

ZEISS Industrial Quality Solutions

Precise

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INNOVATIONS THAT
DRIVE **EFFICIENCY**

**Empowering
the Future**

Quality solutions for battery
safety and performance

**AI-Driven
Inspection**

The future of
quality control

**Giant
Precision**

Quality assurance for
large-scale castings

ZEISS

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#measuringhero

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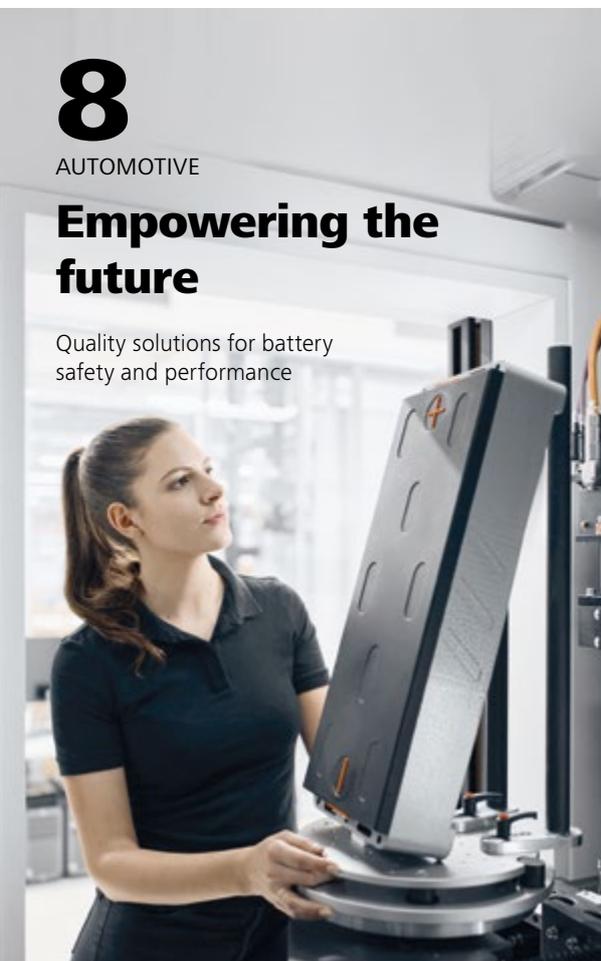


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DECARBONIZATION



GLOBALIZATION

INNOVATIONS THAT DRIVE EFFICIENCY

Navigating the future

In a world where the pace of change is relentless, industries face unprecedented challenges and opportunities. This edition of Precise delves into the main transformative forces shaping the future: decarbonization, digitalization, and globalization. These interconnected megatrends are not just buzzwords, they represent critical pathways toward a sustainable and innovative future. In light of this new imperative, manufacturing companies must be more efficient, faster, and combine new technologies with existing solutions to be successful.

DIGITALIZATION



“At ZEISS, we believe in opportunity. We believe in technology and at ZEISS, we believe in global collaboration.”

Dr. Marc Wawerla
CEO ZEISS Industrial Quality Solutions

Decarbonization: A path to sustainable growth

Despite current developments, climate change remains a key challenge and an opportunity. Significant investments are being made into products like electric power trains, electrolyzers, turbines, and heat pumps. Metrology is essential for improving the efficiency of these products and their production processes. At ZEISS, we are enabling our customers to develop technologies that minimize environmental impact and enhance operational efficiency.

Globalization: Navigating a complex landscape

Considering ongoing global trade tensions, many companies are reorganizing their supply chains, focusing on new markets, and relocating manufacturing facilities. This shift presents an opportunity for modernization and necessitates significant investments in automation within existing factories. This transformation can be seen as the next wave of globalization. Our global presence with over 60 ZEISS Quality Excellence Centers around the world and our expertise allow us to support our customers wherever they are.

Digitalization: Transforming processes for the future

Digitalization is revolutionizing the way businesses operate, offering unprecedented opportunities for efficiency. However, the journey towards a fully digital enterprise is fraught with challenges, including data management, connectivity, and the integration of new technologies. What is always needed is the right data to draw the right conclusions. Our quality data software solutions can serve as a vital source of data on the shop floor. Already today, ZEISS Quality Software is powered by AI and is constantly being improved to include new digital solutions that deliver the highest quality standards across production sites around the world to streamline processes and enhance productivity.

What is needed to overcome these challenges? At ZEISS, we believe that innovation and strong partnerships are required to shape the future together and to learn from each other. By fostering collaboration and sharing knowledge, we aim to empower our customers, partners, and friends to drive efficiency and sustainability in their operations and create immediate business impact. Join us on this journey as we explore the innovations that drive efficiency. This issue of *Precise* presents insights and stories of quality experts leading the future with innovations across different industries. Together, we are not just meeting the demands of today but setting the standards for tomorrow.



Shaping the Future of Metrology

Join the community and never miss an event

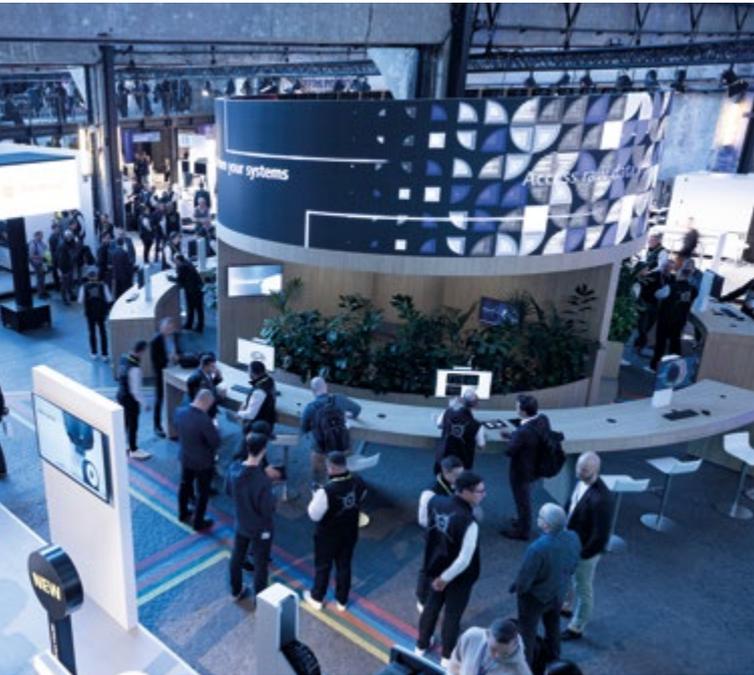


In October 2024, we proudly hosted the first-of-its-kind ZEISS Quality Innovation Summit in Berlin. To foster collaboration and innovation in metrology, this global event brought together industry leaders, experts, and innovators to exchange ideas and explore the future of quality management. It is through such initiatives that we drive the exchange of knowledge and inspire breakthroughs that will shape the industry.

With 2000 participants from 48 countries, more than 50 distinguished speakers, and an extensive exhibition, the Summit served as a key meeting point for quality experts. It provided a platform for companies like Siemens, Mercedes-Benz, Foxconn, and GE Appliances to discuss key trends such as AI and automation as well as their impact on quality assurance. The discussions highlighted how manufacturing is evolving towards smart, sustainable, and connected processes – and how metrology plays a crucial role in this transformation.

Beyond technology insights, the event provided numerous opportunities for networking. Decision-makers and industry professionals connected to exchange ideas and form strategic partnerships – laying the foundation for future collaboration.

The overwhelmingly positive feedback from participants underscores the importance of the summit. Those looking to shape the future of metrology should not miss the next event!



"This event highlighted the growing importance of quality assurance in globally interconnected manufacturing processes, driven by trends like decarbonization, AI, and automation. Our unique portfolio of hardware and software provides leading solutions to address these challenges."

Dr. Marc Wawerla, CEO ZEISS Industrial Quality Solutions

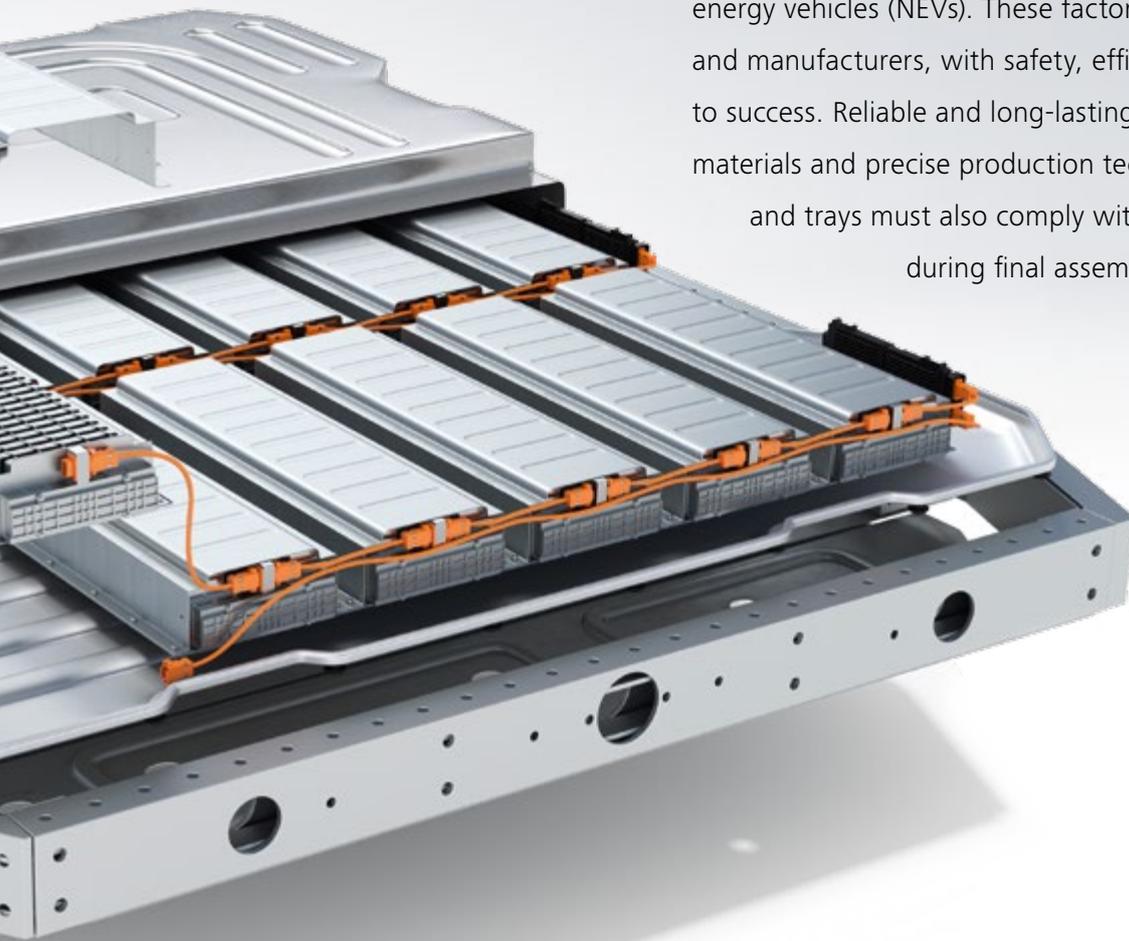


Watch the recordings

Empowering the Future

Quality solutions for battery safety and performance

Batteries are key to range, performance, and longevity in new energy vehicles (NEVs). These factors are decisive for NEV owners and manufacturers, with safety, efficiency, and cost also crucial to success. Reliable and long-lasting batteries require top-class materials and precise production techniques. Cells, modules, and trays must also comply with very tight tolerances during final assembly.



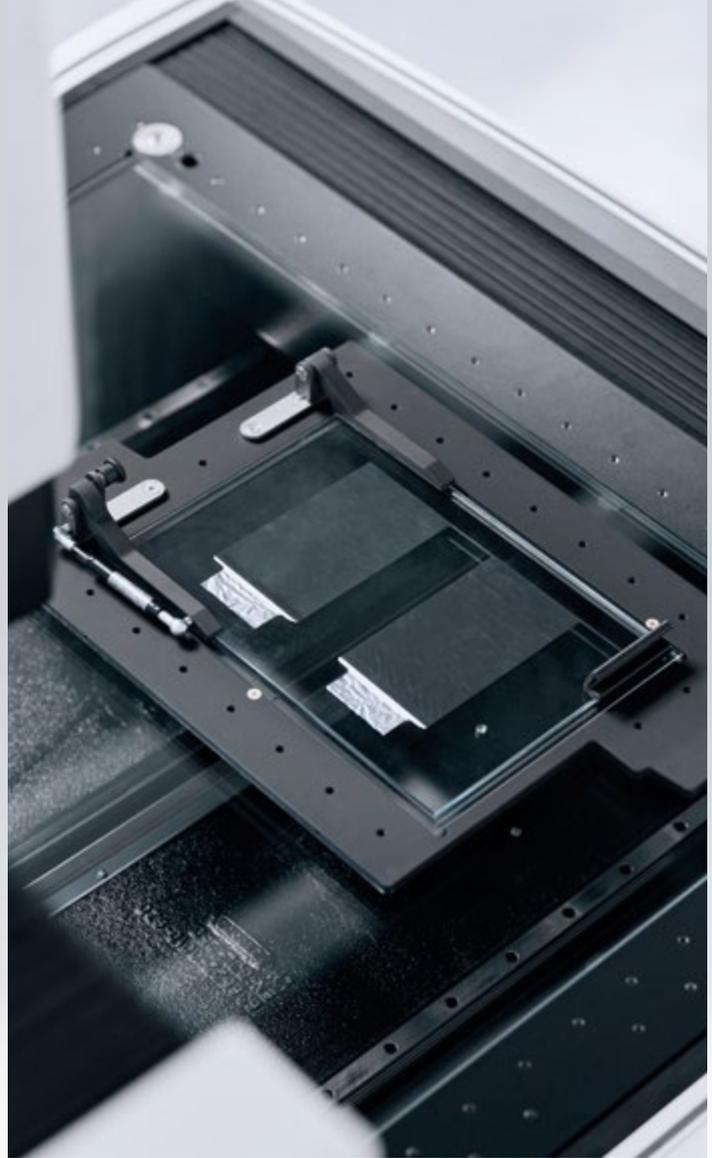
Battery materials in focus

Among all elements in a NEV, the battery system significantly impacts the driving experience. Battery performance is highly influenced by raw materials, with the development of materials and structures playing a key role. Challenges include developing new active materials, ensuring a uniform and consistent supply thereof, maintaining proper calendaring pressure, and observing microscopic changes caused by aging.

