



ZEISS

Seeing beyond

Quality Assurance at all Altitudes

ZEISS Aerospace Solutions



Quality takes flight

Embracing safety and elevating performance

The aerospace industry is constantly evolving. Meet your production targets, pursue sustainable growth, and guarantee the highest safety standards with ZEISS metrology solutions. Dedicated support from our expert team further promotes long-term success.

Safety takes top priority, but staying competitive also means optimizing your production capacity. ZEISS quality assurance (QA) solutions such as material analysis, automation, X-ray, and computed tomography (CT) help address production challenges via early identification of defects.

We understand the importance of sustainability and aim to expedite design-to-delivery processes. Achieve your green goals while maintaining operational efficiency and speed with ZEISS solutions such as additive manufacturing and reverse engineering.



Explore our solutions online:
zeiss.com/aerospacesolutions

ZEISS aerospace solutions for propulsion

Quality-assured blades for extreme conditions

Some 20,000 components make up each aircraft engine, and the tiniest aspects can have major consequences. Fuel efficiency is also a crucial driver for the industry. ZEISS propulsion solutions help tackle these competing challenges with confidence.

Our metrology systems enable measurement of even the smallest tolerances, helping part manufacturers achieve the minimum clearances between components. This in turn saves costs on fuel, reduces emissions, and maximizes the efficiency of the blades and vanes impacting engine performance.

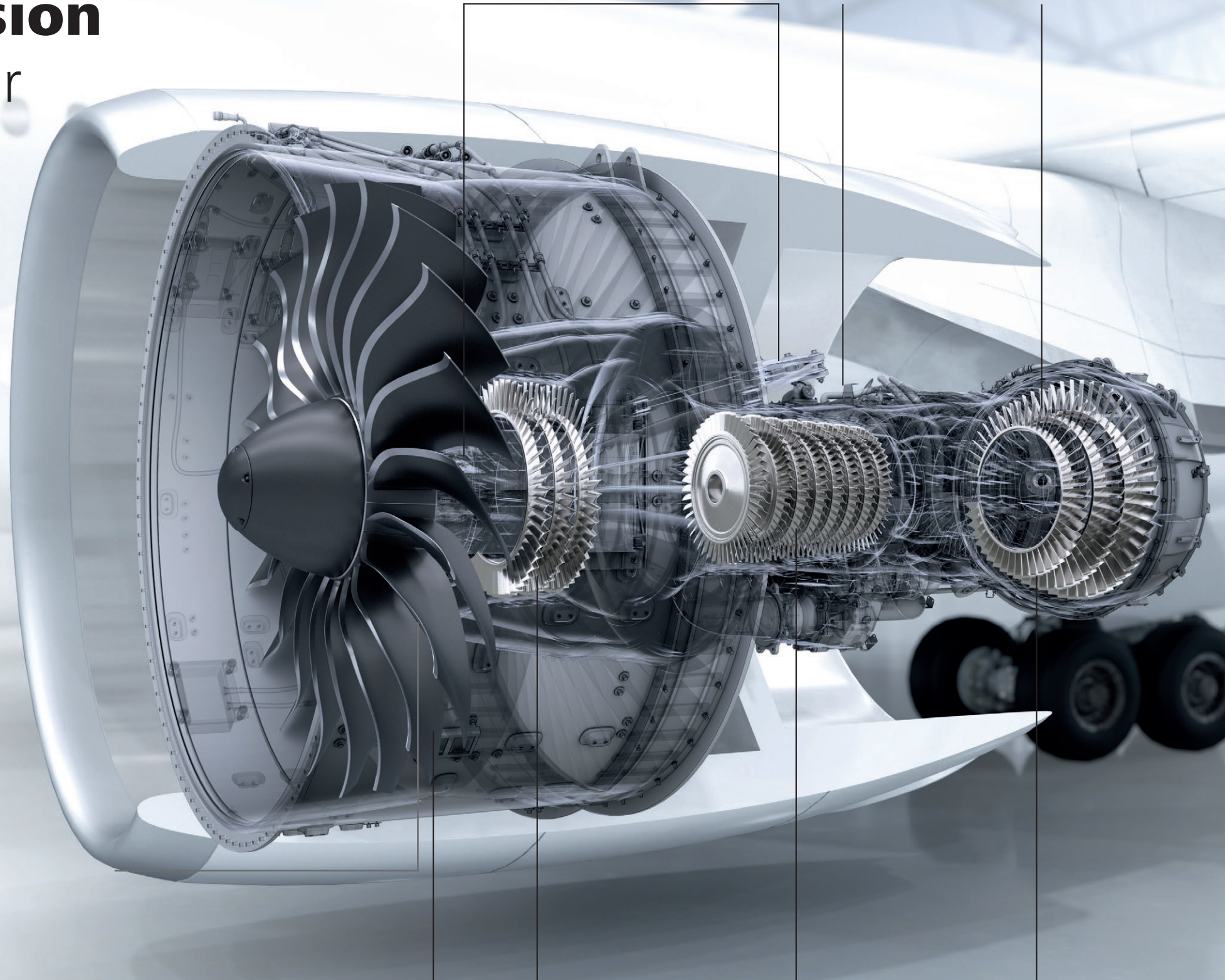
Effective non-destructive testing (NDT) with ZEISS 2D and 3D inspection solutions guarantees structural precision by detecting and evaluating defects without causing damage.

