



Product Information
Version 1.0

ZEISS MinSCAN

The Core of Your Mine-Site Mineralogy Laboratory



Revolutionize Your Plant Performance

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- › The Applications

- › Service

Monitor your mineral processing plant through daily mineralogical analysis of process streams. With ZEISS MinSCAN, you build up a comprehensive understanding of the daily performance of your plant.

Use the data from ZEISS MinSCAN to increase profits through greater concentrate quality and reduced losses to tailings. Rapidly troubleshoot recovery issues, optimize plant performance and compliment assays by giving metallurgists, mine managers and superintendents the confidence to make effective decisions based on quantitative data.

ZEISS MinSCAN marks a step change in automated mineralogy technology building on the unrivaled pedigree of ZEISS to supply rugged SEM hardware for challenging environments. In collaboration with its key industry partners, ZEISS introduces a complete field proven end to end solution to industry for the first time.



Optimize mineral processing circuits at the mine-site



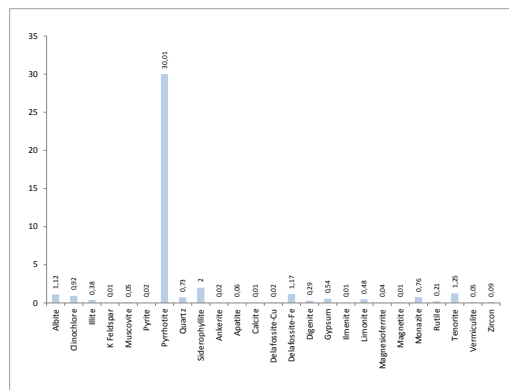
Mineral processing plant

Simpler. More Intelligent. More Integrated.

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Plant Troubleshooting

Use ZEISS MinSCAN data to improve your bottom line. With a systematic sampling strategy and rapid data generation, MinSCAN can provide quantitative answers to the following questions: Are recoverable minerals being lost to tailings? Is the concentrate being diluted? Is the incoming ore type going to the correct process stream? Are penalty elements being sent to the refinery? Having answers to these questions backed by data can enable process improvement superintendents to make the right cost saving decisions for the plant.

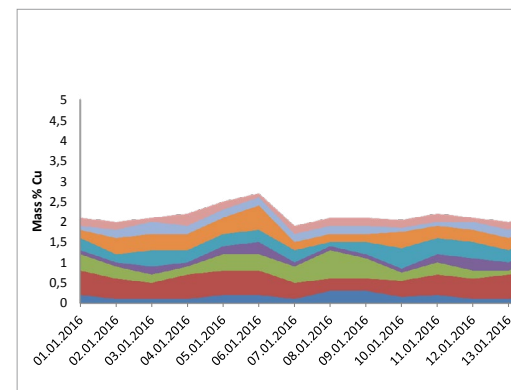


Data proving pyrite dilution of concentrate

Daily Plant Monitoring

Through systematic sampling of the feed, concentrate and tailings of your process streams, understand the changes in target mineral recovery by separating the effects of ore variability from that of processing plant parameters.

Build up an average picture of the feed quality over time and processing plant performance to gauge whether the day's performance is unusually high or low. Use information regarding unoptimized processing plant performance to kickoff process improvement projects and rectify issues backed by historical data. Use information regarding poor feed quality to guide the mine plan and maximize the overall profit of the operation.



Trending graph showing bulk mineralogy variation over time

Feed Forward Analysis

Use ZEISS MinSCAN to analyze blast chippings of mine blocks to direct feed ore to the correct processing stream. Through a fast understanding of the mineralogy and texture of the mine block, a decision can be made to send it to the most appropriate processing stream or even straight to waste to avoid uneconomical processing. During feasibility, use MinSCAN data to refine the block model and incorporate mineralogy and texture into the mine plan.



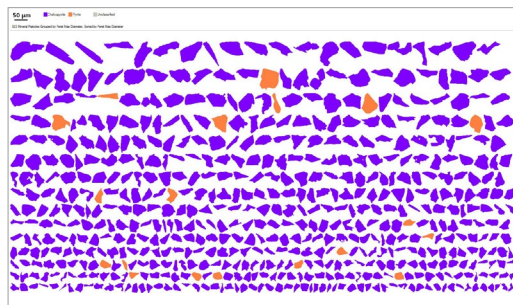
Optimization of extraction processing
Drive ore stockpiling decisions

Your Insight into the Technology Behind It

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View and Manage Your Results

Use Mineralogic's Explorer application to browse results of mineralogy, mineral associations, mineral partial exposed perimeter, elemental assay, locking and mineral liberation. Sort particles and grains, and view individual particles, grains, pores or fields of view. You can automatically separate touching particles. Create large mineral maps and BSD grayscale montages. Enjoy the convenience of modifying mineral classifications. Retrospectively reanalyze data offline increasing productivity. Quickly export data for further handling.