In particular, the choice of cathode, anode, and separator materials plays a decisive part, as they substantially impact the capacity, charging behavior, and service life of the battery. In addition, cell performance depends heavily on the material microstructure, the chemical composition of the particles, and possible impurities. By using the ZEISS VersaXRM 730, relevant material properties crucial for understanding the energy density of the cells can be precisely determined, leading to a significant improvement in battery performance. In addition, the patented correlative light and scanning electron microscope ZEISS EVO enables efficient correlation analysis, which is essential for optimizing material formulations.



With industrial microscopy, computed tomography and coordinate measuring machines, ZEISS supports enhanced battery performance and safety.



Burr inspection and technical cleanliness

The geometry and composition of electrodes inside battery cells significantly influence safety and efficiency. To prevent safety issues and meet strict quality standards, the cutter blade used in the electrode-cutting process must be inspected and replaced on time. Since there is a high risk of particle contamination that can affect battery lifetime and quality, it is essential to detect this and identify the root cause via technical cleanliness with ZEISS Correlative Particle Analysis.

ZEISS VoluMax 9 titan

Reliable CT inspections of multi-material assemblies

ZEISS VoluMax 9 titan enables non-destructive testing of battery modules with high penetration capability, further improving quality assurance in battery production. By eliminating beam hardening artifacts, it ensures higher-quality and faster scans featuring improved detectability of anomaly. With ZEISS INSPECT X-Ray, users perform tasks ranging from scan calibration to report generation in one single software.



[Learn more about ZEISS VoluMax 9 titan](#)



Battery cell production and assembly

Final inspection of the complete battery cells is particularly demanding, as the individual cells in such modules pose several safety risks. All three cell types—cylindrical, prismatic, and pouch—require fast high-resolution testing cycles. Each type also faces unique challenges in terms of manufacturability, performance, durability, safety, quality testing, and failure analysis.

A central concern when inspecting battery cells is the detection of metal particles, delamination, winding, and weldings. This is where the X-ray solution ZEISS METROTOM 800 320 kV comes into play, enabling precise defect inspection during cell assembly. When assembling battery cells, it is essential to detect metal contamination that can occur during cell production to eliminate the risk of short circuits. In addition, safety risks and rejects must be

minimized, which requires a thorough inspection of electrode alignment and position as well as the detection of internal defects. The high cell production speeds also demand fast and high-resolution inspection cycles.

The battery size and density necessitate high-performance systems to perform a final quality inspection. This inspection involves checking the contamination and overhang dimensions. For these purposes, ZEISS Automated Defect Detection (ZADD) and the powerful ZEISS VoluMax 9 titan can be used.



[Download whitepaper about quality assurance for batteries](#)



NEW

Battery tray inspections

The battery tray houses all battery cells, connectors, control units, and packs containing numerous battery modules. As the battery tray is fully integrated into the vehicle body, its structure and integrity must be inspected at various stages during production to ensure quality and safety. Controlling the milling and drilling process in battery tray production is crucial for the quality and safety of the end products. One of the most challenging issues is the thermal expansion of the battery pack during charging and driving, which can lead to twisting and bending of the battery tray. To ensure that all critical functional characteristics are met, these must be measured randomly or through a comprehensive automatic final inspection.

The evaluation of the surface of the battery tray directly influences the dimensional accuracy of the entire vehicle body. Proper positioning of flexible cables and connectors is essential for correctly installing the battery tray and cover. For safe operation, the battery modules must be correctly inserted into the battery tray. With ZEISS CALENO horizontal arm CMM, multi-sensor measurements of many features can be carried out in fast test cycles. Non-contact optical laser scanners quickly extract feature data, while tactile probes capture optically inaccessible characteristics like undercuts. ZEISS ScanBox allows for fast, automated, complete 3D inspection of the battery tray, generating a complete geometric digital twin in just a few minutes. The ZEISS INSPECT software supports time-saving digital assembly, including all connection components and their alignment.

ZEISS VersaXRM™ 730

High-resolution, non-destructive 3D X-ray microscopy

ZEISS VersaXRM™ 730 offers submicron imaging with 450-500 nm resolution across 30-160 kV with the exclusive 40x-Prime objective. Its ZEN navx™ automated user guidance and control system, and AI-driven DeepRecon Pro streamline workflows, optimize image quality, and speed up throughput. Thanks to modern imaging techniques such as High-Aspect Ratio Tomography (HART), the scanning speed and accuracy of large, flat, or irregular samples can be improved.

[Learn more about ZEISS VersaXRM™ 730](#)



Fueling the Future

Hydrogen's role in gas turbine technology



As the global energy landscape shifts toward sustainable and low-carbon solutions, hydrogen (H₂) is emerging as a promising fuel source for gas turbines. The transition to hydrogen not only aligns with climate goals, but also serves as a versatile energy solution that can complement renewable energy sources, providing power during dark doldrums or easing peak loads in the grid. However, to realize the full potential of hydrogen, gas turbines must be prepared to use H₂ instead of fossil fuels.



Key challenges in achieving H₂ readiness

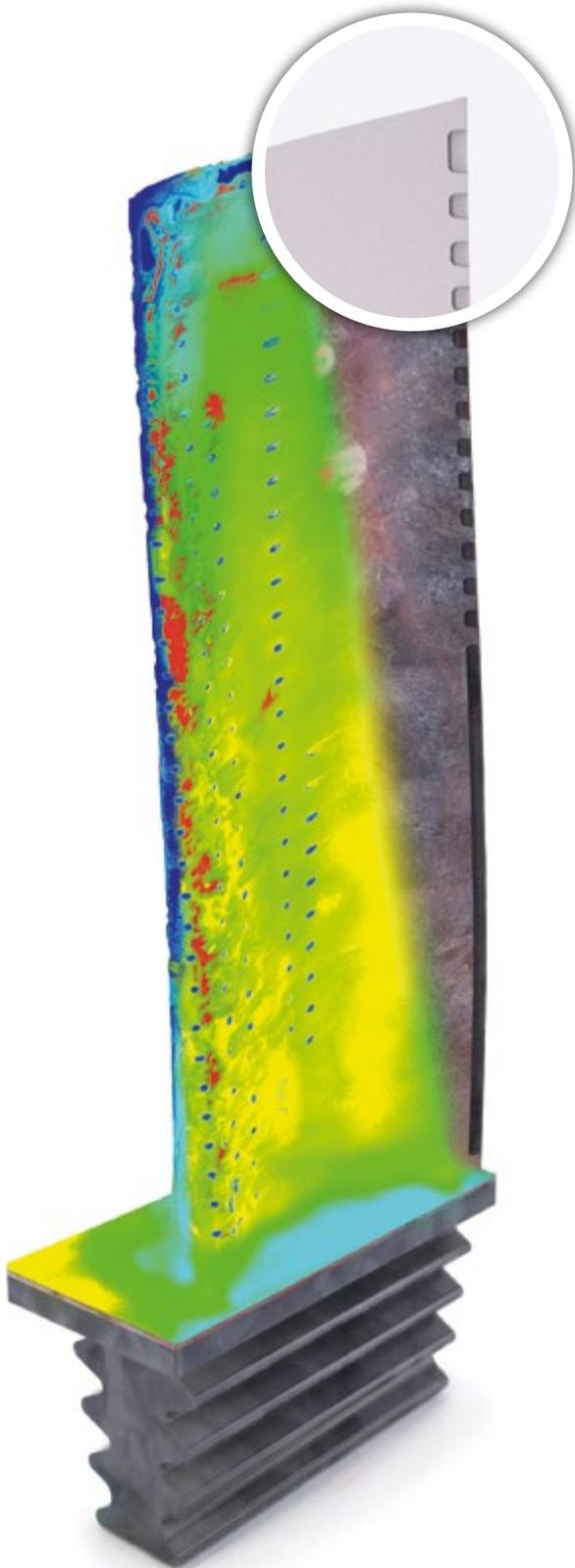
H₂ compatibility is key to ensuring that gas turbines can operate safely and efficiently on hydrogen. This involves overcoming technical challenges such as high combustion temperatures, advanced materials, and special coatings. Given the unique combustion characteristics of hydrogen, modifications to turbine design and processes are essential to optimize the performance and reliability of future hydrogen-powered plants.

One of the biggest challenges in converting gas turbines to hydrogen as a fuel is the high temperatures generated during combustion. Hydrogen generates higher temperatures during combustion than natural gas, which leads to increased thermal stress on the turbine components.

Modern materials must therefore be used that can withstand these high temperatures without compromising structural integrity.

Blades and vanes: Critical components for efficiency

The blades and vanes of gas turbines are crucial for efficient energy conversion and must be designed to handle the unique challenges posed by hydrogen combustion. Manufacturing and assembling these components requires precise inspection techniques, such as geometric dimensioning and tolerancing (GD&T), to maintain tight tolerances. Advanced materials, such as high-temperature alloys and ceramics, are essential for ensuring durability and performance under extreme conditions.



During MRO, IGT blades are inspected and recoated for future service.



Thermal barrier coatings:

A game changer for performance and longevity

Special coatings protect blades and vanes from oxidation and wear, particularly in high-temperature environments. Thermal barrier coatings (TBCs) are especially important in the context of H₂ operation. TBCs are applied to the surfaces of turbine components to thermally insulate them, allowing them to operate at higher temperatures without experiencing thermal fatigue or degradation. This is why quality assurance is particularly important here.

The role of ZEISS Solutions in quality assurance

The implementation of innovative and reliable production methods and maintenance, repair, and overhaul (MRO) processes for H₂-compatible turbine components is of the utmost importance. End-to-end quality assurance processes play a vital role. They ensure the long-term success and reliability of these technologies. High-precision data for complex shapes and internal structures is essential for maintaining tight tolerances, especially in critical areas such as cooling channels and combustion zones. ZEISS offers advanced measurement technologies – such as ZEISS ScanBox and ATOS 5 for Airfoils, ZEISS PRISMO and ZEISS Microscopy Solutions – to ensure the highest levels of component quality.

ZEISS Software: Early analysis for reliability

The fast, accurate, and reliable measurement systems and their powerful control and analysis software solutions like ZEISS INSPECT and ZEISS CALYPSO can identify potential quality problems early in the production process. This minimizes the risk of failure during operation of the gas turbine and increases the service life of its components. By ensuring the quality standards of each individual component, ZEISS solutions make an important contribution to the reliability and overall efficiency of hydrogen-powered gas turbines.

Doncasters

Global leader in turbine blade manufacturing

Founded in 1778 by Daniel Doncaster in Sheffield, UK, Doncasters has evolved from a tool foundry into a leading global supplier of industrial gas turbines and aerospace applications.

Quality, reliability, and safety are critical in the production of turbine blades as even small defects can lead to failure. For over 14 years, Doncasters in Bochum, Germany, has employed optical measurement technology to capture complex blade geometries, such as those used in industrial gas turbines. The company uses two ATOS 5 sensors for 3D data acquisition, one manual for verifying the wax models and a second in a ZEISS ScanBox for final inspection before shipping. Dr. Jens Vrenegor, Head of 3D Metrology, explains, "With the ATOS 3D scanners, we can accelerate measurement times by a factor of two to three while completely scanning critical products."

Committed to innovation, Doncasters is increasingly digitizing processes and using optical 3D metrology to streamline operations, minimize waste, and ensure quality turbine blades.



Watch the full story

The World of Metal Products

The metal products manufacturing industry plays a crucial role in modern manufacturing and engineering, serving as the backbone for various sectors, including automotive, aerospace, medical, and machinery. Metal parts are essential for the functionality and durability of countless products, ranging from tiny precision parts to large structural elements.

In safety-critical products, even the smallest defect can lead to catastrophic failures. That's why comprehensive quality control is implemented throughout the entire manufacturing process, with a focus on core production steps.

As one example, quality is essential at every manufacturing step of a casting part, including molding, machining, and assembly processes: Beginning with software solutions for simulation validation, followed by raw cast inspection using X-ray and microscopy technologies. The process continues with production control via optical 3D scanners during CNC machining and concludes with finished part inspection using coordinate measuring machines.

As technology progresses, the techniques for producing and inspecting casting parts are continually evolving. As the trusted partner of choice, ZEISS is enabling and driving the quality, productivity, and transformation of metal manufacturing companies.

When manufacturing metal products, every step matters – from the simulation to the final touch of mechanical processing.

[Learn more about quality assurance for metal products](#)



NEW

Breyden

Sustainable Production of Brake Discs

Committed to resource efficiency and recycling

In manufacturing, environmental sustainability is increasingly important. As the industry evolves, individual castings like brake discs are coming under the spotlight for their environmental impact due to energy-intensive production processes. Breyden addresses this issue by using recycled materials in its casting process, which reduces the consumption of raw materials and lowers energy usage, fostering a more sustainable production.

European market leader in car brake discs

The automotive supplier annually produces 15 million brake discs for passenger cars. For manufacturing, Breyden uses both industrial scrap and recycled materials from its own production, thus offering a safety-related and sustainably produced product. The German company committed itself to the goals of sustainability and resource efficiency. Each brake disc manufactured in the plant is 100% recyclable.

Less scrap – more quality

The automated quality assurance is conducted with a ZEISS ScanBox during production. If it detects deviations, it transmits the generated measuring data to production in real time to allow for adjusting process parameters. Marcel Nickel, Optical Metrology Specialist at Breyden, is very pleased with the system: “[...] the inspection during production shows us that our process is stable and that we generate almost no scrap.”



ZEISS ScanBox 4105 RC

Automated loading and measurement of parts

ZEISS ScanBox 4105 RC is an optical 3D measuring machine with a motorized sliding door. Parts up to 500 mm in size can be loaded into the ZEISS ScanBox 4105 RC with a robot or an individually configured feeding system and placed on the rotation table module. The elimination of manual individual placement significantly reduces the time required and thus ensures a higher throughput in quality assurance. The autonomous operation increases machine utilization, speeds up measurement cycle times, and allows personnel to be deployed more efficiently.