Our portfolio encompasses additional aerospace applications such as helicopter propulsion and space launch systems. We are committed to providing innovative aerospace metrology solutions that assure the quality and integrity of every component – for total peace of mind.

Transmission
Gear measurement
and surface finish

Cases and frames
Geometry and
surface quality

Rotating components
Dimensional and
surface checks



Blades, blisks/IBR, and vanes
Geometry and surface quality

Aerostructure quality management

Scalable metrology for efficient safety

Lightweight, high-strength composites and alloys are enjoying increased use in the aerospace sector. ZEISS microscopy enables detailed analysis and inspection of these materials via advanced optical and multisensor inspection and testing systems.

Facing a shortage of skilled personnel, the industry is pivoting to a single software solution for a more adaptable workforce and minimized training. ZEISS automation and AI support component manufacturers and OEMs, while our software solutions offer an unparalleled competitive edge.

Advanced metrology and software solutions from ZEISS underpin structural design and analysis processes for the benefit of all air vessels. They are essential for ensuring superlative safety, quality you can rely on, and compliance with the highest regulatory standards.

Our off-the-shelf, fully automated measurement systems make light work of large aerostructure components. With standard hardware and custom solutions beyond this, we can support the manufacturing process of all aircraft parts.

Wings

Component geometry inspection
and wing tension analysis

Fuselage

Digitalization and surface
defects analysis

Interiors

Alignment and
geometry inspection

Aircraft systems quality management

Virtual inspection of safety-critical parts

Aircraft systems such as the landing gear and hydraulic subsystems are critical to safety. Huge numbers of parts featuring many hard-to-reach areas need quick, precise measurement.

Early visualization of defects increases productivity and reduces uncertainty. This demands highly flexible solutions that generate relevant data through the interaction of advanced hardware and software.

Enjoy flexible, repeatable, and accurate measurement with ZEISS. Its non-contact 3D scanning technology supports virtual defect inspection from every angle and captures every edge. Digital twin generation enables high-resolution imaging, high repeatability, and a fast turnaround.

With our virtual assembly solutions, you can ensure a proper fit in the final assembly even before the parts leave production. Meet tolerance requirements, exceed quality standards, and guarantee safety with ZEISS.

