



# F-Scanner 2D

## Imaging inspection of cleanliness and coatings

**100-percent monitoring in the lab or in the line**

*Laboratory and industrial version of the F-Scanner 2D, each with sample chamber below the scanning unit. The industrial variant is available as stand-alone-device and can also be integrated into production lines.*

The laser scanners of the F-Scanner 2D series by Fraunhofer IPM enable complete, spatially resolved inspection of the cleanliness and coating quality of components. The two variants of the F-Scanner 2D are designed for use in quality assurance laboratories and production environments as well as in inline applications.

### High-resolution fluorescence image of the component surface

The F-Scanner 2D, like all systems of the F-Scanner family, is based on the technology of fluorescence measurement. The inspection system makes organic layers and even the slightest residues on metal surfaces visible and quantifiable. Unlike the line scanners F-Scanner 1Dc, the F-Scanner 2D scans the entire surface without moving the component. Full-surface inspection is achieved by a second deflection unit located inside the system. The laser beam traverses the entire scanning area in approximately 5 to 50 seconds, depending on the desired resolution. The measurement data is acquired synchronously with the scanning motion. Software processes the millions of individual data points to create a high-resolution fluorescence image of the component

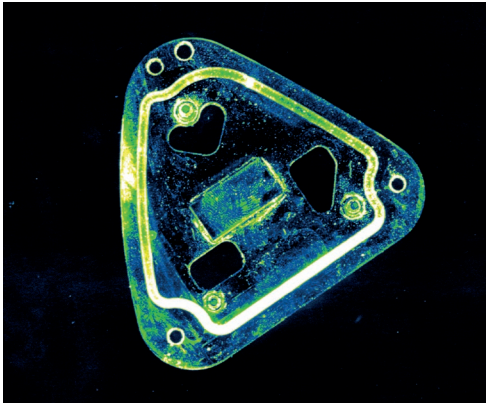
surface. This image shows where and to which extent organic residues or coatings can be found on the component surface.

### Inspecting cleanliness – optimizing production processes

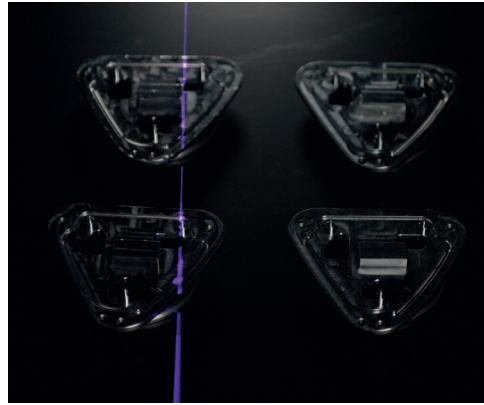
State-of-the-art joining and coating processes such as adhesive bonding, laser welding, electroplating or plasma coating often put very high demands on the cleanliness of the components to be processed. By combining laser technology with extremely sensitive detectors, Fraunhofer IPM's F-Scanners detect organic contaminations such as lubricants, corrosion protection or release agents down to layer thicknesses of just a few nanometers. Thanks to imaging technology, the F-Scanner systems allow for a targeted examination of quality-critical areas and help to identify contaminated

### Advantages at a glance

- Spatially resolved 100-percent surface analysis
- High resolution and field depth
- Eye-safe housing (laboratory version)
- Automated image processing
- All-digital documentation for quality assurance
- Full CE documentation



*Left: Fluorescence image of a part in false color representation. Black areas are clean. White areas are strongly contaminated.*



*Right: Laser beam sweeping across a set of parts inside the sample chamber*

spots. In addition to determining cleanliness, the data often allows to identify the source of problems in the manufacturing process.

Coating inspection with the F-Scanner is based on the same measuring principle and is suitable for almost any coatings that contain organic substances. Just as with cleanliness inspection, apart from assessing the coating quality possible technical issues in the production process can be identified.

### Tailor-made inspection systems for laboratory and inline application

The standard version of the F-Scanner 2D comes with a sample chamber for laboratory applications. This chamber ensures laser safety (laser class 1 for the overall system). The chamber size defines the maximum field of view of the system and is adapted to different applications, such as the inspection of components of

different sizes or entire product carriers. Sample chambers with heights ranging from 40 to 80 cm and fields of view ranging from 30 × 30 cm<sup>2</sup> to 60 × 60 cm<sup>2</sup> are offered as standard.

The robust industrial version of the F-Scanner 2D is designed for use in production environments. It features a dust- and splash-proof housing, as well as temperature stabilization. Thanks to customized data processing and interfaces, the system can be integrated into manufacturing processes, IT infrastructure, and safety systems. The scanning unit can also be fully integrated into production equipment for 100-percent inspection in high-volume processes.

For inspecting very large objects or to achieve particularly short cycle times, the F-Scanner 1Dc can be used as an alternative option to the F-Scanner 2D. Unlike the stationary F-Scanner 2D, the line scanner F-Scanner 1Dc is moved across the surface to be inspected using a linear axis or a robot.

#### Typical specifications F-Scanner 2D

Fluorescence excitation	Typ. 405 nm
Laser safety	Laser class 1 (with sample system) Laser class 3 (scanning unit)
Aperture	40°
Working distance	Typ. 40 to 80 cm
Field of view	Typ. 30 × 30 cm <sup>2</sup> to 60 × 60 cm <sup>2</sup>
Speed	50 to 100 lines per sec
Resolution	Typ. 250 – 500 µm
Dimensions (L × H × W)	70 × 60 × 55 cm <sup>3</sup>
Detection limit	Typ. < 0.01 g / m <sup>2</sup>
Detectable substances	Processing agents, e.g. oils, fats, cleaning agents, organic coatings

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