

OLYMPUS[®]

Industrial Solutions

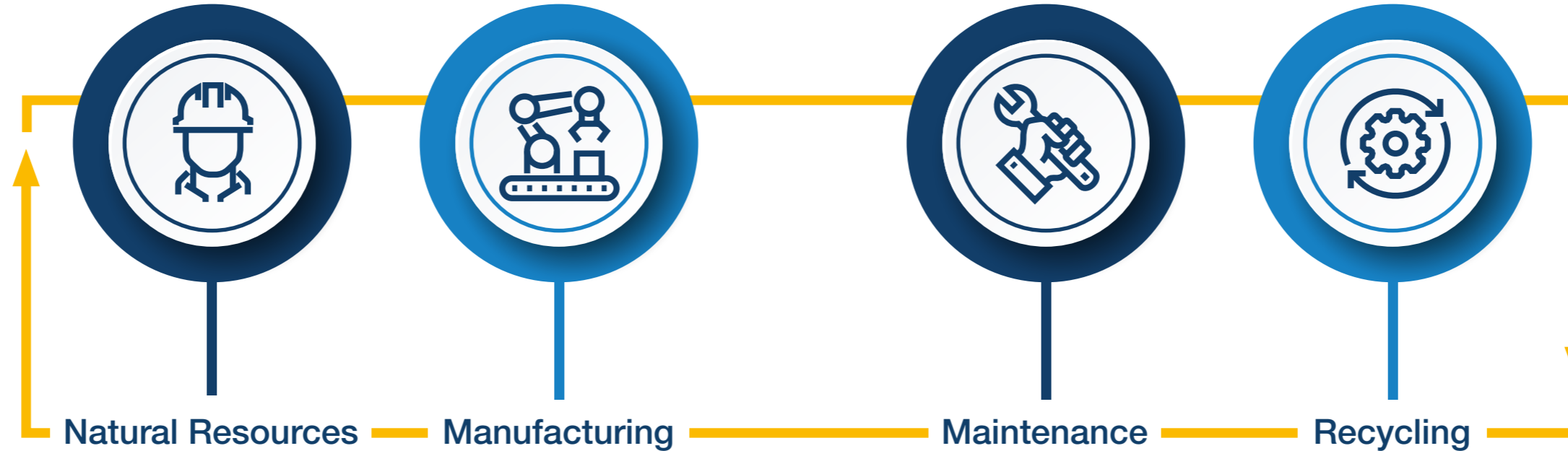


Olympus Scientific Solutions

Companies trust Olympus to provide them with comprehensive inspection solutions to help them solve difficult challenges. Our solutions span the entire resource cycle: mineral exploration and mining, manufacturing, maintenance, and recycling.

Our commitment to designing quality products is linked to our customers' responsibility to ensure safety, quality, and reliability by complying with the highest industry standards and regulations to help people lead safe and productive lives.

Our solutions deliver results that industrial professionals have come to trust. With our diverse portfolio, we offer comprehensive inspection solutions with the flexibility to help you get the job done. If we do not have a solution to your inspection challenge, we can work with you to develop one.



Optimizing natural resource exploration and mining operations, from extraction through mine closure, helps improve efficiency and reduce costs.

Raw minerals are turned into pure metals and alloys and then used to manufacture an array of products from computer chips and electronics to automobiles and airplanes.

Monitoring the condition and composition of parts and components to detect problems before they fail helps prevent downtime and potential environmental damage, so most industries mandate an inspection program.

When products reach the end of their useful life, their raw materials are recycled. Quickly sorting and classifying these materials helps maximize return on investment.



Inspection Technologies



X-ray Fluorescence and X-ray Diffraction

X-ray fluorescence (XRF) provides real-time material chemistry and alloy ID in applications including metal sorting, positive material identification (PMI), geoscience, and hazardous substance screening. X-ray diffraction (XRD) provides phase identification and mineralogy quickly, with little sample preparation.

- Vanta™ series handheld XRF analyzers
- FOX-IQ® in-line XRF analyzer
- TERRA® portable XRD analyzer



Conventional Ultrasound

Single or dual element transducers generate directional sound waves to measure thickness or find hidden flaws inside materials such as metals, plastics, ceramics, and composites.

- EPOCH® series flaw detectors
- 38DL PLUS® thickness gage
- Magna-Mike® series thickness gage



Phased Array Ultrasound

Phased array (PA) uses multielement transducers and powerful software to steer sound beams through the test piece and map returning echoes, producing detailed images of internal structures.

