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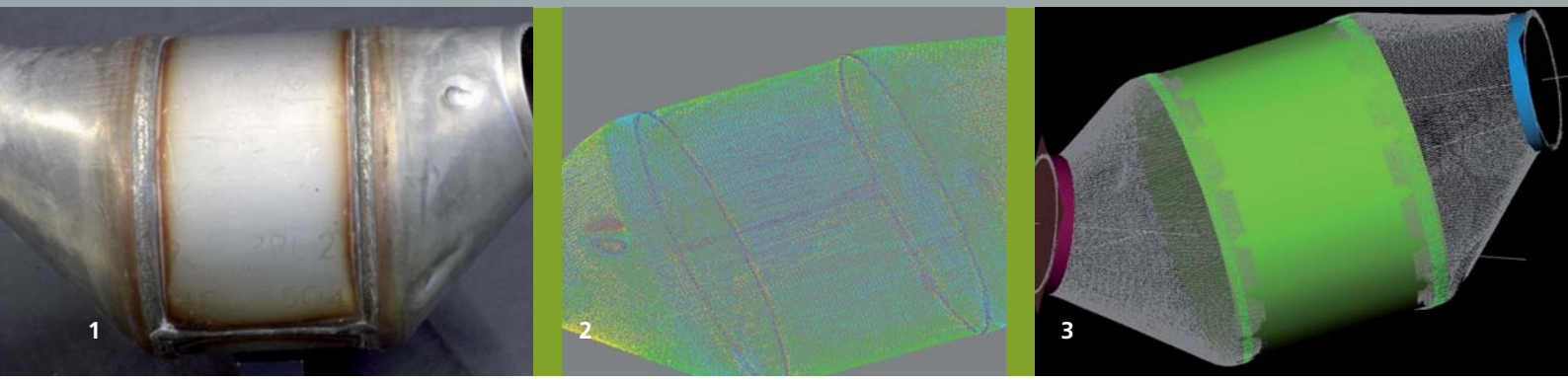

1 *Converter. Photo: Fraunhofer IFF*
2 *3-D point cloud.*
3 *Standard geometry approximation.*

GEOMETRIC QUALITY INSPECTION OF CATALYTIC CONVERTERS

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OPTOINSPECT 3D Measuring Device

Initial Situation and Objective

Part of the exhaust system, converters are standard equipment for cars with gasoline engines. Converters are manufactured by welding individual components together. The quality of the joining processes is crucial for the components' fit when the complete exhaust system is assembled later. Therefore, near in-process inspection is essential for optimal product quality and fit.

The Measurement System

The Fraunhofer IFF has developed and implemented an optical, contactless measurement system for quality inspection. The system is based on light-sectioning in which the converter's surface is digitized by means of laser triangulation. It employs an array of multiple light-sectioning sensors and a motion system to do so. Theen, the generated point cloud is evaluated. Methods of mathematical approximation fit standard geometries, e.g. cylinders and plane, into the point cloud. Afterward, the standard geometries' spatial position and orientation to each other are determined and visualized. Thus, they act as a direct instrument that adjusts and corrects joining units and monitors statistical processes.

Benefits

- Flexible automatic inspection system for differing types and sizes
- Measurement uncertainty in the measuring volume: 600 × 200 × 200 mm³: ≤ ± 100 µm
- Measuring time: 2 to 3 minutes
- Replaces expensive and inflexible gauges

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