



High-performance optics with perfect documentation

**Leica Z6 APO and Z16 APO, the superlative modular 6.3:1 and 16:1 zoom systems
for inspection, system integration, machine vision and more**

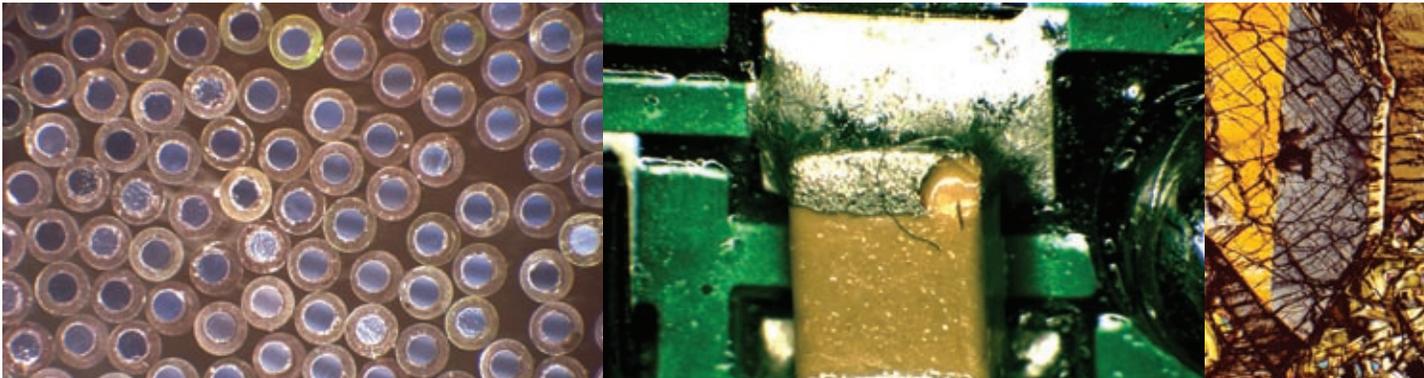
Leica
MICROSYSTEMS

Fit for zero-defect production

In every area of industry, quality objectives are continually reaching new levels; throughput and productivity have to be on the increase at all times. Cost-effective production, high process speeds and 100% quality ensure that companies can remain competitive. It is all about making processes fast. This applies not only to production, but to quality control as well. Likewise, more and more companies are requiring less than 100 DPM (Defects per Million) from their vendors. World-class companies must pursue a practice of zero-defect production.

High performance at a reasonable price

Performance requirements for optical inspection systems have risen correspondingly. The optics used in these systems must conform to the most stringent quality criteria, and frequently also have to withstand difficult conditions in a rough industrial environment. High performance at a reasonable price is in demand. For high-precision inspections throughout the entire production process to integration in machine vision systems, there are now two fully apochromatically corrected zoom systems on the market – the Leica Z6 APO with 6.3:1 zoom and the Leica Z16 APO with 16:1 zoom. Combined with apochromatic objectives, the Leica Z6 APO and Z16 APO outperform other zoom systems in contrast, image sharpness, color fidelity and image precision. With the Leica Z6 APO and Z16 APO, you can set your quality objectives higher starting now.



Fiber-optic section

Bad soldering point

Peridot stone

From individual measurement and inspection stations to system integration

What is more, we can offer complete individual measurement and inspection stations tailored to the your custom needs. The new zoom systems include the widest line of accessory products to meet every imaginable examination, training, and documentation task. With compatible stands, illuminators, binocular tubes and video/phototubes, motorized focus, modern CCD cameras, and much more, the Leica Z6 APO and Z16 APO are suitable for measuring, documenting and analyzing in the QA lab, just as they are suited for biology, geology, histology and training.