[Learn more about ZEISS ScanBox 4105 RC](#)



Ensuring Quality in AI Data Centers

Tools for managing growing complexity throughout production

The race to integrate AI and machine learning into data centers is moving at lightning speed. The next technological revolution is already underway – companies must adapt now.



Advanced technology in AI data centers

AI data centers are fundamentally different in structure compared to traditional hosting facilities: High-speed switching is provided by the core switch, with transmission between switch and device handled by the optical module. Faster transmission between devices is ensured through high-speed backplane connectors. And the high power requirement of AI servers is met by multiphase power supplies, for which multilayer ferrite chip beads are an ideal inductor. To increase efficiency, high-density racks boost the power density and the cold plate transfers absorbed waste heat to the liquid cooling system.

Deep learning, simulations and diagnostics, IoT, virtual assistants, augmented reality: These are just a few examples of AI applications, with the list continuously expanding. As demand for digital infrastructure surges, the complexity of building data centers increases, especially when it comes to ensuring quality. To keep pace, companies need the right tools and strategies to navigate these challenges effectively.

Key challenges

The main challenge in quality assurance for AI data centers lies in ensuring seamless, high-speed data communication without interruptions, which is crucial for cloud services that rely on real-time processing. Any delay or disruption can significantly impact performance and reliability. Consequently, high-performance hardware components are necessary, such as advanced networking equipment, precision-engineered processors, and GPUs, as well as reliable power and cooling systems. Manufacturers need new inspection routines, in part with completely new measuring devices, to be able to check these sophisticated parts.

But that's not all. The increasing complexity of AI systems also demands higher quality standards for the components used. Parts must meet stringent specifications to ensure optimal performance and prevent system failures. In other words: While manufacturing tolerances are getting smaller, testing processes are being expanded and require even better documentation.

ZEISS Quality Innovations



ZEISS SPECTRUM family
**Unmatched
performance
and flexibility
in its class**



ZEISS SPECTRUM family offers unmatched performance and flexibility for a wide range of applications. Experience advanced technology and efficient processes, along with optional active scanning for precise measurements with ZEISS SPECTRUM verity. In addition to reliable tactile measurement, ZEISS SPECTRUM CMMs enable optical scanning with the new laser scanner ZEISS LineScan One. For flexible parts and small features, the ZEISS SoftTouch Mode ensures faster measurements and superior precision.

[Learn more about
ZEISS SPECTRUM family](#)

Quanta Computer Forerunner in Electronics

Quanta Computer, a leading electronics manufacturer based in Taiwan, focuses on the production of notebook computers and servers. Over its 36-year history, the company has undergone significant transformations in information technology, evolving from mobile computing in 1998 to generative AI computing in 2023. To maintain the highest standards of quality assurance, Quanta Computer has adopted cutting-edge measurement practices.

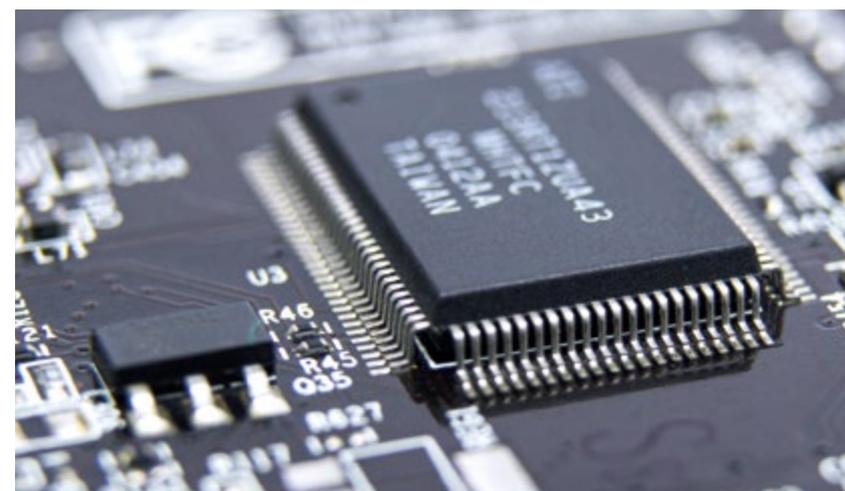
ADAS cold plate measurement

ADAS (advanced driver assistance systems) are high-performance electronic systems in vehicles that use sensors to enhance driving safety and comfort by alerting drivers to potential hazards. They have a specially designed cold plate, which is a thermal management component that dissipates heat from the ADAS, ensuring their reliability and optimal operation. The ADAS cold plate is an aluminum die-cast component that undergoes CNC machining, requiring precise inspection of several critical quality factors with a minimal tolerance of $\pm 0.01\text{mm}$. Quanta value chain players use the CMM ZEISS CONTURA for this task – a system that combines optical and tactile measuring capabilities. The company even passed along this quality

standard to their tier suppliers: Quanta only accepts their products when they use the same measuring system, enhancing efficiency and quality control throughout production.

Porosity and void measurement on cold plates

Quanta has another critical concern regarding the cold plate: the presence of liquid coolant within its cavity. Any surface porosity or internal voids could lead to leakage, compromising the overall system's integrity. The challenge involves assessing various products under different conditions – specifically, to determine whether voids were interconnected, closely spaced, or isolated. To ensure the quality, Quanta value chain players are using ZEISS METROTOM series to do these inspections.



Ensuring flawless AI server PCBs

For the quality inspection of high-density printed circuit boards (PCBs) assembled with over 30 to 45 layers, Quanta goes beyond standard procedures by conducting inspections inside the PCBA drill holes with the X-ray microscope ZEISS Xradia 515 Versa. This extra step is critical, as the motherboard houses chips and other essential electronic components, where even minor defects can lead to quality issues, increased material costs, and delivery delays.

ZEISS Quality Innovations



ZEISS Smartzoom 100

A new simple digital microscope

The ZEISS Smartzoom 100 digital microscope is a compact solution for optical inspection. It is designed for inspecting manageable components and samples at low to medium magnification. By replacing the eyepieces with a monitor, it allows a seamless collaboration with multiple users. The 4K/60FPS camera provides real-time visualization without any delay, which is a huge advantage in many applications. Benefit from a 14.5-inch working distance, integrated vibration reduction, automatic height adjustment, and magnetic lenses. Adjustable lighting and a high-resolution display enhance adaptability for various inspection needs. The software includes simple apps such as the measurement app, and features an open API, making Smartzoom 100 a complete solution for digital optical inspections.

[Learn more about ZEISS Smartzoom 100](#)

BENTELER

Automated Metrology Solutions for Car Body Manufacturing

Quality assurance & real-time analyses across sites

The automotive supplier BENTELER manufactures parts and modules for chassis, car bodies, engine, and exhaust systems as well as e-mobility solutions, which are all subjected to strict safety inspections on a daily basis. "A B-pillar must last in the event of a crash. For this reason, we never compromise on quality," Eduard Reuswich, Continuous Improvement Manager, explains.

For quality assurance, the company relies on optical 3D metrology by ZEISS. At their headquarters in Paderborn, Germany, parts are first digitized using a ZEISS ScanBox optical measuring machine and then analyzed with the inspection software ZEISS INSPECT. Plans for multi-site monitoring include implementing ZEISS ScanBox systems at additional locations, with inspection plans rolled out centrally across sites. The ZEISS PiWeb reporting software enables real-time analysis of global measurement data.

Humans and machines improve efficiency and safety

To ensure a smooth production process, the automotive supplier relies on automated processes. Since introducing their first robot in 1975, their fleet of robots has now grown to 450, while 800 employees are in charge of operating the forming machines. The smart cross-linkage of humans and machines is decisive for long-term success. Another key to success is product quality. To ensure quality at an early stage, the headquarters operate three ZEISS ScanBox systems.

Inspecting parts with the optical measuring machine makes it possible to quickly identify deviations and initiate the relevant corrective actions. The precise sensors measure complete surfaces, including hole patterns and trimmings, within a few minutes. The results are evaluated with the ZEISS INSPECT software, comparing full-field deviations between actual data and the CAD model.

Effective quality assurance worldwide

Multi-site quality assurance is a defining characteristic of BENTELER: Creating prototypes, fixtures, and programs in Paderborn and then training employees locally in optical measuring systems with the respective parts significantly

improves the implementation at other sites. The plug-and-play systems can be used at other sites without any major setup efforts – for example, at the production site in Kariega, South Africa. The plant recently received a ZEISS ScanBox to inspect structural components. “We programmed everything here and then shipped the system including the components over there. All project managers and quality assurance employees love it,” Sebastian Kuhlenkamp, Global Metrology Expert, explains. Standardized reporting with ZEISS PiWeb is another advantage. Thanks to the software, measuring results from other plants can be directly linked to decisions at the Paderborn site. This way, Michael Lindenblatt’s team is able to efficiently track production quality worldwide. Employees at other production sites also benefit from the software: “The provision of live data helps them monitor the quality of their products, take immediate action, and be fully informed at all times.”

ZEISS ScanBox is the established standard

In recent years, BENTELER has continually developed its focus on optical 3D metrology. While ZEISS ScanBox has been used mainly for measuring simple sheet metal parts in the past, the automotive supplier now also measures complex parts with the optical measuring machine. Lindenblatt is very satisfied with this development: “We measure a lot more often now and also obtain more information through the scans. Editing and continuously visualizing this data in ZEISS PiWeb will greatly support both the technology and us.”



Watch the full story



“We programmed everything here and then shipped the system including the components over there. All of the project managers and quality assurance employees love it.”

Sebastian Kuhlenkamp

Global Metrology Expert at BENTELER



Poggipolini

From **Motorsport** to the **Sky**

Founded in 1950, the Italian company Poggipolini specializes in developing and manufacturing critical connecting elements and structural components using titanium and special steel alloys. After supplying leading motorsport teams for 30 years, the company boldly started to apply its expertise and skills to the aerospace sector in 2010. A decade later, customers from the aerospace sector contribute 60% of the company's revenue.

The leap from motorsport to aerospace

Poggipolini entered the racing industry in 1970, intending to reduce weight for the racing teams by manufacturing titanium screws, which are 40% lighter than steel screws while maintaining the same tensile strength. Interest from motorsport teams like Porsche and Ferrari surged in the 1980s. A subsequent 65% drop in sales revenue due to regulatory changes prompted the company to pivot toward

the aerospace sector. Management made the timely decision to take a leading role in manufacturing critical fastening systems for aerospace. This transition, involving the transfer and certification of fastening solutions from motorsport to aerospace, was challenging. This boldness to explore new markets has been a consistent theme in the company's history.

Hot fast forging creates new opportunities

Hot fast forging enabled the company to establish a strong presence in the helicopter, aerospace, hypercar, and motorsport industries. This innovative process facilitates the production of critical connection elements made of titanium and Inconel quickly and at competitive prices, even in small quantities. This opens the possibility for customers to use titanium as an alternative to traditional steel fasteners. In addition to screws and bolts, Poggipolini also manufactures various other parts for aerospace, including drone casings, armor, and helicopter gearbox parts.

“The aerospace industry has stringent safety regulations, and ZEISS solutions allow us to meet the required and very high standards.”

Giacomo Michelini Quality Manager, Poggipolini S.p.A

Reliability guaranteed

“The key to success in the aerospace industry has been and continues to be the high reliability of our parts,” explains Stefano Poggipolini, CEO of Poggipolini. To ensure the functional safety of safety critical components for aviation and aerospace, numerous tests and analyses are conducted in the quality laboratory. Coordinated measuring machines from ZEISS play a crucial role in this process. The company uses various systems, including ZEISS PRISMO and ZEISS O-INSPECT. The decision to choose ZEISS was made by Giacomo Michelini, Quality Manager and Head of the Measurement Laboratory: “The aerospace industry has stringent safety regulations, and ZEISS solutions allow us to meet the required and very high standards.”

Certification and process safety

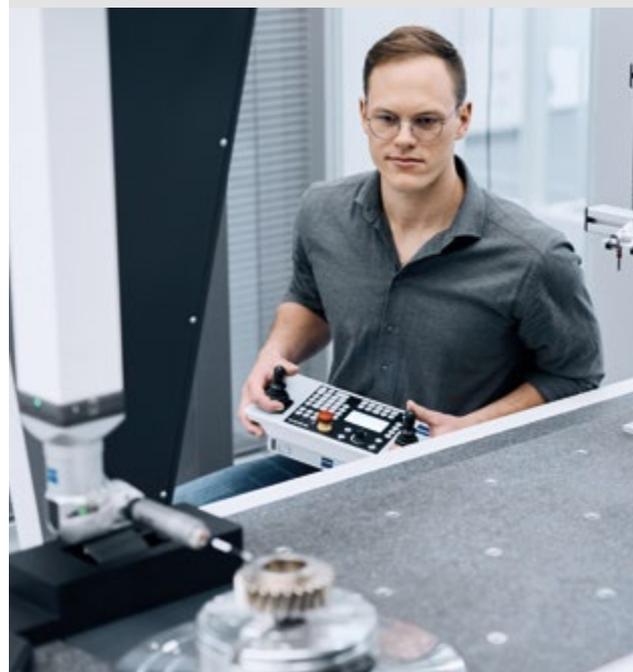
Poggipolini carefully oversees every stage of the manufacturing process to secure and uphold necessary certifications. For example, Giacomo Michelini utilizes the precise ZEISS PRISMO ultra to inspect drone housings. He considers this system a competitive advantage, as it has a substantial measuring range and is the only one of its kind in Italy. The machine allows for simultaneous measurement of multiple aircraft components, combining automation and speed while ensuring accuracy. The measurement results are recorded for quality purposes and used as a base for optimization and corrective actions. Giacomo Michelini is confident that “ZEISS solutions assure us that we are manufacturing in compliance with the standards.”



ZEISS PRISMO ultra

The highest precision, with:

- Top accuracy and reproducibility
- Ensuring form measurement with guaranteed quality
- Providing excellent results
- Dedicated production, installation and acceptance



[Learn more about ZEISS PRISMO ultra](#)

From Water to Power

Quality control in bipolar plate manufacturing

Hydrogen, the simplest and most abundant chemical element, is crucial to the transition to a sustainable energy future. Produced from renewable sources, it serves as a “clean” fuel that emits only water vapor when burned, significantly reducing greenhouse gas emissions compared to fossil fuels. Its high energy density and versatility allow it to be used in many applications.

