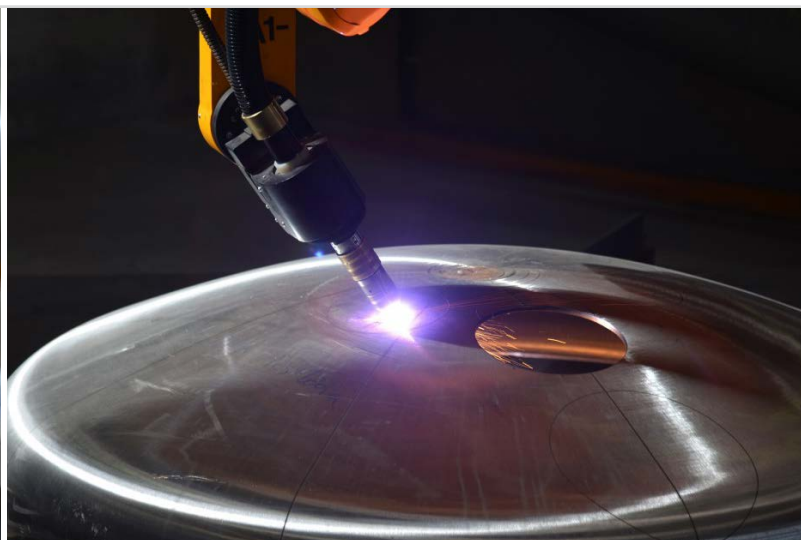




3D measurement of components prior to plasma cutting

The Slovak company MicroStep, spol. s r.o. is a specialist in CNC cutting machines and one of the world's largest producers of automated plasma cutting systems. In a specially developed machine for processing vessel and boiler covers (also known as 'domes') as well as other profiled materials where a real shape of the profile is required, the company relies on precision sensor technology from Micro-Epsilon. The system can handle domes with diameters up to 7 m and a height of up to 1.2 m. In these domes, openings for pipe and valve connections are normally cut. In order to process these huge domes quickly, fully automatically and at extreme precision, it is necessary to determine their shape and exact position within the production line. As the pure CAD data of the dome often differs by several centimeters from the actual dimensions, the 3D profile of the covers is measured before processing using scanCONTROL 2900 laser scanners. The exact dimensions are then determined from the 2D data generated by the scanner which is connected to a 6D scanner position system. The scanning process is performed at high speeds up to 60 m/min. Therefore, a reliable hardware trigger is required to obtain the real shape of the target.

Its compact design, integrated electronics and speed make the Micro-Epsilon laser scanner suitable for inline integration. In addition, high performance scanners achieve a high repeatability of 50 $\mu\text{m}/\text{m}$ even with different reflective properties of the metallic test objects. High repeatability ensures that the process is always carried out at consistently high quality. Furthermore, the measured data can be used to check the quality of the dome. The laser scanner provides a point density of 80 μm over a measuring range of 100 mm.

These precise measured values are then transferred as a point cloud directly via an SDK connection to the customer's mSCAN evaluation software, which calculates the center of the dome and determines the optimal toolpath. For fully automatic processing of measured values, synchronizing the scanner data with the data of the processing space is necessary. MicroStep uses a patented auto-calibration (ACTG) system for this purpose.

Requirements for the measurement system

- High linearity of $\pm 0.2 \text{ mm}$
- Measuring different gloss levels of metals
- Profile frequency of 100 Hz and higher (depending on the point density)
- Ideal for industrial purposes

Ambient conditions

- Industrial production plant

System design

- LLT2900-100/VT-SI (blue or red laser - depending on requirements)
- Special pigtail variant (integrated cable)
- Comprehensive package for sensor connection (SDK)
- Customer provides mSCAN evaluation software

Advantages

- 3D scanning of large components at the highest precision
- Easy machine integration enables fully automatic processing
- Repeatable measurements under industrial conditions