100% quality with the Leica Z6 APO and Z16 APO



Leica Z6 APO highlights

- Zoom 6.3:1, zoom range 0.57× – 3.6×
- Fully apochromatic zoom system and apochromatic objectives for superlative contrast, color fidelity and detail richness
- Magnification 7.1× – 45× visual (with 1× planapochromatic objective, 10× eyepieces, 1.25× Y tube)
- Total magnification 360× visual (with 2× planapochromatic objective, 40× eyepieces, 1.25× Y tube)
- Highest resolution 351 Lp/mm visual* to maximum 702 Lp/mm**
- Highest numerical aperture 0.117 visual* to maximum 0.234**
- Large working distance 97mm* or 39mm**
- Perfect for multifocus applications in various specimen planes
- Highest image fidelity for precise measurements, analysis and documentation
- True color polarization for polarized optical examinations
- Smooth, distortion-free images of flat reflective objects for coaxial-illumination
- Motorized focus (optional)
- Fine focusing for precision focussing at high magnification levels
- Adaptation of 10× and 20× microscope objectives
- Switchable zoom positions for repetitive tasks
- Built-in iris diaphragm for depth of field adjustment
- Apochromatic ErgoTube® with variable viewing angle 10° – 50°
- Accessories in modular design, compatible with accessories from the Leica M stereomicroscope product line
- High-performance transmitted-light base for best relief contrast
- Digital high-performance cameras and image analysis software

* with 1× planapochromatic objective

** with 2× planapochromatic objective

Slim and fit for digital recording and processing

Leica Z6 APO zoom system with fine focusing, planapochromatic objective, carrier and AS video/phototube, video objective with C-mount, Leica DC300 digital camera, incident-light base and focusing drive



It is not quality that costs, it is the lack thereof



Process-concurrent quality control is an extremely important part of industrial production. Testing must be performed for tolerance deviations and their causes; they must be detected and eliminated at the earliest processing stage possible, and not only after the entire value-creation chain has been completed. The longer it takes to discover and remedy defects, the graver their consequences on the company. Quality errors incur consequential costs from waste, rework, down time, quantity errors and so on, in addition to the costs for processing returns, warranties, damage to the company's image, and decline in sales – which are difficult to quantify.

The Leica Z6 APO and Z16 APO fully apochromatic zoom systems now offer you the security of knowing that deviations are detected accurately, and that remedial measures can be implemented at an early stage. When it comes to guaranteeing completeness, checking positions, ensuring dimensional accuracy and contours, and recognizing types, the Leica Z6 APO and Z16 APO ensure efficient, non-destructive 100% quality control. Increase the quality of your QA and shorten your time-to-market.

Leica Z6 APO – highest resolution, highest numerical aperture

The higher the numerical aperture, the better the resolution. Compared to other zoom systems, the Leica Z6 APO with 6.3:1 zoom offers the highest numerical aperture: 0.117 nA (resolution of 351 Lp/mm) with the 1× planapochromatic objective and 0.234 nA (resolution of 702 Lp/mm) with the 2× planapochromatic objective. Details of the specimen appear in higher resolution, and the quantity and quality of information are increased. Because of its very high resolution, the Leica Z6 APO is exceptionally well suited to industrial, scientific and medical applications.

Leica Z6 APO is slim and compact and lends itself as a high-performance optical system for measuring and testing equipment, up to «seeing systems». The incredibly wide range of accessories allows the Leica Z6 APO to be expanded to a high-performance workstation in the test lab for training, documentation and video inspections.