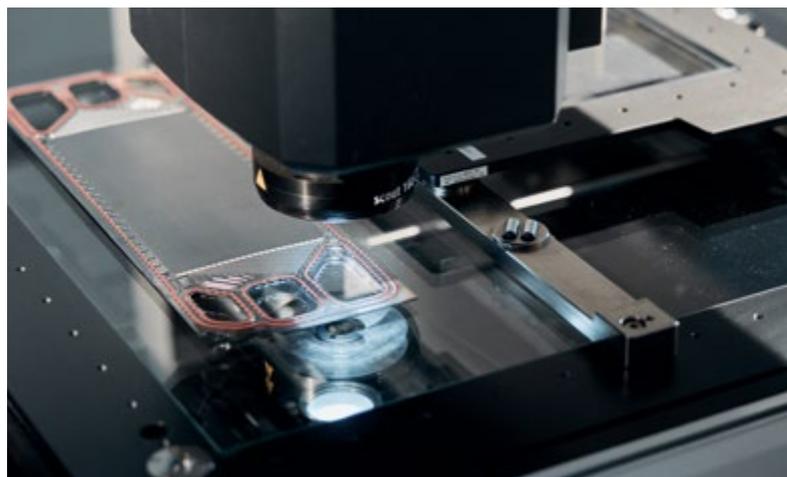
Among the most promising key technologies for hydrogen production and usage are electrolyzers and fuel cells. While electrolyzers use electricity to split water into hydrogen and oxygen, fuel cells convert hydrogen back into electricity, providing a clean and efficient energy source for electromobility and stationary power generation.

Elevating performance with in-depth measurement

Bipolar plates are key components in electrolyzers and fuel cells. The primary goal of bipolar plate design is to develop an innovative structure that maximizes the available surface area, thereby enhancing power density within the given space. Their main functions include electrical conductivity, efficient gas distribution, mechanical stability to withstand high loads, temperature cycling, and corrosion resistance.

Dimensional accuracy, such as thickness, width, length, flow & distribution channel geometry, and, because hydrogen is highly volatile, defects in the seal plane are critical. Even small inaccuracies can significantly affect both the stacking of cells and the efficiency of the entire stack, which is made up of multiple to several hundred individual cells. Therefore, the properties of the plates have a direct impact on the performance and lifetime of the entire system. That's why careful quality control is essential.

ZEISS provides tailored hardware and software solutions, including ZEISS PRISMO with DotScan for non-contact, high-accuracy measurement of flow field channels and their geometry. ATOS technology enables full-field measurement and inspection of flow channels and holes. The measuring machine and microscope in one, ZEISS O-INSPECT duo, can be used to check the quality of seals and sealing surface, as well as to inspect the bipolar plate and membrane for defects. Additionally, ZEISS microscopy solutions like ZEISS EVO analyze materials and microstructures. All data can be evaluated using ZEISS software, ensuring bipolar plates meet performance standards.



Challenges of scaling up

Market demand for the key technologies of electrolyzers and fuel cells is growing rapidly, requiring the industry to scale up production. The way from R&D to market requires quality assurance throughout the process, which is even more important in high volume production. The quality control of components and materials is key to delivering consistent quality in mass production and providing efficient and durable products throughout their lifecycle.

As the H₂ sector continues to expand, solving these issues is critical to scaling up electrolyzer production and advancing applications. By adopting reliable metrology practices, manufacturers can increase efficiency and ultimately contribute to the overall advancement of clean technologies.

Discover how our solutions support scaling bipolar plate production!

Curious about the innovative processes behind bipolar plate manufacturing? Visit our website to see how we contributed to streamlining production, increasing efficiency, and making a difference in the sector.

Discover the full story and learn more about the significant impact on scaling effects.

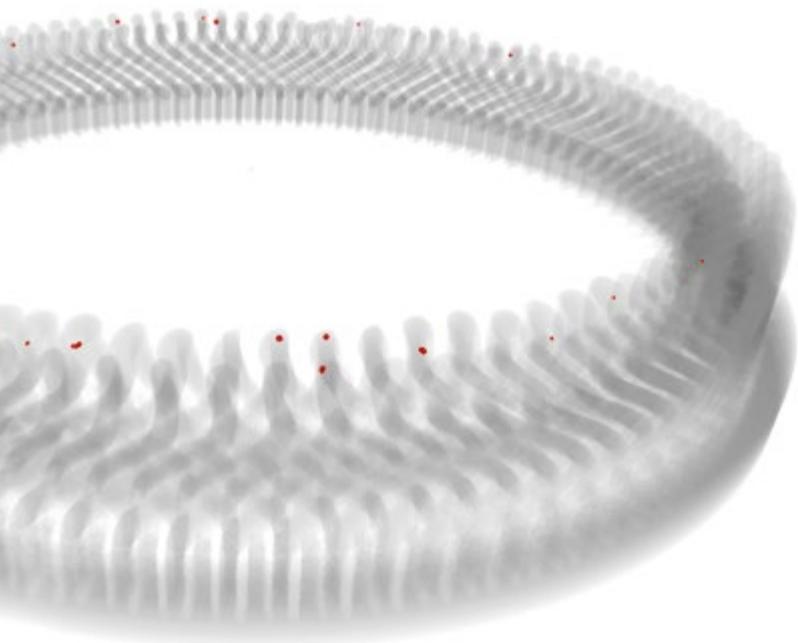
[Watch the full story](#)



AI-Driven Inspection

The future of quality control

As industries and production processes continue to evolve, the role of artificial intelligence in inspection processes is becoming increasingly important. But do you know what possibilities are already available today and how AI can support you in your inspection process? We asked Christian Wojek, Head of AI at ZEISS Industrial Quality Solutions, to explore how AI is shaping industrial metrology and the future of quality control.



Benefit from pre-trained models for common use cases like hairpin inspection

Christian, what are the key drivers for using AI in inspection processes?

Well, as industries transform, we're really seeing a shift in quality control from dimensional metrology applications in the measurement room centered around a metrology expert to automated inspection and metrology that are integrated into production processes. This change is all about increasing efficiency and embracing automation. The key drivers for adopting AI include the need to boost productivity, reduce errors, and tackle challenges like price pressure and the shortage of skilled workers. Customers are looking for high quality, fully automated, highly accurate, and flexible solutions at the same time. With the extensive industry experience of ZEISS we're in a great position to be a trusted partner, delivering comprehensive, user-friendly AI solutions tailored to meet the diverse needs of various industries.



"AI is transforming quality control. I envision a future with autonomous systems that enhance efficiency, reduce manual work, and streamline production through connected process and quality data for operational excellence."



Christian Wojek
Head of Artificial Intelligence,
ZEISS Industrial Quality Solutions

Christian Wojek drives the adoption of AI at ZEISS Industrial Quality Solutions, enhancing product development and internal processes. He actively supports multiple teams in leveraging AI to drive innovation and improve workflows. Previously, he led efforts in developing cutting-edge computer vision solutions for X-ray and CT imaging. Passionate about translating the latest advancements in machine learning into practical applications, Christian is dedicated to delivering impactful solutions that empower customers in their daily operations.

What AI technologies are currently being utilized in inspection processes?

At ZEISS, we've integrated AI into various applications for years. We began with inline CT in casting and microscopy, focusing on layer thickness measurement, particle detection for cleanliness, and grain analysis. More recently, we've expanded our offerings to include AI-based inspection options for electron microscopy applications such as metallography. For CT and X-ray applications, we enable AI-driven inspections, such as noise reduction in X-ray imaging and improved capabilities for weld inspection and defect detection in battery cells. AI also plays a crucial role in identifying issues like porosity (in castings, for example) and supports non-destructive testing (NDT).

How does AI enhance inspections compared to traditional methods, and where is it applied?

AI significantly improves inspections by managing challenging imaging conditions, such as the reduction of noise and artifacts in CT images, which leads to fewer false positives and more reliable results. It can detect defects that traditional software might miss, performing at a human recognition level. Implementation time has drastically decreased, enabling quick AI model creation after scanning samples. AI is used in both measuring rooms, where ease of use is key, and on shop floors, where speed and performance are prioritized, whereby it's always ensured that tools remain user-friendly for quality control personnel.

SOFTWARE

Automatic segmentation of an additively manufactured gear using artificial intelligence.



What options are available from ZEISS for customers interested in AI solutions?

First of all: our AI solutions are easy to use for everyone. You don't need to be an AI expert to use it. To develop customized models, customers can collaborate with our ZEISS AI application experts. We've already created over 100 AI models for microscopy and CT applications and offer pre-trained models for common use cases. Customers can also train their own deep-learning models with microscopy data, and this capability will extend to other technologies like CT data in the future. Of course, the execution of AI models seamlessly integrates into ZEISS software, enhancing image analysis efficiency.



"We need to keep introducing AI into our processes to boost efficiency. In quality inspection, our goal is to cut down on measurement times and improve how all our processes connect.

At Festo, we apply AI solutions from ZEISS in the X-ray domain to detect anomalies and defects. This technology allows us to analyze pores and conduct defect analysis efficiently."

Daisy-Aurora Toro-Cerrato, Head of Corporate Quality Operations Methods, Festo SE & Co. KG

Can you provide different application examples where AI has significantly improved inspection processes?

Sure. For instance, Smith & Nephew, a medical tech company, uses our AI-driven software to automate the microscopic inspection of implant coatings, reducing the measurement time from 45–60 minutes to just 5–7 minutes – a tenfold increase in efficiency. And Festo, a leader in industrial automation, employs our AI-supported automated defect recognition for porosity analysis with CT data. How? At ZEISS, we trained AI models to identify patterns in casting parts, allowing for automated segmentation and classification of defects, which helps Festo to quantify and judge subtle irregularities more effectively.

What exciting trends in AI do you see today for inspection? How will future advancements impact inspection processes?

AI is no longer a concept of the future; it's actively being utilized across various industries today. We see a shift towards end-to-end solutions that enable holistic process optimization. This involves connecting process data with quality data to enable closed-loop control. AI can play a crucial role here. And I think in the long term we're approaching an era of autonomous inspection systems in "dark factories," where minimal human intervention is needed. In these environments, machines, robots, and AI systems autonomously handle tasks like production, assembly, and quality inspection, streamlining operations and enhancing efficiency. There are exciting times ahead.

ZEISS Quality Innovations



ZEISS ZEN core

AI-driven analysis for microscopy

[Learn more about ZEISS ZEN core](#)

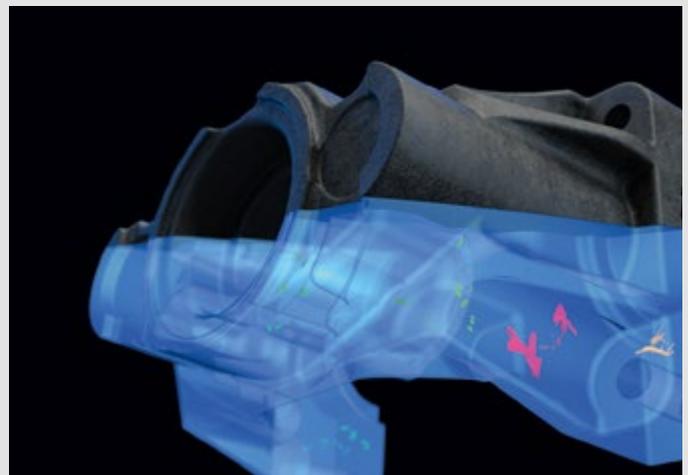
With our microscopy software ZEISS ZEN core, you can acquire images, analyze samples, and integrate all your data into a unified ecosystem for connected microscopy. AI-based algorithms can be applied effortlessly, with no programming required, throughout the entire workflow from imaging to analysis. With the latest release of ZEISS ZEN core, it is now available for electron microscopy, giving you access to the entire microscopy portfolio for a connected research environment. Capture images and correlate results across different microscopes to unlock new possibilities in industrial microscopy, boosting performance and productivity through integrated AI tools.

ZADD

Automated defect detection for CT

Discover AI-driven defect detection with ZEISS INSPECT X-Ray. The app ZADD Segmentation identifies defects in CT data, even with poor image quality, ensuring fast, reliable error detection. Optimize development and analysis, enhance efficiency, and achieve superior quality control with machine learning precision.

[Learn more about ZADD Segmentation](#)





Meet the Maker.

How 3D scanning empowers innovations in the automotive industry

The electric motor market is one of the fastest growing markets in the world, especially in aerospace and automotive. The company Additive Drives wants to revolutionize this future leading technology. To do this, they are using advanced additive manufacturing processes. Complex components of high-performance electric motors and prototypes are 3D printed, allowing the German company to adapt to different industry requirements and customize drives to meet specific customer needs extremely fast. Starting in automotive and prototyping, Additive Drives now focuses on the manufacturing of complete e-motors in serial production.



In order to achieve the targeted efficiency of up to 98% and power densities of over 25 kW/kg, quality control during production is non-negotiable. The 3D scanning solution ZEISS ATOS Q is a fast way forward and is used to develop prototypes and tools. The 3D scanner is easy to use on site. Additive manufactured parts are quickly converted into a 3D model using fringe projection technology, providing detailed information on the geometry of small to medium-sized parts. These can be instantly accessed and intuitively integrated into further iteration loops, saving time in the prototyping process.

To take quality processes to the next level in the future, a semi-automated system is the ideal solution. It not only speeds up the processes but also enables quality control right from the start of the first series production thanks to the simple workflows. The newest member of the #HandsOnMetrology team is an ideal addition for serial production. Developed and produced in Germany, ZEISS ScanPort offers an all-in-one solution for semi-automation – with three axes for complete part acquisition, high-precision 3D scanners and state-of-the-art inspection software ZEISS INSPECT.



Maker Insight

Learn more about the innovations at Additive Drives

ZEISS Quality Innovations

NEW



ZEISS ScanPort

Easy to handle. Ready to scan.