Mechanical systems and hydraulic hoses

Geometry and material
porosity analysis

Landing gear

Process measurement and
movement analysis

Cost-effective solutions for aerospace MRO

Managing supply chain pressure

ZEISS combines measurement, inspection, and detection methods in its automated processes. These are completed in a fraction of the time and without extensive operator training.

To avoid escalating costs in the context of fuselage damage, ZEISS optical scanning helps you make the right decision in a matter of minutes. Simply scan the affected area, check against the maintenance manual, and get airborne again faster.

You can also vastly reduce the maintenance costs for engine and APU parts via targeted use of 3D data. By applying the digital copy and modern inspection methods, you can quickly establish whether a component is within the limits, needs a repair scheme, or is not serviceable.

Our advanced data analysis and visualization capabilities deliver time and cost savings for MRO hangars and repair shops. They also power data-driven decisions, enhanced workflows, and improved performance.

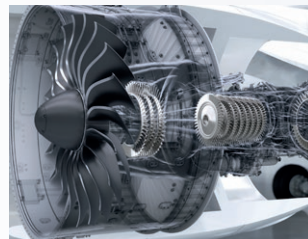
Every minute an aircraft is on the ground (AOG) costs money. And in an aerospace MRO industry that is grappling with an aging workforce, highly manual tasks, a decline in skilled labor, and spare parts shortages, our solutions are uniquely positioned to address these issues and drive efficiency.



