



**iNOEX**  
INSPIRE BEYOND MEASUREMENT

INNOVATIVE WALL THICKNESS MEASUREMENT FOR BLOW MOLDING

# QUALITY ASSURANCE MADE SIMPLE



**WARP** portable  
at KAUTEX Maschinenbau

INSPIRE BEYOND MEASUREMENT

# **Wall thickness analysis of hydrogen tank liners** is essential.

The WARP portable allows us to **save more than 80% of the time** compared to conventional measuring instruments.

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**Andreas Menzlin**

Head of Technical Center KAUTEX Maschinenbau

**For Andreas Menzlin, head of the Technical Center at KAUTEX Maschinenbau, the significant time savings in standard quality control means increased productivity for his employees. Spot checks of critical areas of a liner take only a few seconds.**

Achieving consistent wall thickness distribution throughout the product is one of the key challenges in the blow molding market. This ensures that the quality of the product withstands tests such as the burst pressure test. Minimizing the use of resources and the resulting shorter cooling times contribute to this, reducing cycle time and increasing productivity.

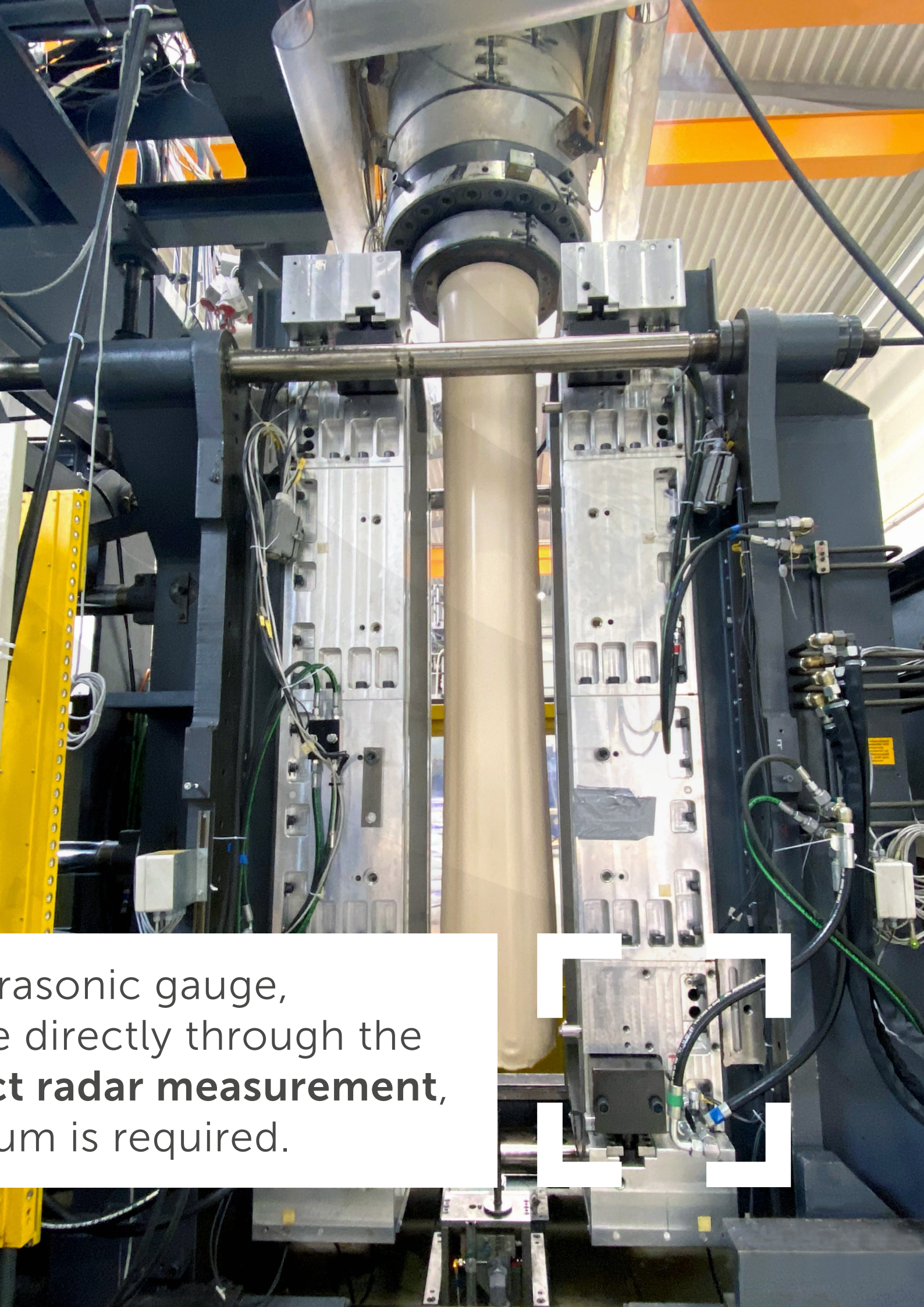
Ensuring consistent product quality is further complicated by the PCR material and requires continuous production monitoring by qualified operators who can adjust parameters as needed. Rejects due to insufficient strength, aesthetics, or sources of defects such as leaks are avoided and reduced to a minimum.