Experience semi-automation with just one click

ZEISS ScanPort is the latest scanning solution to make metrology projects even more efficient using semi-automation. With its three axes, it easily captures every detail of small to medium-sized parts without the need for software programming. ZEISS ScanPort is compatible with the powerful 3D scanners ZEISS ATOS Q and ZEISS GOM Scan 1. Switching between the two sensors makes it a flexible solution ensuring precise data generation across various applications, like casting, additive manufacturing, or plastics. Due to the compact design, ZEISS ScanPort starts operating exactly where it is needed and standardizes measurement workflows with just the push of a button.



Get started

Watch all ZEISS ScanPort videos

More Efficient Wind Turbines

Wind power is a focal point of renewable energy as countries shift away from fossil fuels. The Wind & Energy Systems Institute at the Technical University of Denmark (DTU) aims to enhance wind turbine efficiency.

Understanding load and damage behavior

A key aspect of this research is the design, manufacture, and testing of rotor blades, with a central focus on investigating their load and damage behavior, which is crucial for determining service life. The department utilizes extensive test facilities to analyze rotor blades, focusing on how they perform under extreme loads and identifying factors that contribute to damage. The results are essential not only for optimizing design and production but also for understanding the structural changes that occur over time.

A significant aspect of this research is the creation of digital twins – virtual replicas of rotor blades that reflect their condition throughout their lifespan. This approach allows researchers to monitor the blades' integrity and performance continuously. To facilitate accurate assessment, DTU employs advanced optical measurement systems. These technologies enable rapid and precise analyses of large prototypes, enhancing the research process.

3D measurement of large structures

ZEISS TRITOP is an optical 3D photogrammetry system that captures rotor blade geometry. It consists of a handheld digital camera and calibration objects. By applying coded and uncoded measuring points to the rotor blade, researchers can take images from various angles, generating a detailed 3D point cloud. This system is effective for both non-deformed and deformed rotor blades, allowing an easy evaluation of 3D coordinates using the inspection software ZEISS INSPECT.



At **DTU Risø campus**, newly developed rotor blades undergo thorough testing in extensive and advanced facilities. Researchers perform comprehensive tests to assess the load and failure behavior of the rotor blades.



High-resolution deformation analysis of rotor blades

After recording reference points with the photogrammetry system, ZEISS ARAMIS comes into play. The high-resolution optical 3D measuring system for performing full-field and point-based measurements uses these reference points to automatically transform individual measurements, including coordinates, displacements, and surface strain. To consistently recognize deformations on large objects, multiple systems are linked and synchronized. This comprehensive data collection is vital for assessing rotor blade integrity and performance.

Paving the way for wind energy technology

The research at DTU significantly deepens the understanding of rotor blade dynamics and is critical to the advancement of wind energy technology. By using innovative measurement technologies, DTU effectively optimizes the design and production of wind turbines.



ZEISS Quality Innovations

ZEISS ARAMIS 1

3D testing of deformations and motions

ZEISS ARAMIS 1 is the entry key for beginners to the world of optical 3D measurements of deformation and motion. The system provides measurement data from images and videos offering a precise, flexible, and efficient method for measuring strain, displacement, vibration, and acceleration. It can be used in many different applications in academic materials research and industrial R&D departments. The non-contact measurement method of the ZEISS ARAMIS 1 allows for the many measurement points to be captured simultaneously without any difficulties.

[Learn more about ZEISS ARAMIS 1](#)



Quality assurance in R&D

Accelerating Medical Innovation with Uncompromising Quality

Rigorous quality control throughout the R&D process is essential to ensure that medical products meet the highest standards. ZEISS offers tailored, seamlessly integrated hardware and software solutions for data analysis and reporting, helping manufacturers achieve the desired excellence.



To meet the regulatory demands of medical technology authorities, manufacturers must exceed standard quality assurance requirements. They not only need to establish industry-specific workflows correctly but also document and validate consistent adherence to them. Quality assurance hardware and software must work seamlessly together, providing the necessary functionality while integrating smoothly into subsequent steps of series production.

Material composition analysis

A fundamental step in ensuring the reliability of manufacturing materials is the analysis of their composition. Key challenges include characterizing the chemical composition of bulk materials while focusing on factors like porosity, cracks, and inclusions. Advanced techniques such as light microscopy (LM) and scanning electron microscopy (SEM) are employed to capture particle sizes and reveal detailed compositions. Automated evaluation systems using ZEISS ZEN core templates facilitate the early detection of material quality fluctuations, enhancing reliability and product performance.

Internal defect and structural inspection

Achieving defect-free components is crucial for meeting static and fatigue performance requirements in medical technology. Defects such as pores and cracks above a critical size can compromise structural integrity, while material inclusions may lead to localized brittleness. Reliable inspection methods are essential to detect these flaws early. Additionally, continuous process stability monitoring is key to maintaining consistent part quality.

Light microscopes identify surface failures, while electron microscopes provide high-resolution imaging of fracture characteristics. X-ray computed tomography (CT) and X-ray microscopy enable non-destructive scans to detect internal defects and cracks.

Characterization of surfaces

Surface analysis in medical technology presents unique challenges, especially for complex inner surfaces of porous or trabecular structures. Assessing active coatings like hydroxyapatite requires precise evaluation of thickness, structure, and bonding to the substrate. Additionally, understanding surface roughness and the effects of various treatments is essential to ensure optimal functionality and durability.

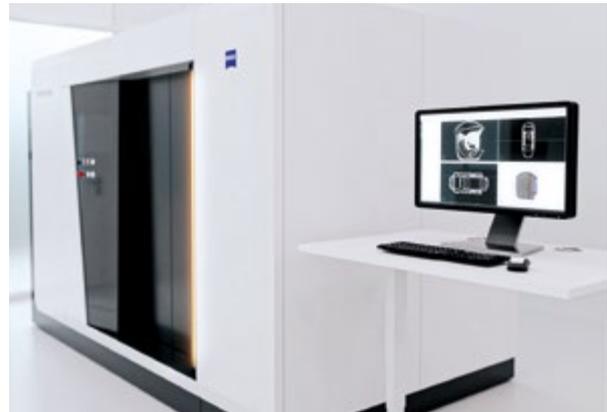
LM and SEM deliver full characterization of surface coatings. Non-contact inspection methods like CT and X-Ray microscopy are crucial for characterizing structural coatings in hard-to-reach areas without destruction of the sample. CMMs allow for accurate measurements of form, size, and position, critical for quality assurance.

Coating analysis

Inspecting complex surface coatings is time-consuming, and evaluations are challenging. However, it is an important part of quality monitoring, ensuring compliance with international standards such as DIN ISO and ASTM. X-ray microscopes and combined microscopy techniques deliver repeatable and reproducible results. High accuracy is achieved through advanced AI-based software analysis.

Dimensional analysis

Maintaining precision in both external and internal features of medical devices is critical for quality and compliance. Externally, the focus lies on accurately measuring geometrical product specifications (GPS) of intricate 3D surfaces, while internally, the challenge is to capture high-resolution images of critical structures. Advanced solutions include optical scanners for delicate components, multisensor CMMs for high-precision scanning, X-ray CT technology for simultaneous internal and external measurement, and X-ray microscopy visualizing submicron internal structures and delivering comprehensive, non-destructive insights.



Technical cleanliness analysis

With stringent standards like VDI 2083 regulating particle contamination analysis, technical cleanliness is increasingly important during the R&D phase. ZEISS offers a technical cleanliness solution that enhances productivity and compliance, integrating LM and SEM data for comprehensive analysis.





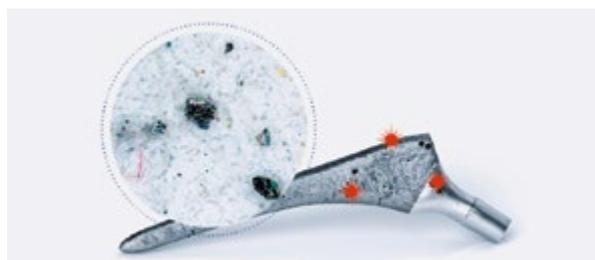
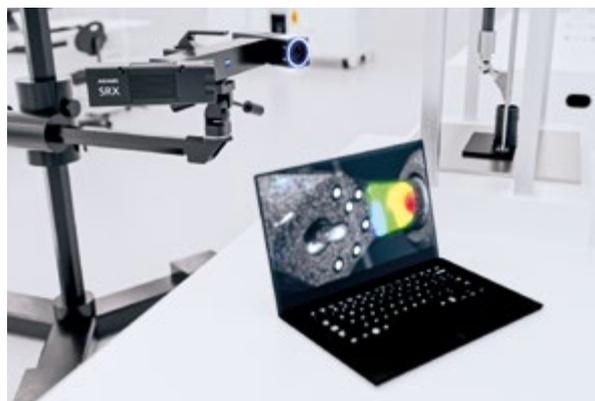
Software solutions for R&D processes

ZEISS CONNECTED QUALITY and ZEISS PiWeb support data processing and analytics, while ZEISS ZEN core offers a correlative workflow, data storage, automated AI functionality, and GxP toolkit for microscopes.

Mechanical property analysis

To ensure medical devices withstand loads as intended and function effectively over time, their mechanical properties must be analyzed. Traditional measuring strategies use strain gauges or displacement transducers which often results in limited data and these approaches are even not suitable for delicate and soft biomaterials like tissue and tendons. Additionally, the interpretation of test results is complex, as human body kinematics introduce intricate motion patterns.

ZEISS offers an optical 3D measurement system that replaces strain gauges or displacement transducers and delivers precise 3D coordinates for statically or dynamically loaded samples and components. Based on that, ZEISS ARAMIS allows the determination of 3D displacements, velocities, accelerations and the analysis of movements according to the six degrees of freedom (6 DoF) approach.



[Learn more about quality assurance in R&D](#)

[Download whitepaper on technical cleanliness](#)



Innovations that Drive Decarbonization

As decarbonization reshapes our world, it is not just an environmental imperative, but also a catalyst for innovation. With the rise of new products and technologies, quality assurance is essential to enable this transformation from product development to production across ever-evolving markets.

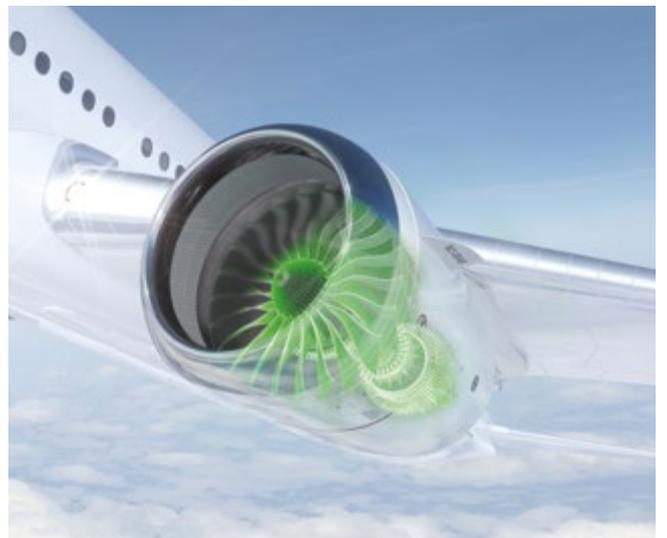


Enabling product innovations

Decarbonization propels innovation across continuously evolving markets, particularly in areas such as new energy vehicles, power & energy, and aerospace. As these industries develop emerging products and technologies like batteries, e-motors, and electrolyzers, the demand for high-precision metrology becomes vital to ensure their quality, safety, and performance. Advanced metrology solutions from ZEISS span the entire lifecycle, from materials testing and product development to production and maintenance, providing robust support at every stage. With that, ZEISS enables its customers to develop innovations that reduce global emissions by means of reliable quality assurance, which is adapted to the dynamic needs of our world.

Increasing product efficiency

While innovation is a crucial driver in quest of reducing our global carbon footprint, efficiency gains have proven to be pivotal across various sectors. Achieving greater product efficiency requires high-precision metrology with tighter tolerances for the accurate measurement of individual parts. For example, the optimal operation of an aero engine relies heavily on the quality inspection of thousands of compressor blades. Metrology solutions enable longer product lifecycles, increased battery ranges, reduced fuel consumption, and further resource savings.





Driving production efficiency

Through stringent quality inspection, process and material efficiency can be ensured in manufacturing. Therefore, the early detection of defects is crucial to reduce scrap rates. Our advanced metrology solutions are a vital catalyst to enable intelligent and quick process corrections in the production line, which result in resource, time, and cost savings. Energy consumption makes an equally important contribution to efficient manufacturing. Given the long lifetime of ZEISS solutions, the usage phase represents the key emission hotspot. Thanks to energy-saving features – such as ZEISS PowerSaver, ZEISS AirSaver, or reduction of laser power – energy consumption is minimized and operational costs are reduced.

Recognized as a pioneer of transformation

Apart from the ZEISS's enabling role, we equally address decarbonization in product development and our own operations through a comprehensive cross-functional program to achieve the sustainability ambitions of the ZEISS Group. ZEISS Industrial Quality Solutions won the 17th German Sustainability Award for companies in the respective category for measurement and control technology. ZEISS was selected for its impactful and exemplary contributions to the transformation in its industry.





Next-Gen Measurement of Electronic Parts

Zollner is more efficient thanks to a 2-in-1 solution

Zollner Elektronik AG, based in Zandt, Germany, is a leading provider of electronics manufacturing services. The company specializes in the complete contract manufacturing of electronic assemblies, devices, and systems. This includes everything from development and PCB assembly to test concepts. For quality assurance, Zollner relies on ZEISS technology and was one of the pilot customers for ZEISS O-INSPECT duo.

"A major advantage of the software ZEISS CALYPSO is, that it is updated frequently, which means that we are always up to date with the latest standards and can incorporate them into our measurements."

