IZFP's accredited inspection lab which complies with DIN EN ISO / IEC 17025.

## Service Portfolio

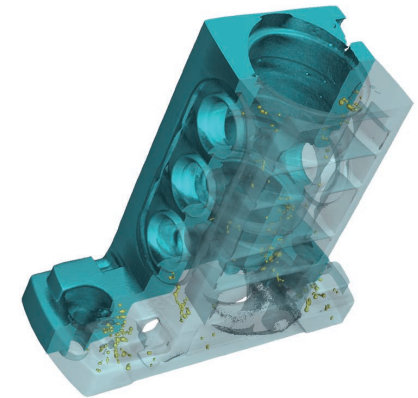
Our services include both, two- and three-dimensional X-ray image representation and processing and a subsequent evaluation by certified experts. In addition to established CT scans we offer laminographic inspection, which is highly suited for big planar objects, e. g. printed circuit boards or fiber reinforced plastics.

### Service Portfolio

- Radioscopy
- Computed tomography
- Helical computed tomography
- Computed laminography
- Swing laminography
- Consulting service and project planning
- System engineering, including design and realization

### Special Services

- Analysis of materials
- Analysis of blowholes
- Function tests
- Feasibility studies
- Combined inspections: X-ray plus ultrasonics, thermography or eddy current



3D visualization of the CT reconstruction of an aluminum casting part (yellow: automatically detected pores in the object volume)

## X-Ray Installations

- All-purpose X-ray system for CT and radioscopy
- CT system Tomolibri® for metrological applications
- CL system CLARA® for big planar components
- CL system DAGE XD7600NT® for high-resolution radiography
- Transportable CT system CT-MICRO for in situ operations