- OmniScan® series flaw detectors
- FOCUS PX™ acquisition instrument



Microscopy

Olympus industrial microscopes combine our renowned optics with powerful software for imaging, analysis, and precision measurement of specimens.

- LEXT® series laser confocal microscopes
- DSX digital microscopes



Remote Visual

After a component is assembled, it can be difficult or even impossible to inspect inside it nondestructively. Remote visual inspection (RVI) uses small, highly maneuverable videoscopes, enabling inspectors to see into difficult-to-access places.

- IPLEX® series videoscopes
- Series C videoscope



Eddy Current

Electromagnetic induction is used to inspect conductive materials. An eddy current (EC) probe with a single coil generates a magnetic field that causes an electrical current to flow through the test piece, enabling surface or near-surface defects to be detected.

- NORTEC® series flaw detectors



Eddy Current Array

Eddy current array (ECA) technology electronically drives and reads several eddy current coils positioned side by side in the same probe. Scan large areas in a single pass with a high resolution and generate C-scan images.

- OmniScan® MX ECA/ECT flaw detector

Geoscience

Olympus provides a full range of solutions for the geoscience industry to help facilitate every stage of the mineral resource life cycle, including exploration, grade control, and mineral processing. Our products include portable, rugged X-ray fluorescence (XRF) and X-ray diffraction (XRD) analyzers and a range of petrological microscopes. This comprehensive solution portfolio enables real-time material chemistry (XRF), quantitative mineralogy (XRD), and traditional optical mineralogy and petrology.



Mining

Fast, accurate decision-making provides miners with substantial cost-reduction opportunities.

- Send fewer grade control samples to the mine-site lab for cost-savings and greater efficiency
- Analyze stockpile material to aid blending and feeding of the mill
- Rapidly delineate mineralogical controls within the deposit

Mineral processing

Olympus' analytical solutions enable metallurgists, mineral processing engineers, and lab managers to monitor efficiency and optimize processes. Mines are increasingly using portable XRF and/or XRD in support of their on-site lab operations.

- Analyze feeds, precipitates, liquids, concentrates, tailings, waste rock, bullion, and activated carbon in real time
- Improved geometallurgical understanding of the deposit
- Optical mineralogy/petrology of host rock materials, gangue, and sulfide mineralogy

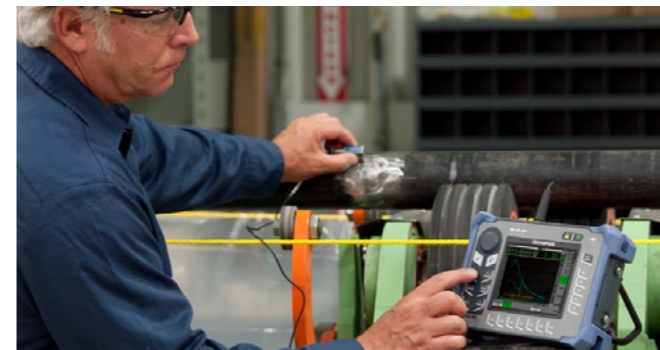
Mineral exploration

Enables explorers to optimize field time, maximize drilling and analytical budgets, and advance project timeframes for smarter decision-making in the field.

- Rugged Vanta™ series handheld XRF analyzers with integrated GPS
- BTX II™ and TERRA® XRD analyzers provide mineralogical information in minutes in a small, energy-efficient package with easy sample preparation
- Full range of upright microscopes for use in petrological and mineralogical investigations

Metal Manufacturing

From small, forged components to cast pieces, to solid metal bars or sheets, metal manufacturers use Olympus nondestructive testing solutions to help verify the quality of the components they are creating or the composition of raw materials.



Testing solid steel bars during production

Bars are tested for cracks, piping voids, and inclusions during production as part of the quality control process.

