

From Users For Users



Unika / Ans / Denmark

Precision in plastics

ZEISS measuring technology
ensures quality of injection
molded parts



UNIKA
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PEOPLE · PROCESS · PERFECTION

Although Unika in Denmark is a medium-sized company, it has highly specialized knowledge in the production of injection molded plastic parts which is appreciated by customers all over the world. Even competitors buy there because of the unsurpassed quality. This is ensured by ZEISS measuring solutions, including the optical 3D scanning system COMET.

It's four o'clock in the morning. Frank Fynbo turns on the light in the measuring room. It'll take four hours before the sun rises here in Ans, in the middle of Denmark. First a sip of coffee, then the Measuring Lab Manager opens the box that his colleagues from the night shift in the production hall up on Lyngbakkevej Street have put together for him. Included are various plastic parts and a complicated metal mold, an injection mold with which such plastic parts are produced.

While the wife and children of the Fynbo family are still sleeping, Frank is already working with ZEISS COMET, checking the first parts. "I like being here so early," says the 54-year-old, "in the morning it is quieter and I can concentrate better on the measurements."



Verifiable quality is an important unique selling point of Unika injection molded parts.

Precision fanatic: Frank Fynbo is the measuring lab manager at the Danish manufacturer of plastic parts Unika.



The plastic housing of a water pump glows blue under the laser light of the ZEISS COMET 3D scanner.



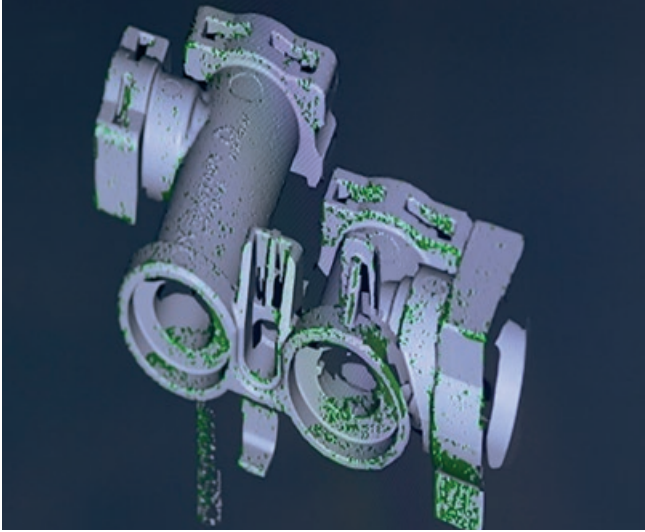
Frank Fynbo at ZEISS COMET. The setup of the 3D scanner and the measurement only take a few minutes.

Precision as a unique selling point

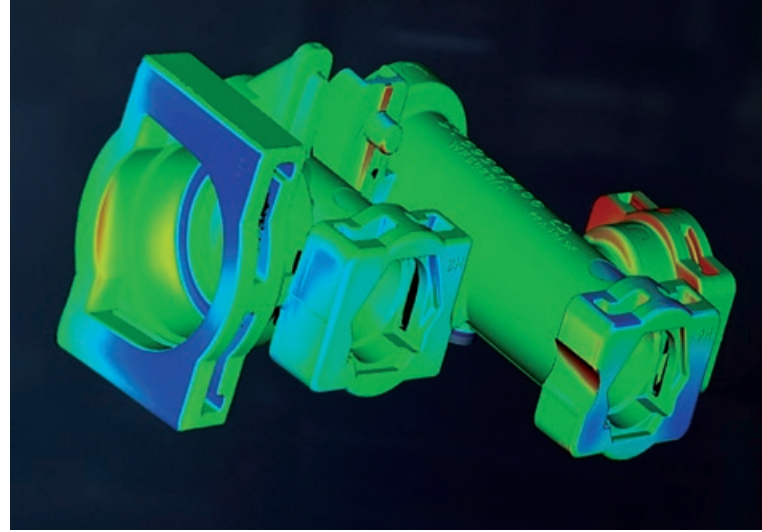
After a few minutes, the first plastic component rests on the turntable and shines in a deep blue violet. The 3D sensor of the ZEISS COMET projects structured light onto the component, its camera captures the light reflections and the software then uses triangulation to determine the position of each point on the surface - three-dimensional and accurate to a few hundredths of a millimeter.