In the past, KAUTEX's quality management system used a variety of measurement techniques, all of which were time-consuming and required large quantities. In the past, calipers were used, which required the destruction of the product. The use of the Hall effect with a magnetic ball as the coupling medium, as well as the use of an ultrasonic gauge, adds time.

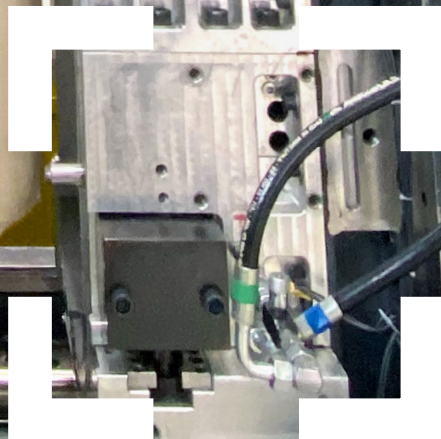
Especially in the quality control of heavy, large-volume products that require a large number of measurement points, the handling of the measurement is of paramount importance.

Compared to our ultrasonic gauge, we can now measure wall thickness in air using **non-contact** WARP, as no coupling medium



A large industrial machine, likely a testing rig, featuring a central vertical shaft. The shaft is surrounded by a complex assembly of components, including a horizontal rod passing through it. Various sensors, cables, and mechanical parts are visible, suggesting a sophisticated measurement system. The machine is housed in a dark frame with some yellow safety railings on the left. The background shows an industrial setting with orange structural elements.

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# What challenges do you face in

At the beginning of every day, Andreas Menzlin asks himself the question: "How can I be sure that the first product we make will have the same geometry and quality as the 100th product of the day?" KAUTEX was looking for a technology that could help minimize this uncertainty, in addition to weighing the products.

Changing batches of PCR material presents every blow molder with the problem of finding the optimum geometry with the lowest possible wall thickness variations and tolerances.

There is no extra step to bring the products to our laboratory or store them temporarily, **we can measure directly on the machine.**



Andreas Menzlin is already familiar with iNOEX's gravimetric systems for extrusion technology. He describes why the decision was made to use iNOEX measurement technology: "We chose the radar-based WARP portable because it is fast and easy to use, we get the measurements right after extrusion. We don't have to wait for the blow-molded product to cool down and we can change parameters immediately if necessary".

The WARP portable is a mobile, intuitive handheld instrument for precise wall thickness measurement. It uses a radar-based principle to measure the wall thickness accurately and reliably.

This advanced technology provides fast, accurate measurement and requires only one calibration for each material.



# *your daily production?*

## **About KAUTEX Maschinenbau**

KAUTEX Maschinenbau System GmbH is a global company. Driven by a passion for plastics, it is one of the world's leading manufacturers of extrusion blow molding machines.

KAUTEX's core values are focused innovation, resilience, and dedication to the projects and products of its customers and partners. KAUTEX's vision to be a leader in transforming and creating value in extrusion blow molding technology is supported by an extensive product portfolio covering all major applications in the packaging, composites, and automotive industries.