Aerostructure
Geometry and surface
precision inspection



Systems
Virtual inspection
and motion analysis



Propulsion
Precision inspection

Driving decarbonization

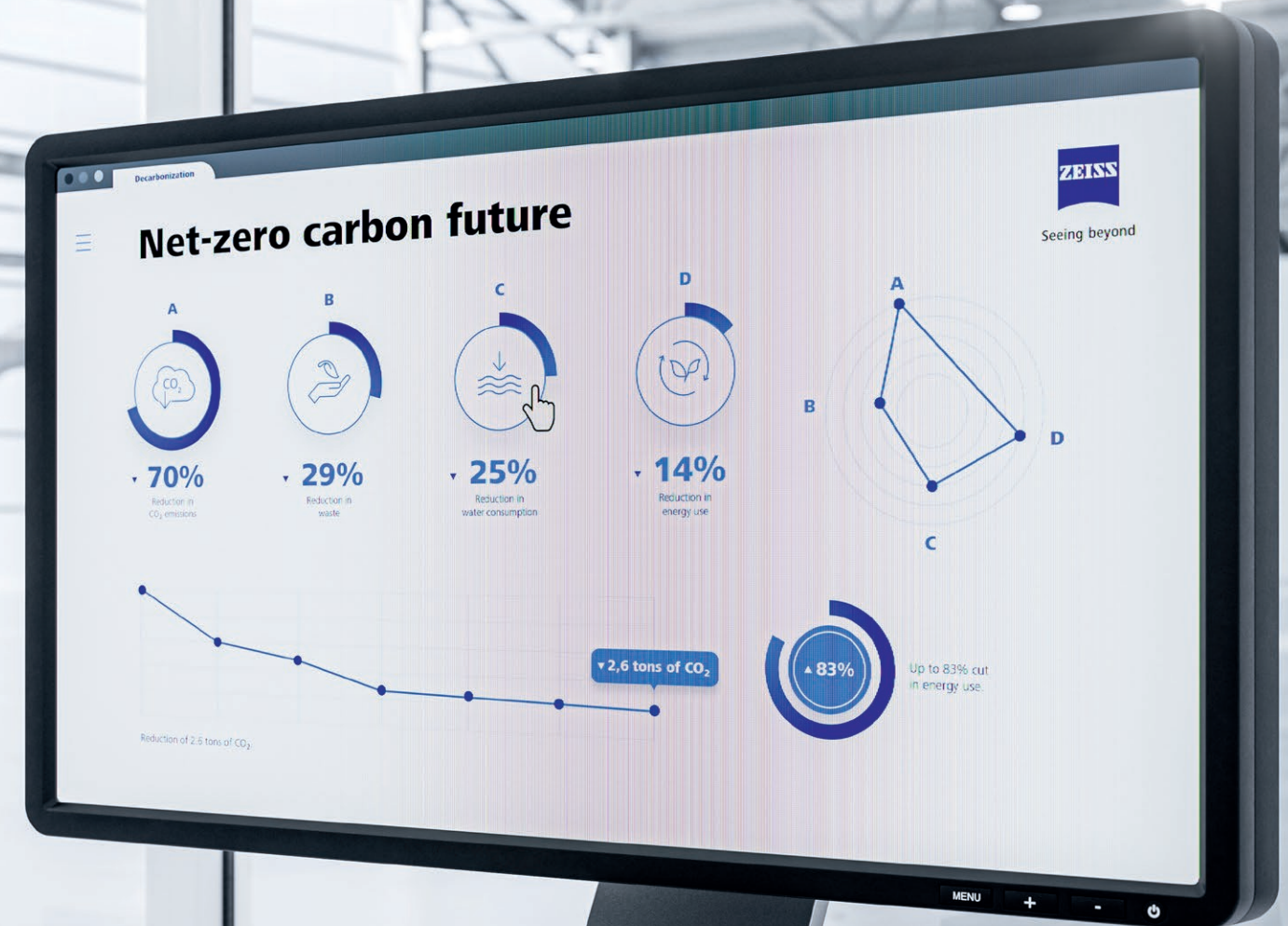
Solutions for the future of flight

Although aerospace contributes only 2 percent of global emissions, it is among the most challenging industries to decarbonize. Yet aerospace decarbonization is crucial for achieving a net-zero future, and quality assurance solutions are essential on this journey.

ZEISS provides the industry with metrology solutions that promote higher precision and lower tolerances, enabling efficiency gains such as reduced fuel consumption and increased engine efficiency. Advancements in quality assurance of lightweight design and novel materials further support the industry in optimizing resource consumption.

To reduce the time between pre-development and series production, ZEISS additive manufacturing solutions enable shortened innovation cycles by means of modernized quality assurance approaches. Additional additive manufacturing and reverse engineering solutions help conserve resources while maintaining operational efficiency and speed.

By leveraging modern technologies and fostering collaboration, we can collectively achieve our aerospace decarbonization goals while maintaining safety, reliability, efficiency, and profitability.



Seamless quality for additive manufacturing

From pre-development to series production

Additive manufacturing, or 3D printing, is a game-changing technology. Offering the potential to enhance production efficiency, reduce costs, and rapidly produce intricate custom parts, it promises to transform the aerospace industry.

To capitalize on these advantages, it is essential to guarantee consistent quality assurance. This covers all aspects from parameter and material development to qualifying the manufacturing process and preserving stability.

Our specialized inspection solution for additive manufacturing provides comprehensive analysis that encompasses material composition, powder integrity, distortion evaluation, defect detection, surface inspection, and more. Integrating these quality assurance processes delivers reliable insight regarding the dependability of additively manufactured parts.

The growing role of artificial intelligence in additive manufacturing is another game-changer. Since AI can analyze defect types and patterns without disrupting production, it enhances quality, enables sustainable process improvements, and sets standards for future series production.



ZEISS portfolio



Want to explore all hardware and software solutions across the entire ZEISS portfolio? Visit us at zeiss.com/metrology

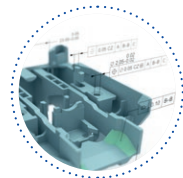
Coordinate measurement solutions



ZEISS CMMs deliver stunning speed, accuracy, and flexibility, while ZEISS VMMs (vision measuring machines) offer outstanding point density for fast optical measurement results.

ZEISS CALYPSO

ZEISS CALYPSO is your dimensional metrology software solution for CMMs.



