

SWISS SAFETY CENTER **GOCATOR® 3D SMART SENSORS USED FOR NON- DESTRUCTIVE TESTING (NDT) OF GAS CYLINDERS**



Swiss Safety Center, Wallisellen, Switzerland
www.safetycenter.ch
www.autosonic.ch
autosonic@safetycenter.ch

Swiss Safety Center AG is a member of the SVTI Group and thus part of a centre of excellence in technical safety and risk management. Within this framework, the Swiss Safety Center offers a comprehensive portfolio of services for industry, retail and commerce. These include checks, permits and inspections of pressure equipment, welding technology and dangerous goods as well as conformity assessments.

The Application

Gas cylinders are required by law to undergo robust quality inspection before release to the market. Each cylinder contains important product and traceability information engraved on its shoulder. This information needs to be read, interpreted, and digitally stored in combination with all the other data collected during the inspection process.

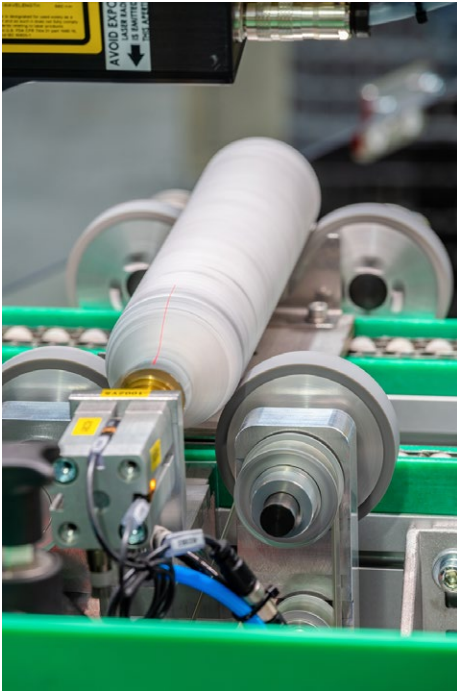
The Challenge

Gas cylinder inspection not only requires Non-Destructive Testing (NDT) to detect defects that occur over time (due to wear and tear), it also requires the creation of tracking records that allow for the monitoring and updating of essential information during the cylinder lifespan (e.g., retesting dates and centers, markets etc.). For this reason, gas cylinder retesting is often associated with inefficient inspection methods and an excess of tedious paperwork.

The Solution

To automate this task, Swiss Safety Center's automatic plant digitizes gas cylinder retesting (making it completely paperless). A wide range of sensors are used to acquire all the information required, and special software approves the compliance according to several parameters. The core of the machine is a combination of Ultrasonic Testing (UT) and Vision Systems that conduct examinations and quality checks, while the result of the whole process is a pallet of ready-to-use cylinders, with a new engraved conformity mark and a digital certificate.





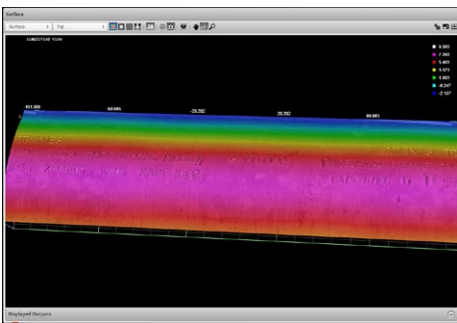
How the System Works

Swiss Safety Center mounted 3 Gocator smart sensors in three different sensible points of the inspection process: the two upstream and downstream Gocators acquire a high resolution 3D surface of the cylinders shoulder during the cylinder rotation at the entrance and at the exit of the line, while the image acquired by the third Gocator sensor (located straight after the UT station), is used to find a suitable free space on the cylinder shoulder to engrave the new conformity mark when all other quality tests have been successfully passed.

The 3D surface images acquired by the 3 Gocator sensors are then, through the GenICam interface, communicated to and analyzed in MVTec Halcon Software. A set of advanced filters is used to rectify the surface curvature and segment the characters that will be, afterwards, interpreted by a Neural Network and a specific Lexicon. In addition, through the Gocator SDK, we were able to synchronize data acquisition and timing, operating mainly with encoder signals and digital I/O triggers.

The Gocator® Advantage

- Generates high-precision 3D scans and accurate measurements
- Robot-compatible for pick-and-place and palletization applications
- Built-in measurement tools make inspection easy (e.g., OCR and Surface Curvature) tools
- Pre-calibrated, out of the box scanning and measurement capability
- Easy integration with existing factory systems



"For each application you can find a Gocator that suits your needs perfectly in terms of FoV and resolution. They are easy to mount, easy to set up, and one Gocator does the job that other sensors would have done with two."

Oliver von Trzebiatowski, Head of Material Technology, Swiss Safety Center

The Result

Previous machines developed for gas cylinder testing were not fully automated. One or more users were constantly required for data entry, small material handling, and merging output data between different testing systems. Therefore, this system achieved a completely automated conformity assessment, where the role of humans is solely to supervise the process and make any decisions that the machine was not able to take. As a result, the line can run 24/7, inspecting and certifying 180 cylinders/hour.

Next Steps

The company is planning to introduce new modules into the current line, as for example the cylinder valve measurement module and the 360° surface analysis against scratches, stains, oxidation.



AMERICAS

LMI Technologies Inc.
Burnaby, BC, Canada

EMEAR

LMI Technologies GmbH
Teltow/Berlin, Germany

ASIA PACIFIC

LMI (Shanghai) Trading Co., Ltd.
Shanghai, China

LMI Technologies has sales offices and distributors worldwide. All contact information is listed at lmi3d.com/contact