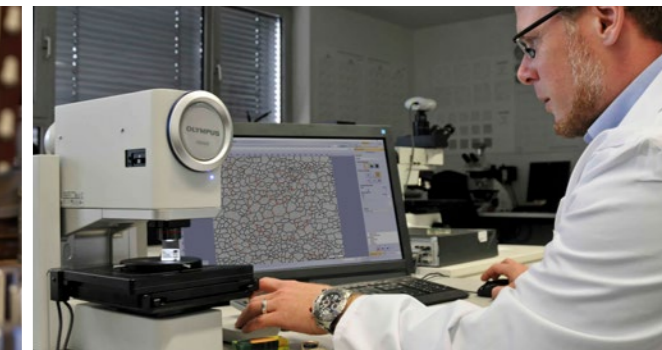
- EPOCH® series ultrasonic flaw detectors provide a fast, cost-effective inspection solution
- Full volumetric coverage of round or square bars provided by the high-speed, in-line Olympus bar inspection system (BIS)
- Eddy current array technology detects near-surface defects



Verify the correct alloy when manufacturing critical components

Vanta™ series XRF analyzers enable fast alloy ID on the spot.

- Standard library includes more than 600 unique alloy grades
- Streamlined record keeping and reporting with wireless connectivity, cloud capabilities, and an optional 5-megapixel panoramic camera
- Optional small spot collimator to isolate small features from the background material



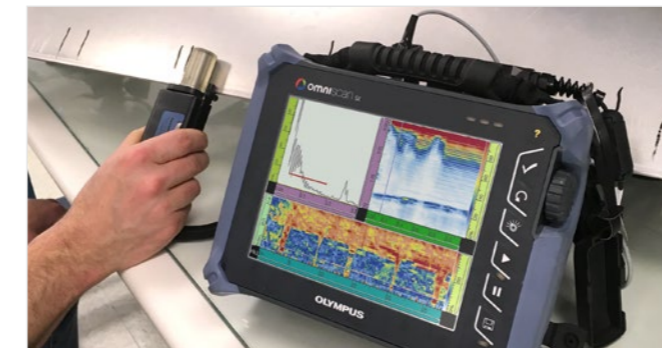
Measuring grain size in metals and alloys

Use Olympus microscopes with OLYMPUS Stream® software to measure the grain size of samples.

- Conduct grain size analysis in compliance with ASTM E112 and international standards
- Use either the intercept or planimetric method to size grains
- Automated grain size calculations via software, minimizing human error

Automotive

The safety and reliability of automobiles rest, in part, on the quality of the materials received from third-party manufacturers as well as the quality of the final assembly. Our inspection solutions enable manufacturers to inspect critical components so they can be confident in the quality of their products.



Inspecting adhesive bonds and welded seams

Automobile components with seams or bonded with adhesives can have weak points. In both instances, inspection with an OmniScan® series phased array flaw detector can help manufacturers spot flaws.

- High-speed data acquisition
- Accurate flaw sizing
- Inspect a seam or weld in a single pass



Cleanliness and quality inspections using microscopes

Olympus stereo microscopes are used to quickly inspect components and verify quality, while the OLYMPUS CIX series cleanliness inspector helps manufacturers meet technical cleanliness requirements.

- Ergonomic stereo microscope components enhance user comfort
- Turnkey technical cleanliness—quickly acquire, process, and document cleanliness data
- Accurate information and repeatable particle measurements



Inspect key vehicle components

After assembly, some engines are pulled from the line to check their combustion chamber for visible imperfections that could cause suboptimal combustion or vehicle performance.

- IPLEX® series videoscopes provide clear, bright images to view small defects
- Thin, flexible videoscopes enable inspectors to access the combustion chamber through the engine's cooling channels
- Insertion tubes with a durable outer layer for a long use-life

Electronics

Manufacturers of precision electronic components regularly test their products to help ensure that they work as expected. As electronic components get smaller, inspection technologies have evolved to keep pace. Our solutions for the electronics industry enable even very fine components to be quickly and easily inspected.



Through-holes in circuit boards

Through-holes are drilled in printed circuit boards (PCBs) during the manufacturing process, but smears of resin left in the holes can prevent conduction in the circuit. Through-holes are inspected to minimize the chances of a short circuit.

- View a clear, all-in-focus image of a through-hole using the extended focal image (EFI) function
- Choose from brightfield, darkfield, MIX (a combination of brightfield and darkfield), differential interference contrast (DIC), and polarization
- Change observation methods with a single click using DSX series digital microscopes



Semiconductor manufacturing

Semiconductor chips and printed circuit boards are dense, and flaws on the boards can cause components to fail prematurely, negatively impacting the quality of the final product.