Companies that produce plastic injection molded parts are common. But only a few reach the quality level of Unika. Precision is an important unique selling point; even competitors order here. Grundfos, for example, the world market leader for water pumps in nearby Bjerringbro, manufactures its own injection-molded parts. But for complicated parts, they also like to use the technical know-how of Unika and exchange measurement data, because Grundfos also relies on ZEISS machines for quality assurance.

After a short time, virtual 3D data of a water pump housing appears on the monitor. A few mouse clicks later, the false color comparison is available, which shows where the part deviates from the CAD design data provided by Grundfos. In the red areas the material is too thick; in the blue areas material is missing. Frank Fynbo clicks on some points in the 3D model and the software indicates the exact deviation for these



From ZEISS COMET to the computer: The 3D model is the exact image of the real component.



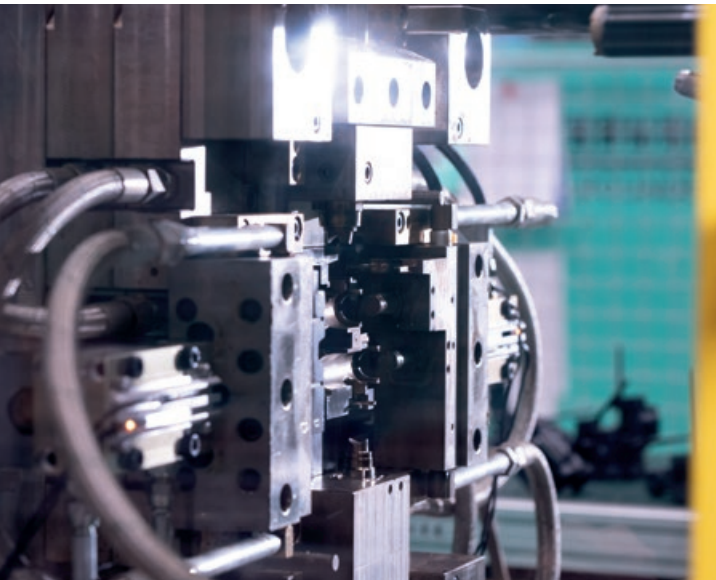
Almost everything is green: ZEISS COMET has found only minor deviations in this water pump housing. In the red areas the material is too thick, in the blue areas there is missing material.

points. The trained toolmaker, who has been working at Unika since 1989, nods satisfied. Everything is within the expected tolerances. Before purchasing ZEISS COMET, Unika had to send the parts to an external service provider for inspection, which was expensive and took much longer.



Frank Fynbo examines the casing of a water pump. Whether all measurements are correct, he can decide however only after the examination with the 3D sensor.





New plastic parts are produced here every minute: The two halves of this injection mold are held together with a force of 80 tons, then the hot plastic shoots in and solidifies. Shortly afterwards, the mold opens and releases the hot part.



After leaving the injection molding machine, the plastic parts cool down on a conveyor belt. The finished injection molded parts are collected in a box and brought to the customer.

Caution when cooling down

The measurement results are not always that positive. In injection molding, thermoplastic material at temperatures of up to 350 degrees Celsius is injected into a two-piece mold at pressures of up to 2000 bar, and the injection mold can be held together by up to 1500 tons in the largest injection molding machines at Unika. Water or oil flows through the mold, which lowers the temperature in a controlled manner until the component solidifies. When it is removed from the

machine after one minute by a robot arm and placed on a conveyor belt, it is still so hot that it cannot be touched. Only after up to 24 hours it does cool down and reaches its final shape. Until then, it can bend or twist, in the worst case until it is unusable. The fact that this is rarely the case at Unika is due to the extensive process knowledge in injection molding as well as Frank Fynbo's meticulousness.

Frank does not rely solely on optical

3D measurement for critical parts, e.g. when series production for a new product begins. In his measuring room he also has a ZEISS CONTURA G2 coordinate measuring machine, which is used for tactile measurements. Sometimes Frank examines plastic parts here, and more frequently the metal injection molding tools that Unika manufactures itself on modern machine tools. Any deviation in the mold would later reflect in the injection molding process and lead to rejects.



Frank Fynbo (right) and injection molding technician Steffen Sejr inspect a plastic part shortly after it has left the injection molding machine.



Unika relies on ZEISS precision: With COMET and CONTURA, injection molding tools and parts can be measured with high precision.