Mineral particles images of heavy mineral sand feed, sorted by Feret max diameter

Remote Data Interpretation

MinSCAN is designed to be operated from anywhere in the world. When connected to a network, data from Mineralogic can be transferred to the cloud and interrogated by the ZEISS applications team to improve results, methods and workflows.

With full remote diagnostic, monitoring and data export capability, you can always be in direct contact with your instrument. Interpretation of results can be performed anywhere in the world enabling your distributed team to be a mouse click away.



Remote access technical support maximizes system uptime

Tailored Precisely to Your Applications

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Typical Applications, Typical Samples	Task	ZEISS MinSCAN Offers
Troubleshooting	Mineral processing efficiency improvement	<ul style="list-style-type: none"> ■ Modal mineralogy ■ Assay ■ Mineral association ■ Liberation ■ Particle size distribution ■ Grain size distribution ■ Exposed particle surface ■ Daily, weekly and monthly trend charts ■ Grade Recovery Curve ■ Cumulative Liberation Yield
Plant Modelling	Benchmarking plant performance and feed quality	<ul style="list-style-type: none"> ■ Modal mineralogy ■ Assay ■ Mineral association ■ Liberation ■ Particle size distribution ■ Grain size distribution ■ Exposed particle surface ■ Daily, weekly and monthly trend charts ■ Grade Recovery Curve ■ Cumulative Liberation Yield

Tailored Precisely to Your Applications

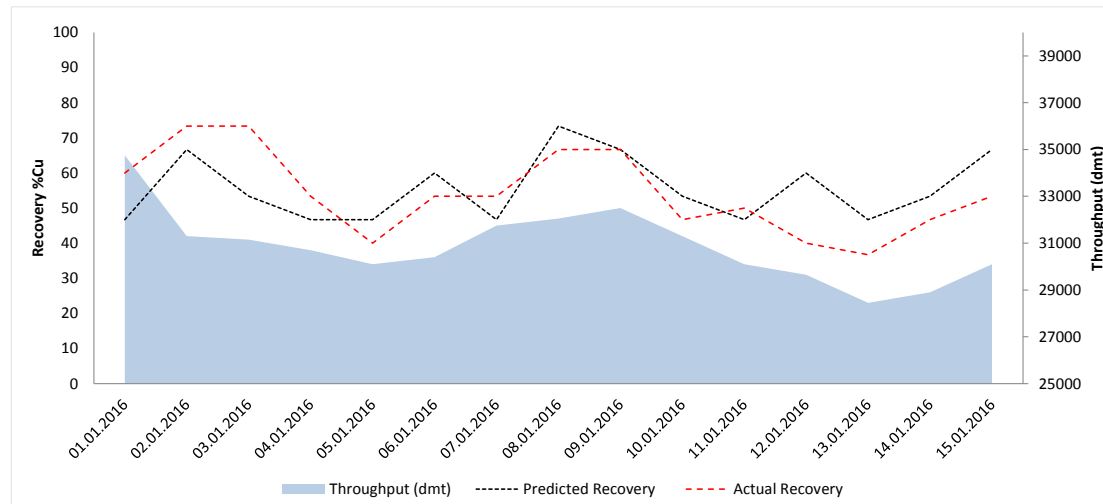
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Typical Applications, Typical Samples	Task	ZEISS MinSCAN Offers
Early Gangue Rejection	Increase head grade through gangue rejection	<ul style="list-style-type: none"> ■ Modal mineralogy ■ Assay ■ Mineral association ■ Liberation ■ Particle size distribution ■ Grain size distribution ■ Exposed particle surface ■ Daily, weekly and monthly trend charts ■ Grade Recovery Curve ■ Cumulative Liberation Yield
Feasibility	Understand the viability of an ore deposit for economic recovery	<ul style="list-style-type: none"> ■ Modal mineralogy ■ Assay ■ Mineral association ■ Liberation ■ Particle size distribution ■ Grain size distribution ■ Exposed particle surface ■ Daily, weekly and monthly trend charts ■ Grade Recovery Curve ■ Cumulative Liberation Yield
Exploration	Use mineral vectoring to identify new deposits	<ul style="list-style-type: none"> ■ Correlation to LA-ICP-MS