Leica Z16 APO highlights

- Zoom 16:1, zoom range 0.57× – 9.2×
- Fully apochromatic zoom system and apochromatic objectives for superlative contrast, color fidelity and detail richness
- Magnification 7.1× – 115× visual (with 1× planapochromatic objective, 10× eyepieces, 1.25× Y tube)
- Total magnification 920× visual (with 2× planapochromatic objective, 40× eyepieces, 1.25× Y tube)
- Resolution 336 Lp/mm visual* to maximum 672 Lp/mm**
- Numerical aperture 0.112 visual* to maximum 0.224**
- Large working distance 97mm* or 39mm**
- Motorized focus (optional)
- Fine focusing for precise focussing at high magnification levels
- Adaptation of 10× and 20× microscope objectives
- Perfect for multifocus applications in various specimen planes
- Highest image fidelity for precise measurements, analysis and documentation
- True color polarization for optical polarization examinations
- Smooth, distortion-free images of flat reflective objects for coaxial illumination
- Switchable zoom positions for repetitive tasks
- Built-in iris diaphragm for depth of field adjustment
- Apochromatic ErgoTube® with variable viewing angle 10° – 50°
- Accessories in modular design, compatible with accessories from the Leica M stereomicroscope product line
- High-performance transmitted-light base for best relief contrast
- Digital high-performance cameras and image analysis software

* with 1× planapochromatic objective

** with 2× planapochromatic objective

The best relief contrast for transparent and semitransparent specimens

Leica Z16 APO system with fine focusing, planapochromatic objective, A-video/photo-tube, video objective, Leica DC480 digital camera, coarse/fine focusing drive and HL RC™ transmitted-light base for the most demanding applications, positive/inverted/dynamic relief contrast, vertical/oblique illumination, single-sided dark field



From A for agronomy to Z for zoology



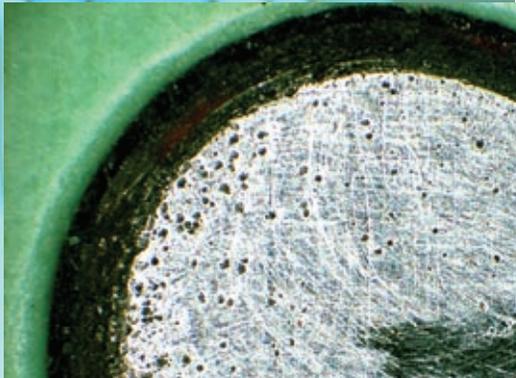
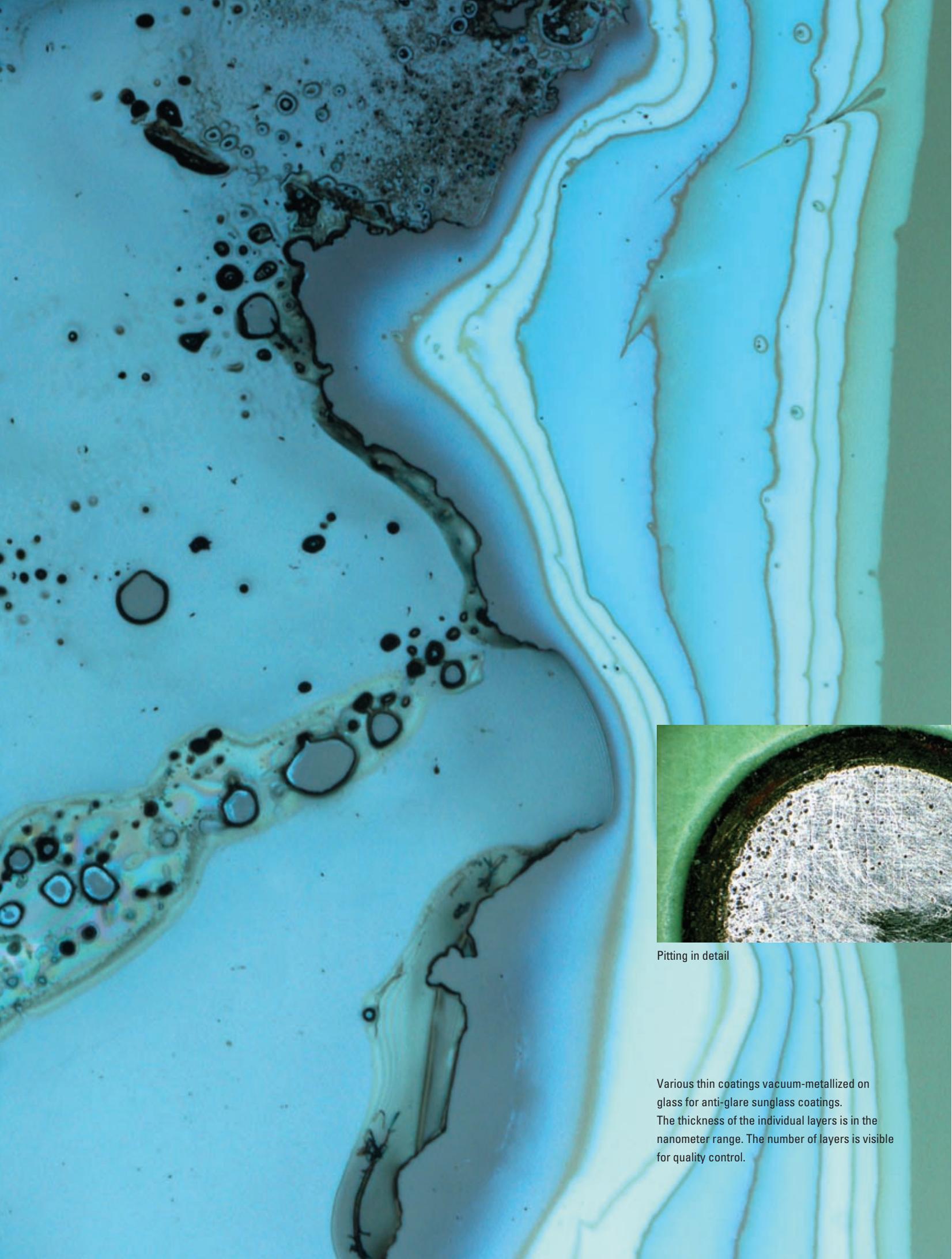
The purpose of examinations of damage to forest ecosystems is to discover their reaction to stress and the cause-effect relationships, so that measures to protect the living space of the forest can be introduced. The examinations record changes to the chemical condition of the soil (solid phase, leachate), in the phenology of trees and in soil vegetation. Soil zoology offers insight into the structure and formal diversity of the soil, and sheds light on ecological relationships. Although it is possible to see earthworms, larvae and bugs with the naked eye, seeing nematodes, mites and protozoa requires the assistance of an optical system. If symptoms can be detected upon an initial inspection with the naked eye, a close examination at the laboratory follows.