ZEISS machines in tandem

Frank has been working with the ZEISS CONTURA since 2010, when Unika bought the system. His area of responsibility also includes a ZEISS DURAMAX measuring machine purchased in 2014, which is used in the workshop for fast tool control. When the measuring tasks increased, there was no question that the next machine would also be from ZEISS. „Machine and software convinced us“, says Frank, „and our largest customer Grundfos also works exclusively with ZEISS machines“.

Thanks to its optical measuring principle, the ZEISS COMET system perfectly complements the tactile measurements of the ZEISS CONTURA. ZEISS colin3D software for COMET is also compatible with ZEISS CALYPSO, the software for ZEISS tactile machines. The optical measurement data is saved as an STL file and loaded into ZEISS CALYPSO. This offers options for superimposing the optical and tactile measurements and makes more detailed statements about deviations from target and actual values. All data is stored permanently and is available at any time as soon as a customer asks for it.



Frank Fynbo in his "command center": From here, the measuring lab manager at Unika controls the ZEISS measuring instruments.



Frank Fynbo defines the inspection strategy for an injection molding tool that he wants to measure with ZEISS CONTURA.



The ZEISS COMET 3D sensor reliably and precisely detects even small-format components.

Small part, big challenge

ZEISS COMET has been in operation since 2017. The component for which the machine was purchased is hardly larger than a pin head: a plastic pin for the hinge of a spectacle frame. „Because it’s so tiny, I couldn’t measure it on the ZEISS CONTURA coordinate measuring machine,” recalls Fynbo, „so we opted for the ZEISS COMET 3D scanner.” Today, of course, it not only measures pins for spectacle frames, but also a wide range of plastic parts or tools. Four lens sets providing different measuring volumes are available. In a two-day training course at ZEISS, Frank Fynbo

learned how to operate the 3D sensor. „I could start measuring right away, but of course I’m still learning every day.”

The ZEISS COMET also plays an important role in reverse engineering. Sometimes customers come with a part without CAD data, sometimes even just with a model made of wood, and the request, “Build it for us from plastic.” Where design data is missing, the ZEISS COMET system can be used to generate it subsequently. This is partly automatic; the fine-tuning to the finished CAD file is done by Unika’s design engineers. The rest of the process is then done

iteratively. The tool is manufactured from the data, which is first measured with the ZEISS COMET and compared to the CAD data. If everything is in order, the tool is mounted in the injection molding machine and some parts are made of plastic. These parts are checked again with ZEISS COMET. If there are deviations, the tool is reworked and measured with higher precision using ZEISS CONTURA. Then the tool is mounted again and the process starts all over again. Until everything is right in the end.



Precise injection molding tools are required for precise plastic parts. A CONTURA coordinate measuring machine from ZEISS ensures their quality at Unika.



Frank Fynbo examines the seat shell of a chair with a 3D scan of ZEISS COMET. The plastic part was produced using 3D printing.

Frank Fynbo (left) and Erik Matthiesen discuss the strategy for quality inspection of a new component. Matthiesen is founder of CamCon IT and dealer for ZEISS COMET in Denmark.

Frank Fynbo is currently discussing the acquisition of another ZEISS CONTURA with Bo Johansen, the CEO and Steen Johansen the Chairman of the Board of Directors, both sons of the founder of Unika. This will be located in the upper hall where the injection molded parts are produced. There, work is carried out around the clock in three shifts, and the employees can then continuously check the quality. "And I could sleep longer in the morning," smiles Frank.



Brief Profile

Unika

The company was founded in 1971 by Ejvind Johansen near the current location in Ans. In 1979, Bo Johansen, his son and a trained toolmaker, joined the company, which he has managed since 1997 after his father retired. His brother Steen Johansen, also a toolmaker, joined the company in 1984 as Chairman of the Board of Directors.

The company started with the production of machine parts. In the 1980s, plastic parts were added. Today the company has over 100 employees, 40 injection molding machines and 27 machines for the production of injection molds and spare parts for other plastic processing companies.

The smallest part manufactured by Unika is a two millimeter pin for spectacle hinges, the largest, a blade for machine fans, is 900 millimeters long.

ZEISS IMT - Application + Success Story

System	ZEISS COMET
Customer	Unika, www.unika.dk
Industry	Plastics - Injection Molding
Created	February 2019

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