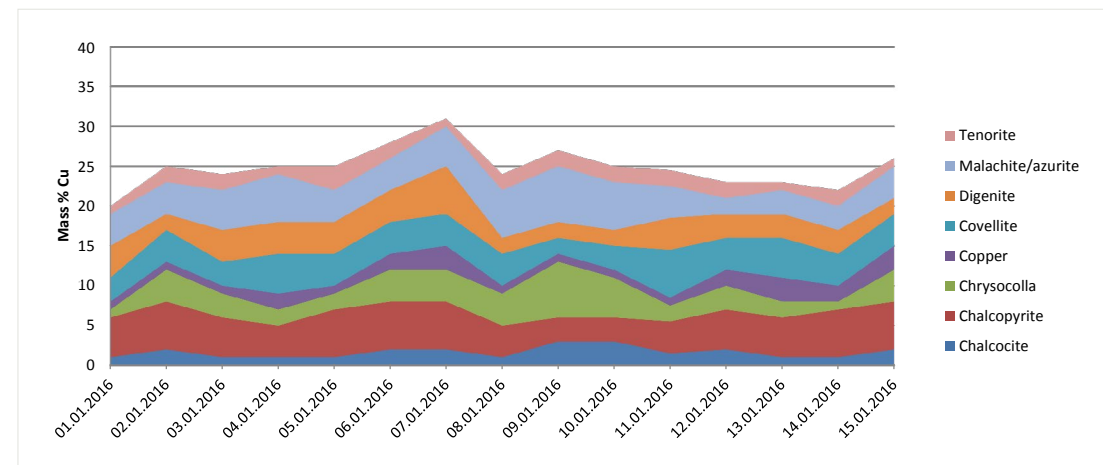
ZEISS MinSCAN at Work

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Trending data produced by MinSCAN running bulk mineralogy analyses on 27 samples per day at a large copper mine. Example shows a drop in recovery correlates well with a spike in copper bearing minerals in the final tailings.