- Make noncontact, high-resolution 3D measurements of the shape and surface of wafer-level chip size packages (CSPs) using LEXT® series laser microscopes
- Quickly capture sharp images of all parts of a silicon wafer to check laser marks
- Capture 3D images of the edge of semiconductor chips after dicing to help ensure quality



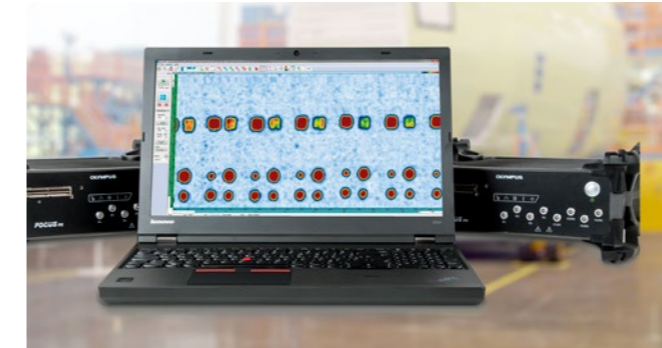
Hazardous material screening

Regulations require that manufacturers ensure consumer electronics are free of lead and other hazardous metals. Our Vanta series XRF analyzers provide immediate pass/fail results on electronic components.

- RoHS (Restriction of Hazardous Substances) directive compliance: detect lead, mercury, chromium, bromine, and cadmium
- Get pass/fail results in seconds
- Check for lead-free compliance in boards, cables, connectors, PCBs, metal components, and solders

Aviation

During manufacturing and maintenance, critical components in aircraft are inspected to check that they are operating correctly. Inspectors must be familiar with multiple NDT technologies, so having equipment that is versatile and easy to use is important.



Inspect composite aircraft components for flaws

The FOCUS PX™ acquisition unit provides full volumetric inspection of composite components, even if they are geometrically complex, to help ensure parts meet high-quality standards during manufacturing.

- Scalable: use up to four acquisition units in parallel
- High data throughput and a high signal-to-noise ratio
- Precise delamination sizing



Check the structural integrity using eddy current technology

Most aircraft are made with aluminum alloys that need to be inspected for corrosion. Eddy current flaw detectors provide a portable, powerful inspection solution.

- Highly reliable detection of surface and near-surface defects
- Eddy current array instruments provide large area coverage and a high probability of detection
- Wide variety of sensors for multiple applications



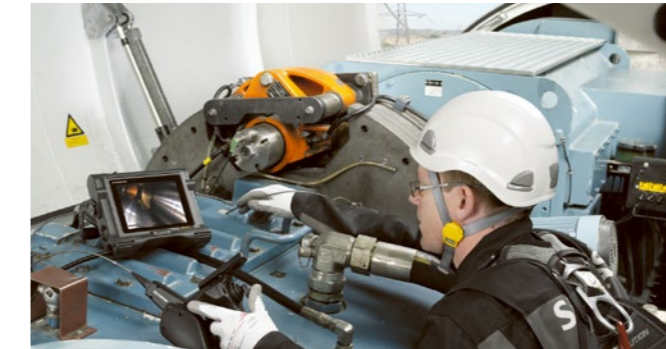
Look inside jet engines for cracks, erosion, and other flaws

Remote visual inspection with IPLEX® series videoscopes provides maximum probability of detection of critical defects in jet engines to help ensure safety.

- Quickly maneuver the videoscope to the inspection location
- Locate and measure cracks with high-resolution images and stereo measurement
- Record images and measurement data for comprehensive reporting

Power Generation

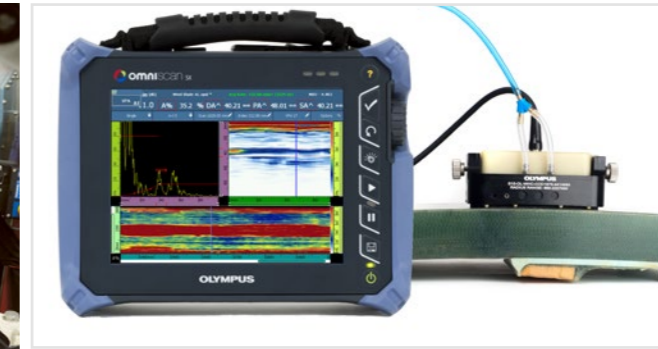
Power generation infrastructures operate in harsh environments and under high levels of stress. Consequently, various NDT tests are necessary to help ensure component integrity during manufacturing, construction, and maintenance.



