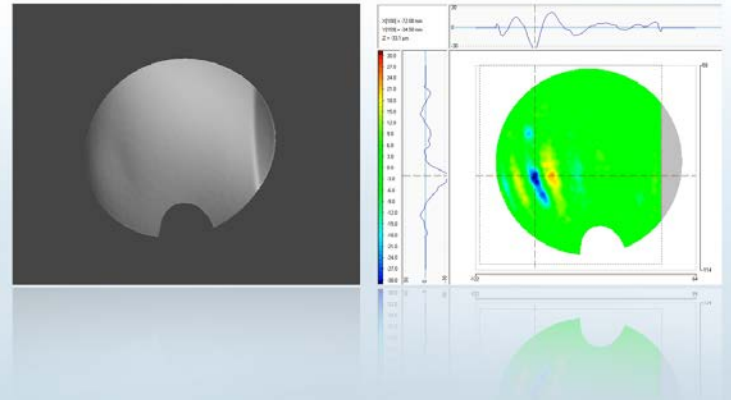




Surface inspection of car attachments (here: fuel filler flaps)

High quality standards and the visual appearance of products are crucial factors in every industry sector. Visible parts presenting unwanted flaws suggest low quality. Particularly in the automotive industry, optical sensors are used which perform reliable inspection of car attachments such as fuel filler flaps and charging flaps. The surfaceCONTROL2500 3D sensor from Micro-Epsilon measures and analyzes components after their production and before the processing steps in order to recognize defects early.

Most car manufacturers or their suppliers manufacture fuel filler flaps and charging flaps from black plastics. Here, the injection molding method is applied where small sink marks cannot be entirely avoided despite the use of the most modern materials. Defects can occur due to different wall thicknesses or mass accumulations because of attachment points located on the rear side.

As long as the component is not painted, micrometer-sized sink marks remain almost invisible until they become apparent after the painting process. This is why the fuel filler flaps and charging flaps are measured before the painting process with the surfaceCONTROL2500 3D sensor. The measurements are directly performed in the production plants. Therefore, the sensor generates a 3D point cloud from the surface to be inspected which is then analyzed using the surfaceCONTROL InspectionTools software. This reveals even the smallest of surface unevenness in order to sort out bad parts in due time. Subjective evaluations by auditors which are prone to error become superfluous.

The surfaceCONTROL2500 provides reliable measurement data for precise and objective evaluation purposes. This helps to recognize defects at an early stage of the production process and to avoid rejects or even customer complaints.

As well as for manual, random inspection, the 3D sensor can also be used as an inline system for process monitoring and control tasks. Depending on the target surface, cycle times of at least 2 seconds are possible with automated inspection.

Requirements for the measurement system

- Large measuring range: 300 mm x 220 mm
- Detectable defect size: 8 μm in depth
(with lateral expansion $x, y > 5 \text{ mm}$)
- Special methods for local analysis of surface shape
- Target: Black, diffuse reflecting plastic
- Inline use (cycle time from 2 s, depending on the surface)

Ambient conditions

- Production plant under industrial conditions
(fluctuating temperature, dust, dirt, ...)
- Production line or offline test station next to the line

System design

- surfaceCONTROL2500-360 3D sensor
- surfaceCONTROL DefMap3D
+ surfaceCONTROL InspectionTools software
- Workstation + TFT display

Advantages

- Inline integration for direct process control and optimization
- Defect analysis based on measurement values enables objective evaluation
- Recognition of shape deviations in the micrometer range avoids further processing of defective components in order to reduce rejects