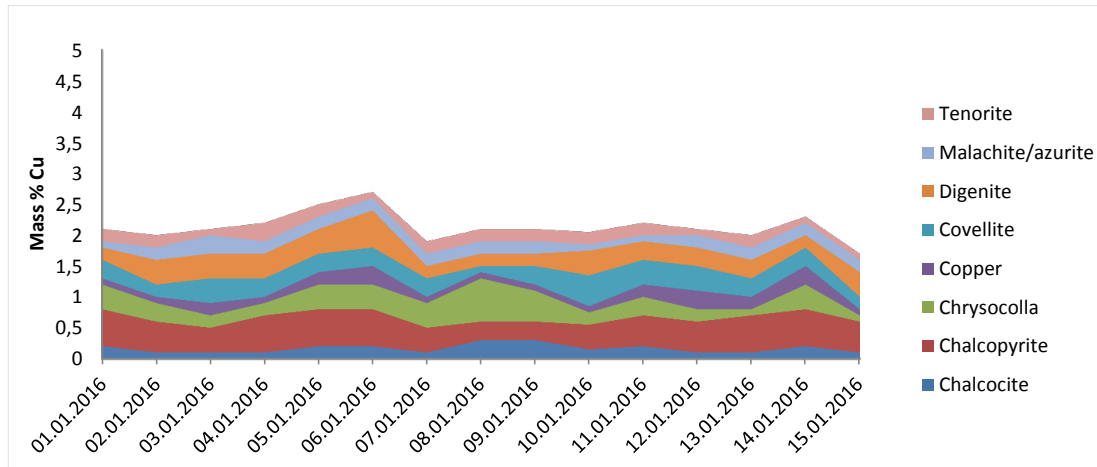
Plant performance



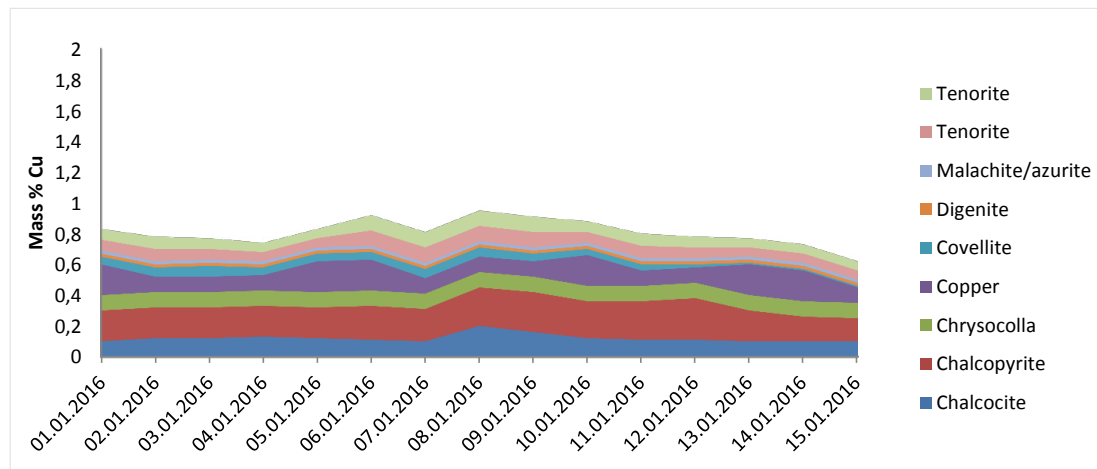
Distribution of Cu in Re-cleaner concentrate

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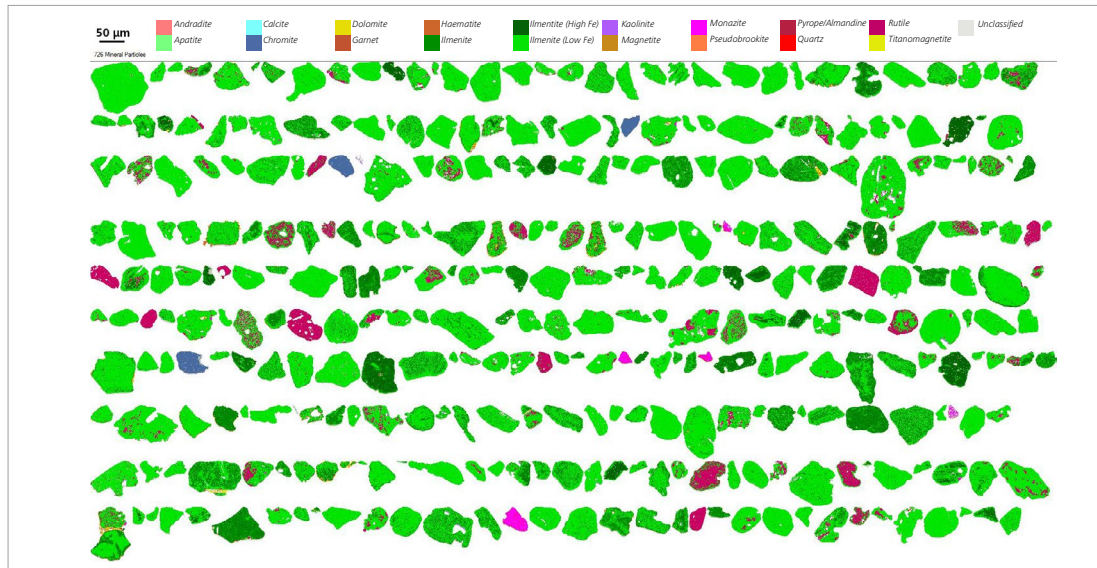
Cu deportment by mineral in cyclone overflow



