

QUALIS MAKES SMART MOVES WITH 3D LASER SCANNING

One year ago, Qualis – a specialized contract metrology firm in Germany – started off with its CMM-operated laser scanner from Metris. Where tactile measurement falls short on fragile, flexible or complex parts made of plastic, metal or composite, the non-contact laser scanner accurately and efficiently digitizes the complete geometry of parts. The acquired 3D scans help Qualis metrologists assist customers in optimizing product design and verifying serial production quality. Straightforward CMM programming and automated inspection and reporting in Metris Focus software enable them to turn around inspection jobs quickly. Also for tactile inspection jobs, Qualis customers increasingly request laser scanning and associated interactive reporting to gain deeper and more complete insight.

STRETCHING THE LIMITATIONS OF EXISTING CMM INFRASTRUCTURE

Qualis is a growing contract metrology firm located in the Frankfurt area. Founded by metrology specialist Martin Reinhardt, Qualis gradually built a name for itself in the German automotive supplier industry. On customer demand, Qualis metrology engineers perform contract inspection work on tooth wheels, covers, valves, buttons and switches, electronics, turbine blades, and a diversity of other parts. 90% of Qualis metrology activity focuses on non-metal components, such as plastics, composites and

other compound material types. In addition to executing contract metrology work, daughter company Qualis Service maintains and supports metrology equipment of different make.

Driven by a desire to successfully tackle any inspection challenge, Qualis retrofitted one of its CMMs with the Metris LC15 laser scanner. This 3D laser line scanner, specifically designed for highly accurate scanning, inspects a specimen by beaming a 15mm wide laser stripe on the surface of the part being inspected. The built-in camera dynamically captures the projected laser stripe, and scanner electronics generate a continuous stream of 3D measurement point coordinates. Following this approach, the entire surfaces of parts – including features and freeform areas – are digitized in an accurate and efficient fashion. This kind of metrology solutions are very helpful in the inspection of plastic and polymer (coated) parts, which often face different mold and post shrinkage and moisture growth characteristics.

Compared to touch probes that potentially scratch fragile components or press flexible parts, laser scanning is entirely non-contact. Also for structures with low rigidity, such as thin bended bars, the use of laser scanning avoids challenging fixturing and unreliable touch probing. Qualis engineers opted for laser scanning when being asked to investigate a thin component for an open roof system for a major German vehicle type. It concerned a spring-loaded thin bended bar made of metal that forms the core of the air-lifting flap that minimizes noise disturbances when driving with the roof open. At Qualis, engineers simply put the part on a pedestal on the CMM granite, and scan the part to digitize its shape.

LESS EFFORT TO COLLECT MORE DATA IN A SHORTER TIME

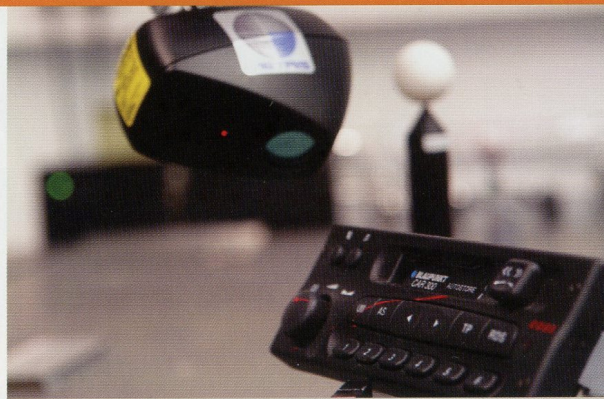
"Defining straightforward scanner movements in Metris Focus Scan only takes us a fraction of the time that we would

METRIS LC15 @ QUALIS

CMM-operated 3D laser scanning verifies the geometry of fragile, flexible or complex parts.

- ✓ Faster inspection through easy CMM programming and automatic inspection and reporting
- ✓ Dense point clouds eliminate anomalies that potentially remain unnoticed through touch probing
- ✓ Graphic inspection reports are interactive and can be accessed using a free downloadable Focus Inspection viewer





Qualis takes advantage of the versatility of laser scanning, as it runs optical inspection on diverse objects



Also for turbine blades, Qualis opts for laser scanning to get the complete picture in record time.

otherwise need to program hundreds of touch points," says Martin Reinhardt, CEO of Qualis. "During inspection, we monitor the 3D surface being scanned build up on the screen in real time. A complete scan consists of a dense cloud of hundred thousands or even millions of accurate surface points that eliminate anomalies that potentially remain unnoticed through touch probing. Tests we performed confirm that the Metris scanner is designed to investigate smaller parts with accuracy levels up to 10 micron.

Focus Inspection offers us the choice to interactively or automatically analyze the data, perform CAD comparison, and generate metrology reports. After reducing point cloud data using filtering technology, point cloud data is converted into a mesh that is aligned with the CAD model. Qualis often applies the 3-2-1 alignment procedure, which consecutively executes space, planar and last zero point alignment. To maximize serial inspection productivity, Focus Automation

allows us to replay the same inspection procedure as many times as needed."

At Qualis, laser scanning is applied to evaluate the quality of prototype samples and pre-production batches. Metris LC15 is additionally used to scan serial-produced parts to indirectly monitor degrading production mold geometry. In cases where customers conclude that prototype parts crafted from original CAD files do not live up to expectations, the decision is sometimes made to immediately implement countermeasures in hardware. Subsequently, Qualis metrologists scan the 3D surfaces of many modified part variants, and use the acquired data to assist the customer in defining optimum geometric settings. The sample part that is selected as the master part is then scanned to accurately reverse engineer the CAD file that will go into pre-production. This procedure, for example, was applied to a key part of new medical equipment of which millions will be produced soon.

DEFINING STRAIGHTFORWARD SCANNER MOVEMENTS IN METRIS FOCUS CAN ONLY TAKES US A FRACTION OF THE TIME THAT WE WOULD OTHERWISE NEED TO PROGRAM HUNDREDS OF TOUCH POINTS."

Sven Lange



Qualis quickly turns around Metris 3D laser scanning assignments using the Metris Focus software suite.

INTERACTIVE REPORTING SUPPORTS WELL-INFORMED DECISIONS

To allow measurement results to be evaluated efficiently, Focus Inspection reports shows the comparison of the 3D scan with the CAD model by using color-coded areas that mark local deviations. "We regularly send Focus inspection reports to customers, who access the file using a free downloadable Focus Inspection viewer," explains Martin Reinhardt. "The interactive report enables customers to evaluate the inspected part from any preferred viewpoint and click locations of interest to consult the underlying metrology data. Customers also request 3D laser scanning and associated reporting as a means to put their touch sensor measurements into perspective. The dazzling number of measurement points provides a higher degree of measurement confidence that forms a solid basis for well-informed quality decision making." www.qualis3d.de