Michael Zeller, Senior Manager Test Equipment Monitoring & Measurement Technology, Zollner Elektronik AG

Strict standards and complex components

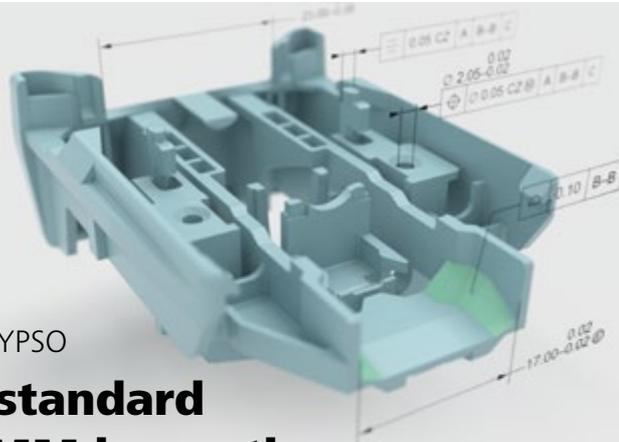
Zollner operates in seven industries, including automotive and medical technology, adhering to strict laws and standards for product reliability and safety. On top of this, the diverse product range presents unique inspection challenges. "We have both very small components in the micrometer range and complex systems requiring geometric dimensioning and tolerancing (GD&T)," explains Michael Zeller, Senior Manager Test Equipment Monitoring & Measurement Technology at Zollner. To meet these challenges, Zollner uses diverse technologies for different components: the coordinate measuring machine for stable workpieces, ZEISS O-DETECT for parts that may deform under probe force, and ZEISS microscopes for detailed material analysis to identify small defects or contaminants.

Software solutions for global quality assurance

Zollner uses the metrology software ZEISS CALYPSO for both optical and tactile coordinate measurement technology. All measurement data is securely stored on a central server, enabling access from all 25 locations worldwide through the software ZEISS PiWeb. This integrated approach allows Zollner to maintain rigorous quality assurance across all operations.

New 2-in-1 solution combining microscopy and metrology

Zollner was among the first pilot customers for the ZEISS O-INSPECT duo, which combines microscopy and metrology with optical and tactile measurement in a single device. This allows for more efficient measurement and inspection tasks. The system excels at detecting small features on circuit boards. The two software products make even the smallest details visible. For Zollner, a key advantage is its large measurement volume, enabling examination of bigger components without cutting samples. This capability enhances Zollner's quality assurance processes while maintaining accuracy and efficiency in inspecting electronic components.



ZEISS CALYPSO

Gold standard for CMM inspection

Your software for coordinate measuring machines: ZEISS CALYPSO measures geometrical elements simply, quickly and reliably. Combined with ZEISS measuring systems and sensors, you will have a powerful one-stop system.

[Learn more about ZEISS CALYPSO](#)



ZEISS O-INSPECT duo
Measuring machine and microscope in one

ZEISS O-INSPECT duo combines two technologies in one single product and provides a solution for both, microscopy and metrology with optical and tactile measurements. The system offers a non-destructive inspection solution for large workpieces or for many small parts, capturing even the smallest details at once. By performing measurement and inspection tasks on the same device, you can reduce setup times and open floorspace in the facility. The integration of two specialized software solutions, ZEISS CALYPSO for metrology and ZEISS ZEN core for microscopy, delivers unique benefits and helps to automate workflows.

[Learn more about ZEISS O-INSPECT duo](#)

The Goal of Zero Emissions

Hydrogen fueling sustainable commercial vehicles

The automotive industry is actively working to make passenger vehicles as well as commercial vehicles more sustainable. Central to this transformation are innovative companies like cellcentric, specializing in manufacturing fuel cell systems that enhance eco-friendliness of long-haul heavy-duty trucks. Daimler Buses produces zero-emission city buses, further contributing to the movement towards greener urban mobility. Both companies aim to produce commercial vehicles with zero emissions and therefore contribute to cleaner transportation.

cellcentric

Manufacturing fuel cells as a driver of efficiency

cellcentric develops and manufactures the complete fuel cell system, including all of the parts of the fuel cell stack, at their site in Esslingen, Germany. They explained the complex process to us.

A hydrogen fuel cell is an electrochemical cell that converts the chemical energy of hydrogen and oxygen into electricity. Imagine a fuel cell system in a heavy-duty truck installed where the combustion engine is today. Hydrogen from a tank reacts with oxygen from the air, separated by a membrane, generating electrical energy to power the electric motor directly and/or to charge a battery. This battery then powers the vehicle via electric motors. The only by-products of this process are water and heat, with no pollutants or greenhouse gases.

How to produce fuel cells

The first step in producing a fuel cell system involves mixing an "ink," a black emulsification of carbon powder, catalyst, and ionomer. Depending on the recipe, this ink is laminated as cathode or anode on a proton exchange membrane, enabling the electrochemical reaction to generate electricity.

To amplify the electrical power of a fuel cell stack, hundreds of unit cells containing the coated membrane and carbon bipolar plates are assembled in series. The number of cells in one stack depends on a number of factors, amongst others the desired power output and the geometrical boundary conditions. For cellcentric's 150 kW system, the stack module contains around 500 cells. Assembling hundreds of cells requires the precise measurement of tolerances, as deviations can accumulate during the process. Therefore, cellcentric partners with ZEISS for optical and tactile measurement to ensure high-quality standards in fuel cell production.





Daimler Buses

Emission-free city buses



As European cities prepare to switch to emission-free public transport by 2035, Daimler Buses is supporting this transformation with electrically powered city buses. We talked to Till Oberwörder, CEO of Daimler Buses.

What progress has your company made in electrification so far?

We are in the midst of the transformation that we, as a manufacturer, are actively driving forward together with our customers. We are building on both battery-electric and hydrogen-based technologies and have a clear e-roadmap. City buses are already well advanced in terms of electrification and are in daily use in many cities. In 2026, our first electrically powered inter-city bus will follow, which will also electrify connections between cities and rural areas – and electric coaches will follow by the end of the decade.

Where do you see the biggest challenge in the transformation of your industry?

For bus operators to be able to operate electrified fleets, a functioning and reliable charging and hydrogen tank infrastructure is required – across the board. Charging infrastructure is the pivotal point for the ramp-up of electromobility.

How are you approaching this challenge?

We are relying on an intensive dialog with policy makers, energy suppliers and our customers – only if all parties involved are fully committed to driving electrification forward will it work in the long term and across the board, i.e. beyond the highways. Moreover, our own strategic approach goes far beyond the vehicle itself. We not only offer our customers electrified buses, but also complete solutions for operating electric fleets. For this purpose, we established a new subsidiary, Daimler Buses Solutions GmbH, in 2023. On request, bus operators can obtain a complete e-system from a single source: From individually configured electric buses to complete charging infrastructure for the depot, including construction measures, electrical installations, chargers, battery storage and other digital services.



Giant Precision

Quality assurance for large-scale castings

Large-scale castings are becoming more important across various industries, driven by the need for efficiency and cost-effectiveness in manufacturing. From shipbuilding to power generation, sectors are increasingly relying on oversized parts to meet their operational demands. A notable example of this trend is found in the automotive industry, where gigacasting is transforming the production of large aluminum parts. Instead of manufacturing different parts of a car body individually and then welding them together,

large components are now manufactured from a single casting. This approach not only reduces production and personnel costs but also enhances overall efficiency. All that is needed is a large mold into which the liquid aluminum is shot under very high pressure. Handtmann, Europe's largest light-metal foundry, is leading the transition to gigacasting by casting complete structural parts and battery trays for electric vehicles in one piece.



Handtmann Group New standards in die casting

An example of the gigacasting megatrend can be seen in the large parts produced by die casting company Albert Handtmann Metallgusswerk GmbH & Co. KG. Headquartered in Biberach, Germany, Handtmann is the first European Tier-1 supplier to invest in gigacasting technology. The company runs the biggest family-owned light-metal foundry in Europe where it produces large structural parts for the automotive industry. As a vital part of its strategic approach, Handtmann can now cast complete front or rear sections as well as battery trays for electric vehicles in one piece, addressing the growing demand for innovative solutions in vehicle production.

To ensure the quality of these large and complex structural components, the company utilizes not only optical 3D measurement technology but also large-scale 2D X-ray technology from ZEISS to inspect the castings non-destructively. With its enormous inspection volume, the ZEISS OMNIA GC 220-180 is the best solution to inspect large castings for defects. It represents a future-proof investment for the company to further strengthen and expand its pioneering role in gigacasting.

Alongside the automotive industry, other sectors, such as shipbuilding and power generation, also depend on large casting parts. Thanks to different casting processes and the use of diverse materials, companies can develop customized solutions that meet the specific requirements of their applications. Siempelkamp, the world's largest hand-molding foundry, has expertise in producing very large and heavy castings for various industries.

However, while the advantages of large castings are evident, the production and quality assurance of these parts pose significant challenges, with only a few manufacturers equipped to handle them. As the demand for XXL casting parts continues to rise, strict quality assurance along the entire production process is essential to ensure that components meet the required specifications and minimize safety risks. Such quality assurance solutions include hardware and software designed to automatically detect defects and analyze data at various production steps. This ensures the achievement of defined quality and cost targets, while also allowing for further improvements.



ZEISS OMNIA GC 220-180 Automated 2D X-ray inspection of large parts

ZEISS OMNIA GC 220-180 addresses the need for quality assurance of gigacastings, offering a future-proof solution for defect detection in large aluminum components using advanced X-ray technology. With an impressive inspection volume of 2200×1800×900 mm and a focus on automation, the system enables 2D X-ray inspection of large casting in short cycle times – ready for inline or atline operation. With a compact system design and modular loading options, it can be easily integrated into existing production lines, optimizing the efficiency of the entire production process across industries.

[Learn more about
ZEISS OMNIA GC 220-180](#)



Siempelkamp
**Specialist for
Large
Castings**

The German Siempelkamp Giesserei plays a crucial role in this demanding environment. The company specializes in the production of large and heavy castings which are used in the areas of energy conversion, raw material processing as well as press and machine construction. With an impressive weight of up to 320 tons per part, the company combines its decades of experience in foundry technology with a resolute commitment to safe working processes, environmental protection, and the highest product quality. Siempelkamp is an important global supplier for the industry.

To ensure a smooth production process for top-quality castings, the company relies on measuring technology from ZEISS. Thanks to the specifically developed project measuring cell, Siempelkamp Giesserei can now also use ZEISS ATOS LRX as an automated solution. The 3D scanner enables Siempelkamp to carry out effective quality assurance while increasing energy efficiency and using valuable resources sustainably by minimizing scrap. Using the large measuring area, even huge parts with a length of 23.5 meters can be scanned quickly, whereas components weighing up to 320 tons can also be inspected without the hassle of time-consuming alignment.



“To achieve precise manufacturing of such large components, it is essential to ensure the accuracy of the details, which, of course, cannot be achieved without the use of high-precision metrology.”

Dr. Georg Geier,
Managing Director at Siempelkamp Giesserei GmbH
& Siempelkamp Metallurgie GmbH



ZEISS ATOS LRX

The specialist for 3D scanning of large-volume parts

ZEISS ATOS LRX is specialized in 3D measurements of large-volume parts. The sensor provides full-field data with highly detailed resolution in next to no time. Thanks to its ultra-bright laser light source and the large measuring area, fewer scans are required. With a dustproof and splashproof housing, this solid system is designed for rough production conditions and thus perfectly suited for industrial use.

[Learn more about ZEISS ATOS LRX](#)



Data Globalization

Generating data is easy – mastering it is the real challenge

Companies face challenges with fragmented storage systems and inconsistent data formats from different measurement technologies and manual processes. Localized knowledge gaps and decentralized data management create traceability issues and regulatory compliance challenges, compromising the effective use of quality data for efficiency. Furthermore, the lack of timely alerts for quality issues and reliable early warning mechanisms highlights the necessity for cohesive data management strategies.

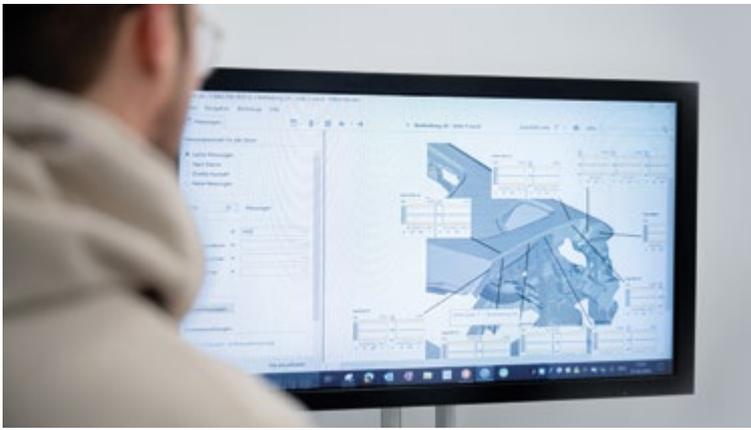
The data flood is still rising

Even more data overload arises from the ongoing trend of digitalization: Manufacturers are increasingly virtualizing more steps in quality assurance to save time, reduce costs, and lower CO2 emissions. For example, they use digital twins to simulate mounting processes and to replace expensive physical inspection methods such as master jigs. But where is all this data stored? Can it be consolidated? And how can you quickly find answers when each report is 50–100 pages long?

Solution: Implement a global data pool

To trace the product and the associated measurement data along the whole production process, companies need a holistic system for relevant quality data collected worldwide, with pre-programmed evaluations revealing pain-points at first sight. Such an implementation requires a sophisticated data concept. That sounds like an incredible amount of effort – but with the right software solution, it is perfectly feasible.

[Learn more about ZEISS PiWeb](#)



Volkswagen

70 report pages in just a few seconds

The Volkswagen Group took this pioneering step by introducing the data management software ZEISS PiWeb on a global scale in a project involving brands such as Volkswagen, Seat, Porsche, and Audi. This has significantly accelerated the generation of measurement reports. Previously, manufacturing had to wait a long time for a trunk lid report. Now, the consolidation of results in cross-site reports allows Volkswagen to get the job done within seconds, enabling faster responses to deviations. The team is even working on connecting suppliers to the solution. No more storage on different servers – just all data in the ZEISS PiWeb data base.

[Read the full story!](#)

STIHL

Significant efficiency improvements

With ZEISS PiWeb, STIHL has successfully integrated quality data throughout the whole production process. The data is automatically uploaded to the data base, making paperless office work possible. In assembly processes and production applications, shop floor quality dashboards allow personnel to clearly view the quality status of products in real time to quickly identify any quality anomalies and ensure that no issues go unnoticed.



Where to start?

