



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

GEOMETRIC QUALITY INSPECTION OF CATALYTIC CONVERTERS

Fraunhofer Institute for Factory Operation and Automation IFF

Prof. Michael Schenk

Sandtorstrasse 22
39106 Magdeburg, Germany

Contact
Measurement and Testing Technology
Business Unit

Dr. Dirk Berndt
Tel. +49 391 4090-224
dirk.berndt@iff.fraunhofer.de

Ralf Warnemünde
Tel. +49 391 4090-225
ralf.warnemuende@iff.fraunhofer.de

www.iff.fraunhofer.de

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 multiple light-sectioning sensors and a motion system to do so. Then, the gene-

rated 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: $600 \times 200 \times 200 \text{ mm}^3: \leq \pm 100 \mu\text{m}$
- Measuring time: 2 to 3 minutes
- Replaces expensive and inflexible gauges