Visual inspection of gearboxes

Wind turbine components are exposed to demanding in-service conditions, including mechanical stress and corrosive environments. Their cramped interiors are challenging to inspect visually, but IPLEX® series videoscopes enable inspectors to see into difficult-to-reach areas.

- Bright, high-resolution images
- Oil clearing tip adaptor helps save time
- Automated report generation with InHelp® software



Wind blade spar cap and shear web bonding inspection

Wind blades are subjected to considerable lift forces. The quality of the bonding between the blade's shear webs and spar caps must be tested to help ensure the blade's integrity.

- Low-frequency probes for inspecting glass and carbon fiber-reinforced materials
- Probes and holders for inspecting thick or thin materials, optimized for near-surface resolution
- Options for manual encoded or semiautomated encoded inspections



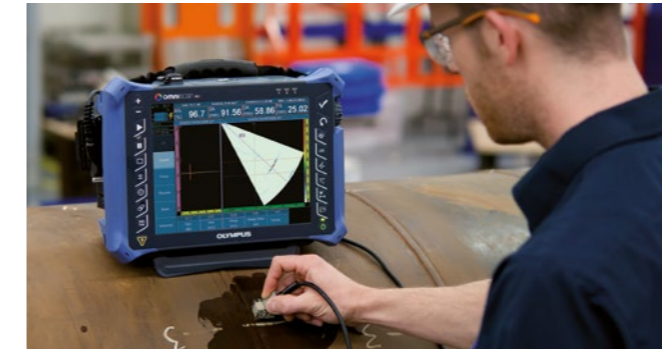
Circumferential weld inspection in wind turbine towers

Wind tower sections are joined together using circumferential welds, and these welds must be inspected to help ensure the tower's structural integrity. Olympus conventional and phased array ultrasonic scanners are used to quickly inspect circumferential welds for flaws.

- High signal-to-noise ratio
- Quickly detect and size volumetric flaws in the weld
- Detect and position surface-breaking defects

Oil & Gas

A regular nondestructive testing program is important to help maintain the safe and efficient operation of pipelines and other assets in the oil and gas industry and minimize costly unplanned downtime.



Inspect clad pipe and vessels for stress corrosion cracking

Stress corrosion cracking (SCC) forms in a corrosive environment. If this damage mechanism goes undetected, it can result in a critical failure.

- Inspect welds through painted surfaces with Olympus' MagnaFORM™ eddy current array solution
- Inspect the entire weld surface in a single pass
- Inspect rough or corroded surfaces without cleaning or stripping



Inspect offshore platform supports for corrosion and erosion

Steel offshore platforms are susceptible to corrosion and must be regularly inspected, but the remote location and rope access requirements pose challenges. The lightweight EPOCH® 6LT flaw detector with the rope access accessory kit can attach to a user's leg or harness, helping make these inspections easier and more efficient.

- Available corrosion module software makes corrosion scanning fast and efficient
- User interface optimized for one-handed operation
- Transmit and archive inspection data wirelessly using the Olympus Scientific Cloud



Use the right alloy for the right application

Alloys can have different properties, such as high heat tolerances, resistance to corrosion, and durability. It is difficult to visually tell these alloys apart, so inspectors use Vanta™ handheld XRF analyzers for positive material identification.

- Comply with the American Petroleum Institute (API) Recommended Practice (RP) 578—material verification program for new and existing alloy piping systems
- In-service inspection of high-temperature systems and hot sample surfaces (up to 425 °C)
- Evaluate flow-accelerated corrosion (FAC) susceptibility

Olympus Scientific Solutions

Olympus was established in 1919 when founder Takeshi Yamashita told his engineers that imitations of imported microscopes would not suffice and that the goal should always be to create something new. This idea continues to drive Olympus today through our history of innovation and our commitment to research and development.

Our community and our customers are at the center of everything we do. Our goal is to supply reliable systems that support our customers with enhanced safety, quality, and productivity and provide solutions that help people around the world live safer, healthier lives.

Committed to the Community

We support the communities where we live and work through outreach programs including food drives, planting trees, and donating our time and resources. Olympus is also a member of the United Nations' Global Compact, a pledge to the international community to align our operation with universal principles of human rights, sustainability, and responsibility.