Start your global data management project with a promising use case. Identify a team that is open to change and likes technology. The ZEISS team will also advise and support you actively as an experienced implementation partner, taking the requirements of all relevant stakeholders into account.

ZEISS Quality Innovations

NEW



ZEISS CONNECTED QUALITY

Connecting data for global quality processes

Transform your global quality operations with a new level of connectivity and collaboration! We focus on integrating your measuring systems, operators, and quality data worldwide.

ZEISS CONNECTED QUALITY enables real-time data exchange throughout the whole inspection process. This way, global collaboration becomes very easy and inspection processes can be managed centrally: Approve inspection plans, order inspections, and oversee the results as well as the performance of your measuring systems.

- Manage your quality data and operations
- Monitor your measuring systems
- Access data from your measuring systems

[Learn more about ZEISS CONNECTED QUALITY](#)

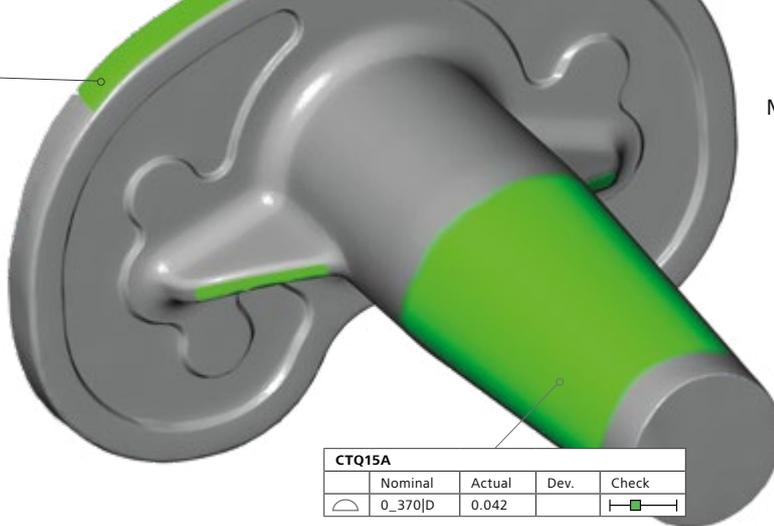


Non-Contact Inspection of Medical Devices

Orchid Orthopedic Solutions boosts efficiency
with automated 3D scanning

Orchid Orthopedic Solutions is a medical device manufacturer providing manufacturing services for orthopedic procedures. They focus on investment casting for knee implants, including 3D wax printing, machining, and finishing knee femoral components and stemmed tibial plates. These small parts begin as wax and turn into cobalt-chromium castings.

CTQ15A				
	Nominal	Actual	Dev.	Check
	0.390[D E F]	0.108		



MEDICAL

CTQ15A				
	Nominal	Actual	Dev.	Check
	0.370[D]	0.042		

Fully automated and repeatable inspection

Orchid typically manufactures knee implant components based on customer designs, necessitating precise and repeatable inspections. However, the organic shapes made single-point measuring methods time-consuming and limited in feature assessment. That’s why the company sought technologies to automate quality processes, aiming to reduce inspection time and enhance information. After reviewing the results of a Gage R&R (repeatability and reproducibility) study performed with the technology, Orchid purchased the optical 3D measuring machine ZEISS ScanBox, including ZEISS INSPECT software.

Frank Sears, Lead Quality Engineer at Orchid, and his team utilize the programming functions in the software to optimize the robotic arm’s positioning for the sensor, enhancing data collection. Collaborating with ZEISS automation experts, they developed a customized script for automated inspection, enabling batch scanning of up to 24 knee implant components. The software intelligently separates the 3D mesh data sets and applies the appropriate inspection templates.

Inspection templates define which features of casting components with complex surfaces will be inspected. The creation of these templates is fast and easy. Once created, the specific inspection elements are automatically applied. Additionally, the full-field 3D data capture enables reverse

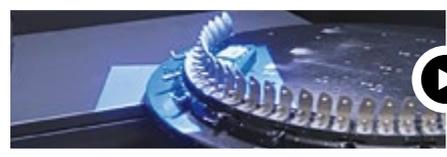
engineering by scanning in-house tooling to generate digital twins, facilitating the creation of solid models for tool reproduction. This capability is crucial for older wax tools lacking available models.

Enhanced data visualization

Orchid’s team utilizes ZEISS INSPECT to visualize data clearly, allowing flexible levels of details for inspection features and models. This capability enables the production of inspection reports that enhance customer communication and collaboration. As Sears noted, “ZEISS INSPECT provides a 3D surface map where you can analyze in real time, showing high points and areas needing rework, which has been really helpful.”

Decreasing inspection time and increasing part information

By implementing the new process, Orchid successfully decreased inspection time and enhanced part information. Previously, inspecting a knee implant took about four minutes a piece with four features measured. The new system now allows inspection of 40 pieces in 45 minutes to an hour, significantly improving efficiency while measuring many more features. The company has also made significant cost savings, meaning that even more products will be scanned with the system in the future.



Watch the full story

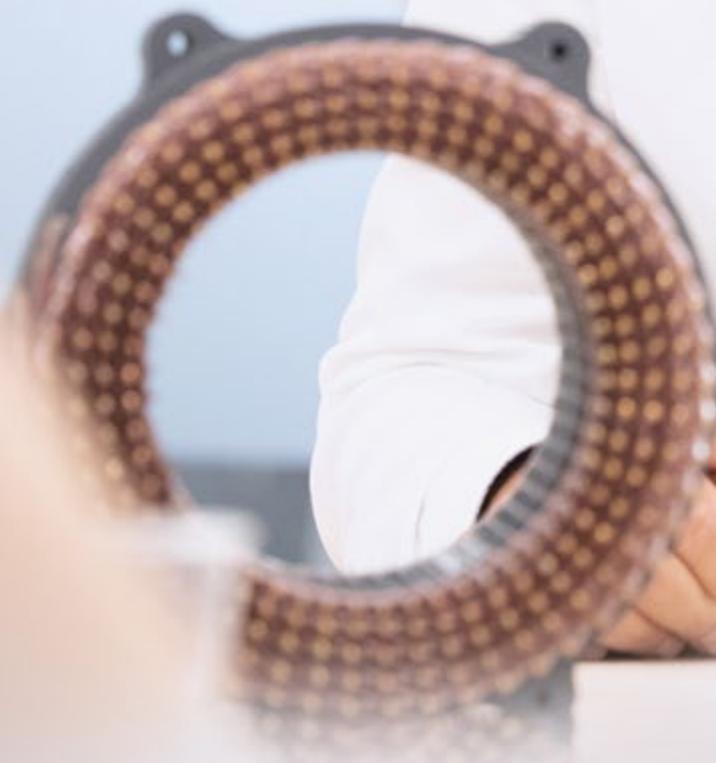
ZEISS ScanBox Series 4

Mobile stand-alone measuring solution for the production environment

- Compact and mobile stand-alone measuring solution
- Utilized across industries for quality control of plastic and metal parts
- Automated loading of multiple parts and autonomous part inspection
- Seamless integration of modular units into your production line

Electric Drive

Efficient quality assurance of
e-motor parts at GROB



Manufacturing technology from GROB is used by more than two thirds of all electric car manufacturers. The family-owned company has earned this market leadership role mainly through its rigorous quality standards.



The supplier of production and automation systems GROB has recognized the potential of e-drives early on. Together with customers, the German company develops and builds machines and systems for the large-scale manufacture of stators and rotors for all well-known OEMs. To ensure quality and precision of the prototypes produced on these systems, GROB relies on microscopy, optical, and tactile technologies by ZEISS throughout the production process, from incoming goods to the final assembled part. This approach guarantees that every e-motor part meets stringent quality standards.

Stator: simple structure, complex manufacturing

The motor of an electric car is impressively simple: A rotating electromagnet (rotor) turns in the magnetic field of a stationary permanent magnet (stator). The stator consists only of a sheet steel housing, the laminated core, and induction coils made of coated copper – although today hairpins are increasingly being used instead of wound wire coils.

“As advantageous as hairpins are, their manufacture is demanding, especially when it comes to bending and welding,” explains Georg Knoll, supervisor of welding processes at GROB and head of the workshop testing laboratory.

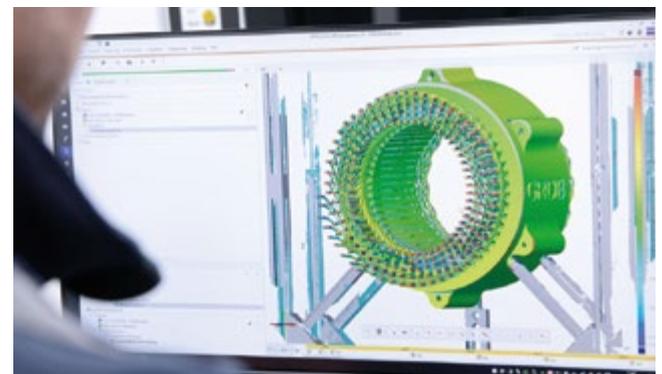
End-to-end needs technology combination

The quality assurance process of a stator starts with the incoming goods inspection: The copper wire for the hairpins is analyzed under the microscope ZEISS Axio Imager to check the condition of the insulation coatings. The software ZEISS ZEN core supports material analysis and the measurement of the coating thickness. Then the wires are bent into shape. GROB evaluates their bending behavior with the multi-sensor coordinate measuring machine ZEISS PRISMO to ensure dimensional accuracy and homogeneity.

Once the hairpins are assembled in the laminated core, the welded ends of the hairpins are inspected using computed tomography to detect pores. GROB then rechecks the positions of the stator's welded joints with

AI enhances inspection quality of stators

Integrating AI into the inspection of stators enhances process efficiency. The AI-powered ZEISS ZEN core software detects minute defects, such as those in coatings or porosities on individual hairpin microscopy images. Additionally, computed tomography provides non-destructive, 3D visualization of internal structures for accurate assessments of hairpin integrity on the full stator. ZEISS INSPECT software excels in automated defect detection, even in fast scans of entire stators with artifacts. Pre-trained models – for example for hairpin inspections – integrate seamlessly and can be customized to meet specific requirements, ensuring optimal quality control in electric vehicle stators.



the CMM. Finally, the team inspects the entire assembly using ZEISS ScanBox, a fully automated optical measuring machine, and the inspection software ZEISS INSPECT to ensure matching dimensions and to rule out surface defects.

Enhanced quality assurance productivity by 30%

“We combine microscopic, tactile, and optical measurement technology to achieve optimal results,” says Martin Negele, Head of Quality Assurance. And the company benefits from having a partner for all solutions in ZEISS. Negele emphasizes: “The uniform ecosystem saves us training effort and makes it easier for our employees to operate the different solutions. And it makes workload planning more flexible and efficient. As a result, our productivity has increased by 30%.”



Starrag

Aerospace Innovation for Maximum Efficiency

Starrag develops and produces production solutions for the aviation and aerospace industry. In a pilot project aimed at reducing measuring times for turbine blades, the Swiss company became the first in the world to use the coordinate measuring machine ZEISS PRISMO fortis.



The aerospace industry faces a significant challenge: achieving high-precision measurements of aviation and aerospace parts while also increasing speed. ZEISS has addressed this challenge by introducing ZEISS PRISMO fortis coordinate measuring system. This advanced system features a highly dynamic rotary table and incorporates an acceleration mode designed for aerospace applications. It offers two options that allow a fast definition of the rotary table's axis while ensuring reliable accuracy.

[Learn more about ZEISS PRISMO fortis](#)

NEW**Fascination for a new solution**

Roland Ziltener, who was the head of quality management at Starrag at the time, still remembers the beginning of the pilot project. "We saw the device in Oberkochen and were immediately excited." To check whether this new development could maintain the required precision while reducing measuring time, all turbine blades produced by Starrag were measured with ZEISS PRISMO fortis over an 18-month test period. Evaluating the system's accuracy involved comparing the measurement results with reference values.

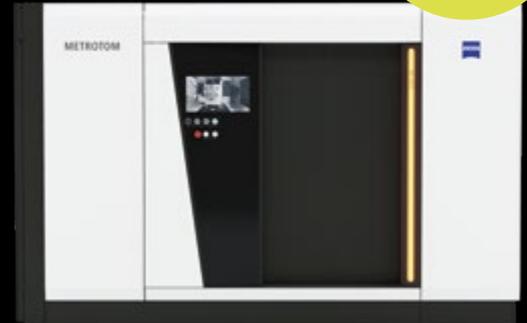
Impressive turbine blade measurement efficiency

"Quality control of turbine blades and blisks typically accounts for 20% of total production costs and 25% of total production time. This project demonstrated that productivity can be increased by measuring the turbine blades with the new system. The standard measurement time at Starrag, which was previously 4 minutes and 30 seconds, has been reduced to just 70 seconds. These time savings "give us greater flexibility in selecting the parameters and workpieces to be measured, and also helps us optimize our production process," emphasizes Ziltener.

**Software solutions: Simple and easy to understand**

"Quality is made, not just measured," Ziltener likes to say. For this reason, Starrag goes beyond a simple good/bad evaluation of parts, focusing instead on qualitatively high-value feedback to a machine's performance. ZEISS CALYPSO and the Airfoil Inspection add-on, specifically designed for analyzing rotor blades, guide vanes, blisks, and nozzle guide vanes in gas turbines, enable Starrag to interpret the measured data collected quickly.

The results are presented in a clear and accessible manner "so that even non-metrologists immediately understand possible problems," explains Ziltener. This clarity simplifies communication with suppliers and facilitates the development of standardized solutions. The Aerospace & Turbine Competence Center machine operators can also quickly identify whether their processes are running smoothly, and independently take corrective action to address any possible deviations. Ziltener is convinced that "in an industry that demands absolute precision in production and quality control, Starrag has set new standards in quality control with this pilot project."



ZEISS METROTOM 800 320 kV

Measure and inspect high-density parts with CT

ZEISS METROTOM 800 320 kV is the perfect solution for quality assurance of turbine blades with complex internal structures as well as dense, additively manufactured metal components such as fuel injectors. Our latest addition to the ZEISS 3D X-Ray portfolio features a high-kV microfocus tube with up to 500 W power, a large-area X-ray detector, and a precise, metrology-grade positioning system. With optional ZEISS scatterControl, it delivers superior scan results on complex components or high-density medical implants, ensuring competitive scan times and increased operational efficiency.