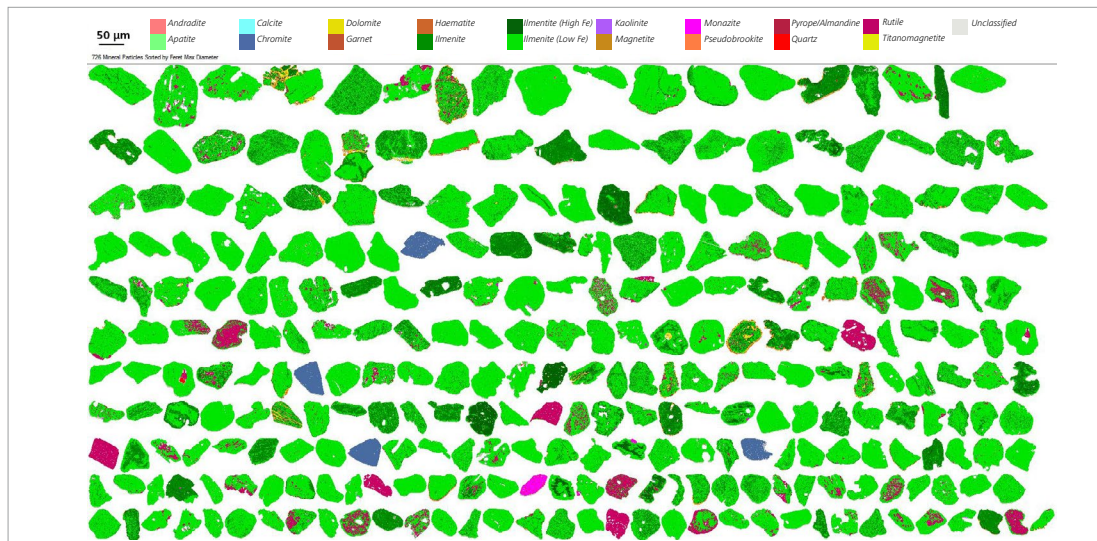
Distribution of Cu bearing minerals in final tail

ZEISS MinSCAN at Work

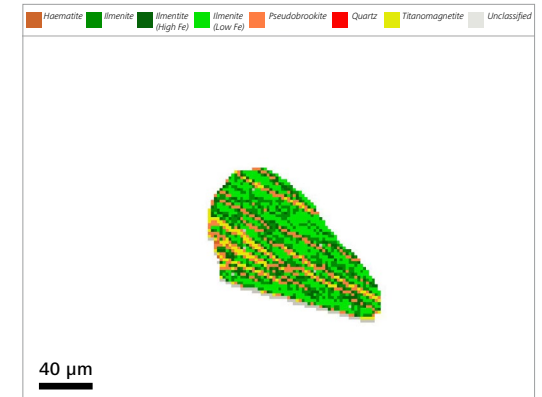
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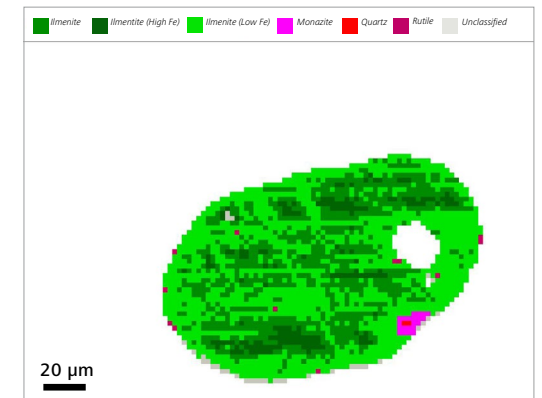
Randomly sorted heavy mineral sand mineral particles



Heavy mineral sand mineral particles sorted by Feret max diameter



Detailed high resolution mineral map of a heavy mineral sand particle



Detailed high resolution mineral map of a heavy mineral sand particle

Expand Your Possibilities

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Automated mineralogy solutions from ZEISS are also available on laboratory based instruments. Choose between C-SEM and FE-SEM analytical technology and between 1 and 3 EDS detectors. Complement automated mineralogy with WDX, XRF or Raman spectroscopy.

ZEISS EVO for 24/7 Ore Process Control

EVO is the industry standard platform for automated mineralogy and is in operation worldwide in mineral processing laboratories. EVO's column isolation valve allows fast sample transfer and chamber pump down, making it the ideal SEM for 24/7 ore processing. Choose between three chamber sizes – 10, 15 or 25 – to get the right system for your application. Use EVO in variable pressure mode for easy analysis of uncoated samples, shortening your time to result.



ZEISS Sigma 300 for Research into Ore Processing

Sigma is a Schottky thermal emitter which combines a high brightness source with high stability improving your time to result. By exploiting Sigma's exceptional imaging capabilities, you can distinguish minerals of similar average atomic weight by grayscale alone (0.07 atomic mass unit resolution). The multi-purpose nature of Sigma allows it to perform a range of complementary analytical techniques for maximum flexibility.

