

INSPECTING METAL GAS CYLINDER FORMING

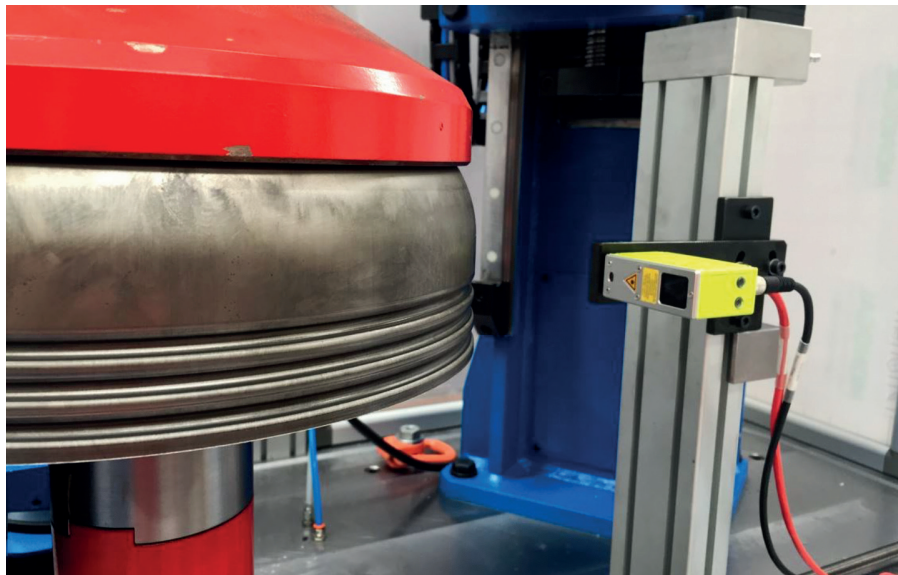


CUSTOMER

MDA s.r.l (Multiphysics Diagnostics Automation) is an Italian company focused on providing innovative solutions based on a multiphysics approach.

They are experienced in applying scientific and technological research to industrial processes and medical applications.

The expertise of MDA in industrial automation makes it possible to integrate this approach into industrial applications in the field of automatic visual inspection.



THE SOLUTION

Working for a machine builder that uses automatic production lines for gas cylinder manufacturing, MDA designed a contactless system that uses 3D vision to check the correct shape of the top and bottom caps right after the deep drawing process and before the welding process.

At the core of this system is a SmartRay ECCO sensor that extracts the profile information, which is then matched with the desired shape.

The software implemented can import the correct bending profile from a CAD file, or in learning mode from the acquisition of a

sample. The user can configure upper and lower tolerance limits on the imported profile.

The profile captured by the SmartRay ECCO is compared with a threshold range with an accuracy of 0.1mm. The measurement can be made on a number of positions, all of which can be defined by the user.

The ECCO 55.100 sensor was selected for this application, due to the wide field of view and high-speed performance (up to 6 kHz), which allows to take the lateral surface profile of the rotating part. The ECCO 55.100 has also a small form factor, making it easy to integrate the sensor in the machine.

THE APPLICATION

Gas cylinders are required to contain gases under pressurised conditions. The manufacturing process for these containers involves the sheet metal forming of different parts of the cylinder, followed by welding of parts.

The bottom and top sections of the gas cylinder are formed by means of a deep drawing press that bends the metal sheets. The final shape can vary according to the tank internal pressure, gas type and tank material.

Correct bending is crucial for the welding process, as it guarantees the correct joining of the two parts. When bending is not as expected, coupling problems can arise, leading to leakages in the cylinder, or even collisions in the case of robot welding.

MDA developed a solution that prevents non-conforming parts from proceeding to the welding step, saving both the time and costs caused by further processing.



THE SOLUTION



Our **ECCO 55** Series sensors have pushed the limits of 3D sensor technology in so many areas. They can identify smaller defects, make more precise measurements, scan bigger objects and inspect shiny parts on any high speed production line.

SmartRay
ECCO 55.100

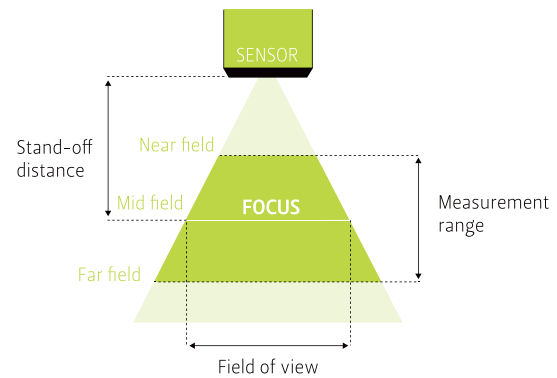
Typ. field of view
118 mm

Measurement range
100 mm

Typical scan rate
Approx. from 400 Hz up to 6 KHz

Typ. vertical resolution
19 μm – 53.5 μm

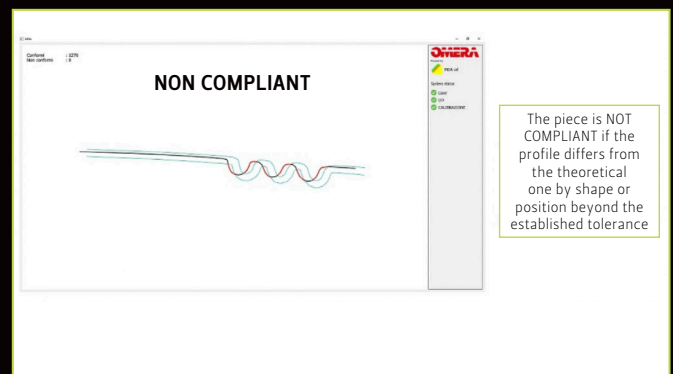
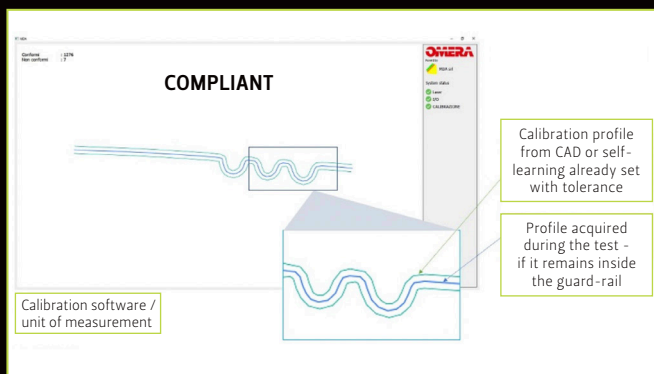
Typ. lateral resolution
136 μm – 228 μm



THE RESULT

One of the challenges of this application was the metal and shiny surface of the parts, which the **ECCO 55.100** sensor was able to manage perfectly, producing a high-quality profile of the inspected part.

Thanks to the 3D vision system, whenever a non-conformity was detected, the part was immediately rejected, avoiding the time and expense of further processing.



“Before the implementation of the system, a manual measurement was made on random samples using a jig tool, which took at least two minutes to check the whole surface. With the SmartRay sensor it takes 5 seconds to automatically check the surface, resulting in 96% of time saved for a single check. In addition it is now possible to perform the inspection on 100% of production”.

Sergio Badocco – Owner of MDA

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