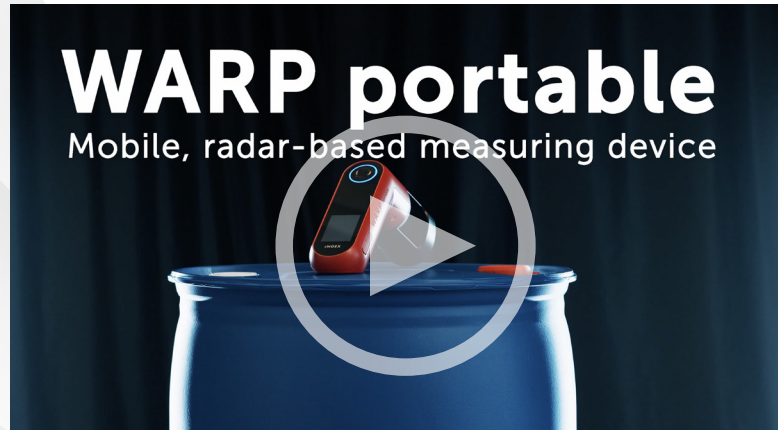


The integrated centering aid ensures that the ideal measuring distance is always maintained. The measurement is recorded with an individual time stamp and the corresponding angular position is stored up to 500 times. The WARP portable provides a non-contact, non-destructive alternative to previous measurement technologies that were either destructive or required additional effort.

After a year of using the WARP portable, the KAUTEX team has seen significant efficiency improvements. "In our day-to-day operations, the most common products we measure are Type IV hydrogen liners, drums, and our specialized large packaging applications. Compared to previous technologies such as calipers, ultrasonic devices or Hall effect gauges, the WARP portable offers significant time savings and increased safety for employees," says Andreas Menzlin.

## **WARP portable**

Mobile, radar-based measuring device



The ability to measure the wall thickness of hot products and make immediate adjustments to the WDS® (Wall-Thickness-Control) has optimized production processes at KAUTEX. The time savings of more than 80% in wall thickness measurement is not only due to the overall speed of the measurement principle but also to the documentation of the measurement results.

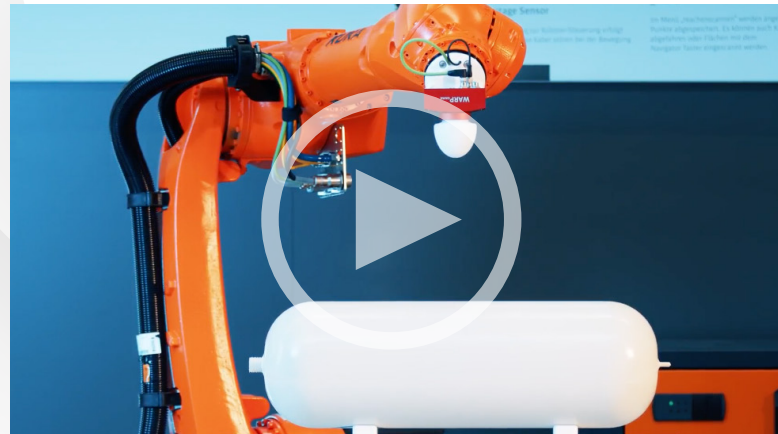




## Two measuring devices, two applications.

In addition to the WARP portable, the self-contained WARP GAUGE sensor, combined with simple kinematics, automatically measures blow-molded parts after de-molding. The sensor is guided perpendicular to the part surface and generates a grid of measuring points depending on the frequency and speed of the movement.

The measuring points measure the distance, wall thickness, and, if applicable, the diameter of the component. In combination with the sensor position, the contour of the part can also be recorded, providing information on the ovality of the part.



In addition to measuring demolded parts, the WARP GAUGE sensor can be integrated directly into the blow molding system to provide measurement data during the extrusion of continuously produced melt hoses.

The small size of the WARP GAUGE allows flexible integration into the line depending on process control and part geometry.

The key is to find the point where the data generated is as meaningful as possible and the number of measurements is sufficient to draw conclusions about the process and actively implement process control.



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