[Learn more about ZEISS METROTOM 800 320 kV](#)



One Metrology Software for Multiple Technologies

#HandsOnMetrology is the go-to community for all makers seeking an easy entry into metrology. This platform connects enthusiasts worldwide by providing helpful insights into outstanding quality assurance applications. Whether users are looking for step-by-step instructions or more advanced expert hacks to realize their tasks – #HandsOnMetrology has the answer. Maker Portraits from all fields of metrology inspire and inform about turning ideas into reality, making inspections more effortless than they have ever been before.

Getting started in metrology is even easier if you can use one software for all systems. ZEISS INSPECT is already the solution for 3D scanners and CTs. Good news for all users: It is now possible to use the first ZEISS coordinate and vision measuring machines (CMMs & VMMs), ZEISS DuraMax, and ZEISS O-DETECT with ZEISS INSPECT! #HandsOnMetrology makes it easy to find the right solution for your task. All with one software.

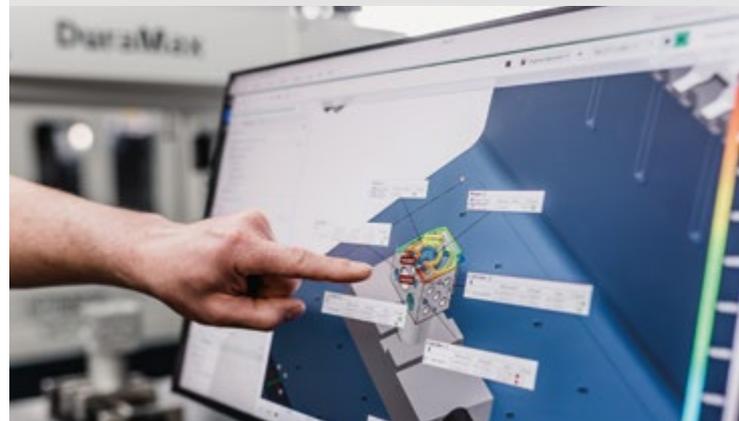


Grupo Arcoiris Quality improvement of plastic parts

With over 40 years of experience, the Mexican company Grupo Arcoiris specializes in the manufacturing of plastic products for various industries.

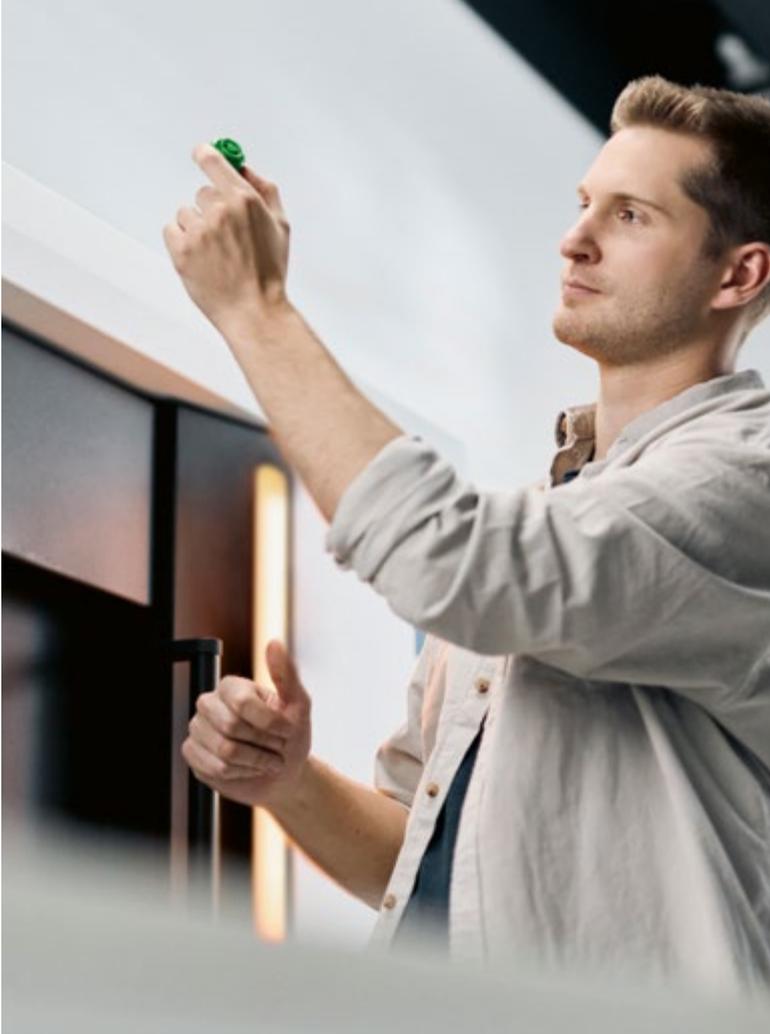
Get started with tactile inspections

From production straight to inspection: Jooß Mechanik creates efficient quality control using ZEISS coordinate measuring machine.



Jooß Mechanik, a company based in Germany, faced a big challenge in the production of turned parts: How could the quality of various complex parts be determined with a very high degree of accuracy? The goal was an intuitive measurement evaluation without long training periods, whilst maintaining comprehensive evaluation options. The company found what they were looking for in the all-in-one solution ZEISS DuraMax with ZEISS INSPECT. It provides quality assurance directly on the shop floor.

Jooß Mechanik now transfers its final products from the manufacturing machine directly to the measuring machine and thus captures precise data for single inspections as well as serial measurements of their mechanical parts more quickly. Materials like stainless steel are measured in one go, making it possible to determine drilling distances and drilling depths as well as geometries. With the operation and analysis software ZEISS INSPECT, the company benefits from extended evaluation possibilities, such as easy part programming, collision-free path planning, and automatic tool selection.



Leveling up quality control in production

For Engineering Manager Maurice Belmont Wong, the holistic inspection of plastic products is the key to success. Corresponding inspection processes therefore take place throughout the entire manufacturing process. ZEISS T-SCAN hawk 2 is making the inspection of their plastic injection molds easy and intuitive. The hand-held 3D scanner with its powerful laser lines is used directly in production to regularly check and verify the injection molds for wear and tear – before production even begins. However, one quality assurance step is not enough for the company.

When the inside matters

To ensure proper functioning of products, ZEISS METROTOM 1 is the perfect addition to their workflows. The X-rays of METROTOM 1 capture plastics from all angles, delivering precise 3D data of external and internal structures. By analyzing the captured information with ZEISS INSPECT, the company detects internal defects or mismatches in the assembly of multiple components which might lead to malfunctioning. With the metrology solutions from ZEISS, the company was not only able to successfully manufacture the products but also to significantly reduce the reject rate.



When the inside matters

Learn more about your easy entry into CT technology using ZEISS METROTOM 1

Your Global Partner throughout the Entire Product Lifecycle



Enhancing productivity with ZEISS Metrology Services

As a comprehensive solutions provider, ZEISS remains at your side beyond the purchase of a measuring machine. From measuring services and accessories to training and enhanced application support – with our global presence, we offer you the right expertise at all stages of the product lifecycle.

With our digital solutions such as Smart Services Dashboard and Remote Health Check, customers can continuously monitor and analyze their systems. Thanks to our global service network, with over 2000 field service engineers, ZEISS provides customized service packages, tailored to specific customer needs to help maximize the machine's uptime and overall equipment effectiveness. Reinforcing our commitment to long-term reliability and performance throughout the product life cycle, we offer enhanced after-sales support, featuring retrofit solutions and advanced maintenance packages for both hardware and software.

Achieving more together

Our local service offices, called Quality Excellence Centers, situated at 64 locations worldwide, cater to customers across all industry verticals and are a one stop solution for all measurement services. Experience our systems, join expert-led live demonstrations and deep dive into technical topics in our classroom and hands-on training sessions. The Quality Excellence Centers can help with component validation, deploying a diverse range of measurement technologies to boost your engineering capabilities. Our team could also demonstrate how different technologies can be combined to gain deeper insights and develop innovative solutions for complex metrology challenges.



Quality Excellence Center

- Measurement Services
- Customer Center
- User Trainings
- Product Demos
- 64 Locations in 38 Countries



Knowledge

- Training & Learning
- AUKOM
- ZEISS Academy
- > 100 Courses
- 38 Countries



Maintenance & Repair

- Customized Service Contracts
- Software Maintenance
- Calibration Service



Retrofit & Productivity

- Modernize Systems
- Accessories
- Monitor & Analyse
- ZEISS Metrology Shop



Benefit from expert knowledge

Often, the little tricks make metrology work even more efficiently and precisely. This is where our ZEISS Metrology Expert Tips come in! In the first season of this video series, ZEISS experts provide valuable tips on all aspects of ZEISS Original Accessories to help you enhance your measuring skills and get the most out of your system. Scan the QR code and select your country to view all published videos in the ZEISS Metrology Shop.

Learn more – from the next season of ZEISS Metrology Expert Tips

This time, we will offer tips tailored to your specific application. Scan the QR code for more information.



Just grab ZEISS accessories online

Order stylus systems, machine accessories, measuring room equipment, and training courses quickly and easily online – at any time.

Get software licenses and apps online

Get easy access to free trials and software licenses – fully flexible, anytime. Discover our apps for specific tasks – we are constantly adding new apps and products.



#MEASURINGHERO



Jay and Ana's most exciting stories

We celebrate the heroes who make precision possible—those who keep industries running, innovations advancing, and quality at the highest level. In order to put our #measuringheroes around the world in the spotlight, we have created the ZEISS #measuringhero Vlog series on YouTube. Our hosts Jay and Ana share helpful tips and tricks for your measurement tasks, meet metrologists from all over the world, and give insights into compelling companies.

Get to know some of Jay and Ana's most exciting stories!

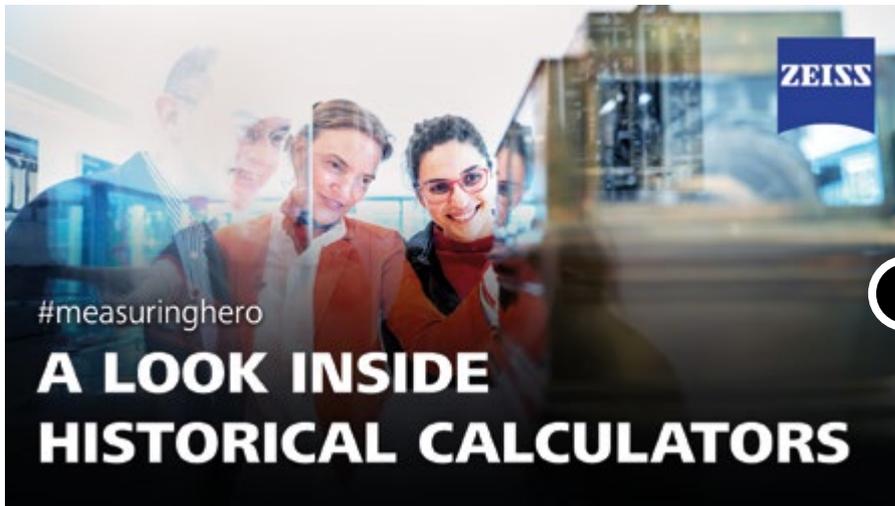


Röchling Medical

“One of my recent standout moments has to be my visit to Röchling Medical. It all started when I met the team during the Medical Days at the ZEISS headquarters in Oberkochen. There was a great spirit between our teams right from the start, so we decided to arrange a visit to Röchling Medical in Waldachtal. Let me tell you, it was such a rewarding experience! The atmosphere was warm and welcoming, and I got a fantastic behind-the-scenes look at one of the leading medical plastics manufacturers. It was a perfect blend of learning and networking, and it really highlighted the importance of collaboration in our industry.”

Jay Elepano, #measuringhero since 2019

#MEASURINGHERO



**Museum of
Arithmetic and
Computing in Bonn**

“Wow, what an incredible journey through the history of calculating machines! At the Arithmeum in Bonn, I got to see some of the most fascinating historical calculators ever built. It’s amazing to think about how complex and intricate these early machines were compared to today’s devices. But the adventure didn’t stop there! After an inspiring tour, I faced a new measuring challenge: How can we analyze the Arithmaurel, the fastest calculating machine of the 19th century, without taking it apart? Luckily, I knew just the right expert to help!”

Ana Carolina Mayr Adam, #measuringhero since 2022



**TOORA
Casting**

“It’s not every day that I get the chance to delve so deeply into the fascinating world of metal casting. From the very first moment, I was impressed by the precision, expertise, and cutting-edge technology that goes into every step of the process at TOORA Casting S.p.A. in Italy. Seeing raw materials transformed into high-quality components was truly mesmerizing. I was so captivated by everything I learned and saw that filming just one episode wasn’t enough – I had to make two!”

Jay Elepano, #measuringhero since 2019

Be part of the community

Metrology is more than precision – it’s about collaboration, innovation, and shared expertise. The ZEISS #measuringhero community brings together professionals from around the world, giving you access to insights, best practices, and real-world applications from a wide range of industries.

Join the community today and take metrology to the next level!

[Subscribe to the #measuringhero Newsletter!](#)





Events

Join us at various trade shows and our own in-house events to experience how ZEISS solutions are designed to meet the requirements of your unique quality inspection challenges.

Upcoming Events

Global Metrology Network

ZEISS Industrial Quality Solutions is a world leader in quality assurance and inspection. Over 5,400 employees from more than 100 sales and service centers support customers around the world. ZEISS is recognized as a leading partner for the automotive, aerospace, power & energy, metal products, mechanical engineering, medical technology, electronics and plastics industries.

The range of solutions includes coordinate measuring machines, optical 3D scanning, 3D testing, computed tomography and microscopy. ZEISS combines trusted hardware with powerful software to inspect, analyze and evaluate quality data.

All key components, such as controllers, software, measuring systems and sensors, are developed and manufactured in-house. To ensure seamless integration into customers' quality assurance processes, ZEISS has deep expertise in loading and automation systems and offers complete turnkey solutions. This combination and a broad product portfolio support customers for today's and tomorrow's challenges.

12
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39
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64
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Seeing beyond