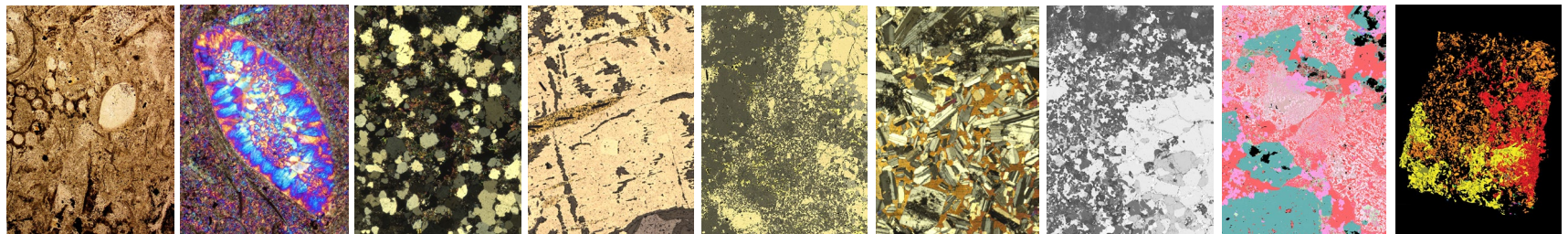


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Microscopy Solutions for Natural Resources

ZEISS offers you the industry's widest range of imaging solutions for natural resources. Choose from light, electron and ion microscopes with an imaging range from 1 μm to 0.5 nm resolution. Use multiple technologies for imaging and correlate your data to gain a deeper understanding of your samples. Choose between focused ion beam and X-ray microscopy for imaging of volumes with voxel resolution as small as 5 nm.



**Stereo
Microscopes**

**Teaching
Microscopes**

**Polarized Light
Microscopes**

**Widefield
Microscopes**

**Research
Microscopes**

**Slide
Scanner**

**Scanning
Electron
Microscopes**

**Automated
Mineralogy
Systems**

**X-ray
Microscopes**

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Correlative Image Viewing with ZEISS Atlas 5

With Atlas 5 you can compare and correlate data from any microscope system. Combine images from the same region of interest, acquired with optical, electron, ion and X-ray microscopes. Atlas 5 is your disruptive technology for correlative data interaction in mining and geoscience.

Correlate the Following Image Types:

- Polarized images from a light microscope such as Axio Imager 2
- Secondary electron, backscatter and cathodoluminescence images from a scanning electron microscope such as EVO, Sigma, GeminiSEM and MERLIN
- Mineral maps from a petrological analyzer such as Mineralogic
- Virtual 2D data slices from an X-ray microscope such as Xradia Versa and Xradia Ultra



Count on Service in the True Sense of the Word

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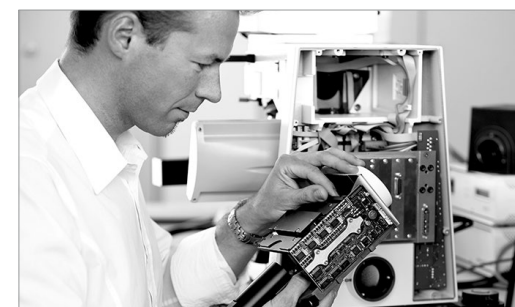
Because the ZEISS microscope system is one of your most important tools, we make sure it is always ready to perform. What's more, we'll see to it that you are employing all the options that get the best from your microscope. You can choose from a range of service products, each delivered by highly qualified ZEISS MinSCAN specialists who will support you long beyond the purchase of your system. Our aim is to enable you to experience those special moments that inspire your work.

Repair. Maintain. Optimize.

Attain maximum uptime with your microscope. A ZEISS Protect Service Agreement lets you budget for operating costs, all the while reducing costly downtime and achieving the best results through the improved performance of your system. Choose from service agreements designed to give you a range of options and control levels. We'll work with you to select the Protect Service Agreement that addresses your system needs and usage requirements, in line with your organization's standard practices. Our service on-demand also brings you distinct advantages. ZEISS service staff will analyze issues at hand and resolve them – whether using ZEISS Connected Assistance remote service or working on site.

Enhance Your Microscope System.

Your ZEISS microscope system is designed for a variety of updates; open interfaces allow you to maintain a high technological level at all times. As a result you'll work more efficiently now, while extending the productive lifetime of your microscope as new update possibilities come on stream.



Profit from the optimized performance of your microscope system with services from ZEISS – now and for years to come.

>> www.zeiss.com/microservice



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Not for therapeutic, treatment or medical diagnostic evidence. Not all products are available in every country.
Contact your local ZEISS representative for more information.
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