Committed to Sustainability

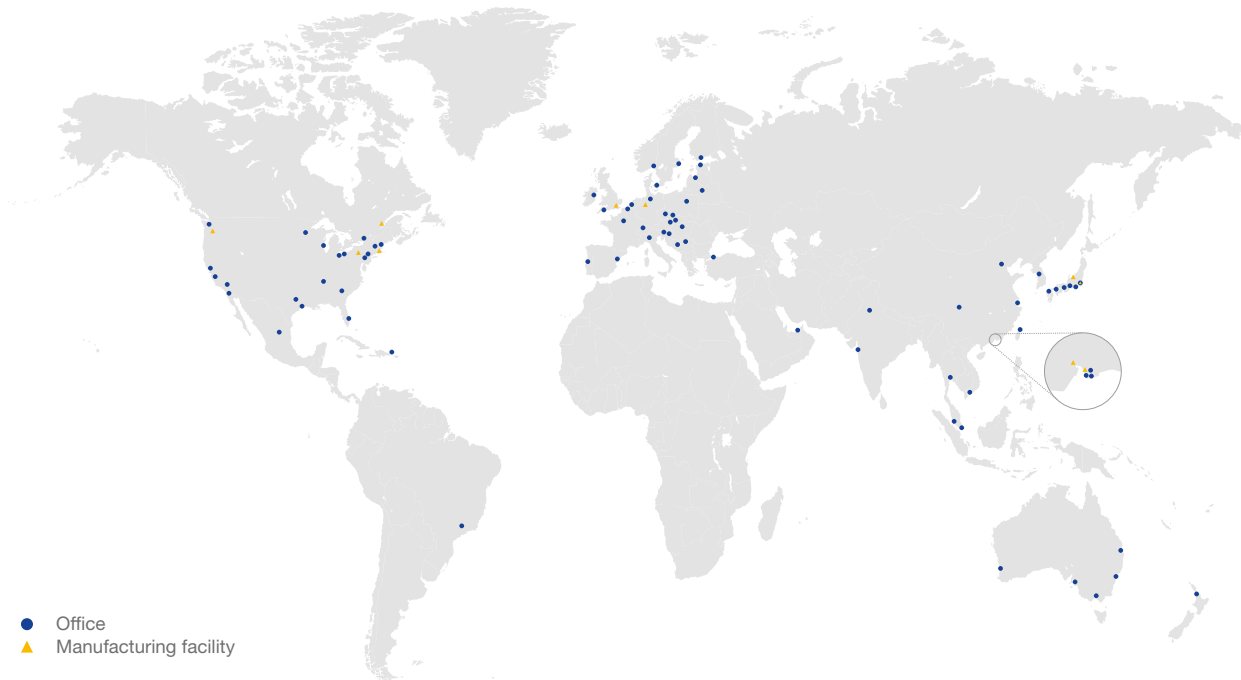
Olympus is committed environmental sustainability both in our manufacturing practices and in the products that we make. We follow a rigorous environmental management program and comply with all regional and international environmental legislation.

Service and Support

We serve the needs of our customers anytime, anywhere. Our global network of sales and service teams are ready to answer questions about our products, applications, training, and technologies. Our sales representatives will help you choose the solution you need for your application. If you are not ready to purchase, we also offer rental and lease options.*

We stand behind our products with technical support and after-sales service. Our professionally staffed service centers **are dedicated** to assisting customers with repair or calibration throughout the life of their equipment. Our service facilities provide expert troubleshooting and technical support and turn around repair or service requests as quickly as possible.

*Rental not available in every country. Please contact your local Olympus representative.



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OLYMPUS

OLYMPUS CORPORATION OF THE AMERICAS

48 Woerd Avenue, Waltham, MA 02453, USA, Tel.: (1) 781-419-9300
110 Magellan Circle, Webster, TX 77598, USA, Tel.: (1) 281-922-9300

OLYMPUS CORPORATION

Shinjuku Monolith, 3-1Nishi-Shinjuku2-chome, Shinjuku-ku, Tokyo 163-0914, Japan, Tel: 81(0)3-6901-4039

OLYMPUS EUROPA SE & CO. KG

Wendenstraße 14-18, 20097 Hamburg, Germany, Tel.: (49) 40-23773-0

OLYMPUS CORPORATION OF ASIA PACIFIC LIMITED

L43, Office Tower, Langham Place, 8 Argyle Street, Mongkok, Kowloon, Hong Kong

OLYMPUS (CHINA) CO., LTD.

A&F, Ping An International Financial Center, No. 1-3, Xinyuan South Road, Chaoyang District, Beijing, 100027 P.R.C.

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