ZEISS Smart Services

ZEISS Smart Services boost safety, availability, and productivity.



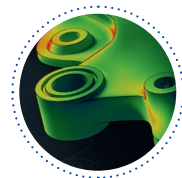
Optical solutions



ZEISS manual and automatic scanning delivers fast high-resolution results for small to medium components. ZEISS optical solutions enable dynamic object measurement to test for deformation or movement.

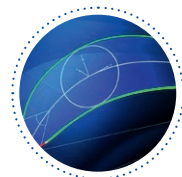
ZEISS INSPECT

ZEISS INSPECT Optical 3D software takes inspection and evaluation to a whole new level with features such as full-field data acquisition and trend analysis.



ZEISS INSPECT Airfoil

This inspection software for blade geometries links directly to ZEISS CALYPSO and ZEISS INSPECT – and can also read third-party data.



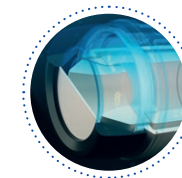
CT and X-ray solutions



2D and 3D X-ray solutions from ZEISS are ideal for fast and non-destructive part evaluation. ZEISS industrial CT enables precise measurements and defect analyses via the data from a single X-ray scan.

ZEISS INSPECT

ZEISS INSPECT X-Ray software performs in-depth visualization and analyses using the data generated with industrial CT.



ZADD Segmentation

Based on machine learning, this software enables the detection, segmentation, and evaluation of defects and abnormalities. AI is used to inspect CT data.



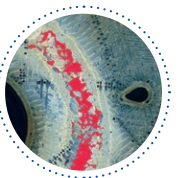
Microscopy solutions



ZEISS offers precision solutions in light, digital, electron, and X-ray microscopy, from specific surface inspection to general material characterization.

ZEISS ZEN core

The powerful imaging and connectivity software ZEISS ZEN core enables traceable analysis and ensures compliance with regulatory demands.



ZEN Intellesis

ZEN Intellesis leverages machine learning to automatically segment multi-dimensional images, even including 3D datasets. This removes the need for manual processing.

Supporting software

Data exchange

The truth from a single source: ZEISS CONNECTED QUALITY enables agnostic, traceable, secure, and global quality processes, offers access to system health and utilization data, and contributes to centrally managed global quality operations.



Data management

ZEISS PiWeb scalable reporting and quality management software combines metrology results from different measuring technologies for efficient tracking of production quality. Its powerful features and intuitive templates handle huge amounts of data and provide immediate results.



Reverse engineering

ZEISS REVERSE ENGINEERING surface reconstruction software promotes the automated, interactive, and highly precise creation of CAD models. The additional tool correction option helps improve CAD data quality.



ZEISS Industrial Quality Solutions – Present in all regions

38

Sales & service organizations

11

Production sites

245

Sales partners worldwide

4,800

Employees

63

ZEISS Quality Excellence Centers

ZEISS Aerospace Solutions promptly generate precise information at all points throughout the product life cycle. For research and development departments, production or manufacturing environments, and maintenance, repair, and overhaul (MRO) facilities, we provide smart solutions for ensuring regulatory compliance and efficiency.

Want to know which solution is perfect for you?
Get in contact with our global aerospace experts.



aero.metrology@zeiss.com



Carl Zeiss Industrielle Messtechnik GmbH

Carl-Zeiss-Straße 22
73447 Oberkochen

Vertrieb

Telefon: +49 7364 20 6337
E-Mail: sales.metrology.de@zeiss.com

Service

Telefon: +49 7364 20 6337
E-Mail: info.metrology.de@zeiss.com

www.zeiss.de/imt

Carl Zeiss Industrial Quality Solutions, LLC

6250 Sycamore Lane North
Maple Grove, MN 55369, USA

Phone: +1 800 327-9735
Fax: +1 763 533-0219
Email: info.metrology.us@zeiss.com

www.zeiss.com/metrology