

## Case Study

## Geometrical Properties Inspection

**Precise Measurements  
of Depth, Area, and Volume**

*With 3D vision for surface quality, we will have a complete, precise, and stable inspection of each product. Inea has really raised the bar with responsiveness and solutions that are above expectations.*



– Quality Control Manager

**The customer.**

An international exhaust system provider that designs, engineers and manufactures exhaust system components in over 100 factories around the world. They are a Tier 1 OEM supplier for major automotive companies. The quality of the catalyst surfaces is very important, because possible defects on surface areas usually lead to higher exhaust emissions, which are regulated by the Euro 6 standard.

**The challenge.**

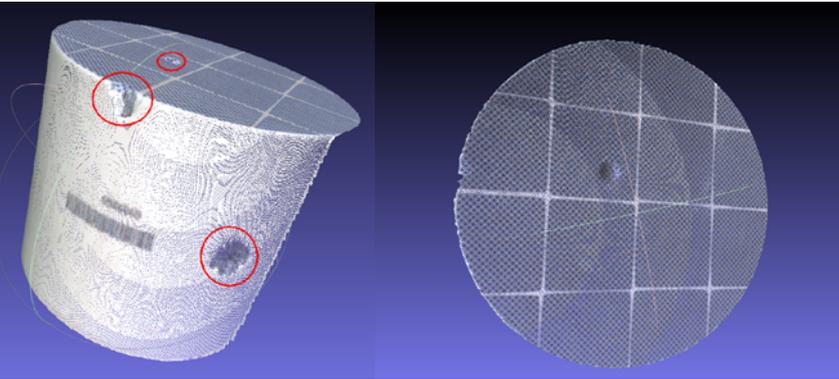
100% quality assurance with precise measurements of depth, area, and volume of each chip or gauge. There are different quality demands for different sections of each part type. Greater deformities are allowed at the edges as opposed to side surfaces, which are in contact with exhaust metal housing, and need to be in near perfect condition to avoid greater damage during assembly.

Any undetected defects of the part could also cause further structural damage of the part and loss of functionality, which could initiate a recall of the vehicles and cause substantial economic implications.

The aim we also wanted to achieve, is detecting deviations or malfunctions as early in the process as possible, which also helps decrease the quality-related costs.

The solution.

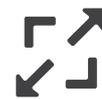
Usually, only every n-th part would be inspected on a production line, since both digitalisation and analysis are extremely time-consuming (usually the tens of minutes). We have managed to implement a similar logic in an in-line production process.



The entire inspection process (data acquisition, analysis, saving raw data, and communication) would be performed in under 8 seconds. That is a manufacturing cycle time for three different types of catalysts at the same time, which are randomly inspected during the same run. The solution is an advanced 3D vision control, combined with a specific part handling system, which ensures precise part positioning during the entire inspection process.

The system detects all geometrical deviations greater than 0.3 mm and stores complete 3D information for each geometrical defect. The allowable values (deformation parameters) are adjustable, parametrized, and set as part-specific templates, making our solution MES-ready.

Expected results.



**400%**

**larger resolution**  
of inspected part image



**30%**

**faster than required**  
DAQ, analysis, and response



**80%**

**scrap reduction**  
from manufacturing process