The new Leica Z6 APO and Z16 APO zoom systems are ideally prepared for all incidental classification tasks and evaluations in biology, criminology and medical laboratories. The high resolution, the parallax-free images made possible by the vertical beam path as well as the accessories for adapting high-magnification microscope objectives, for measurements, polarization, digital and video documentation satisfy the highest demands for an optical system.

Leica Z16 APO – highest magnification, ultra-sharp, detail-rich images

Leica Z16 APO offers a 16:1 zoom with a zoom range of 0.57× to 9.2×. The high-magnification Leica Z16 APO is exceptionally well-suited for use in microelectronics as well as laboratory workstations in medicine, biology, education, research, development and criminology. With the standard configuration (1× objective and 10× eyepieces) objects can be observed at a magnification level of up to 115× and, depending on the optics combination, to a maximum of 920×. You can zoom continuously from an overview to a detail view, but can also save 13 precise click-stop zoom positions for tasks such as repetitive measurements and photographs.

You can even use the 16:1 zoom level with the HR objectives, so that total magnifications of up to 460× and a resolution of up a maximum of 1350 Lp/mm can be achieved. With compatible stands, illuminators and camera systems, the Leica Z16 APO delivers precise results for analysis, measurement and image processing. Therefore, the Leica Z16 APO zoom system is perfectly suited to tasks which depend on the highest degree of measurement accuracy, such as in inspections of safety-related systems and components in the automotive supply industry and many other fields of precision mechanics, in high-precision fiber alignment and mounting, examination of semiconductor material, differentiation of healthy and diseased cells etc.



Pitting in detail

Various thin coatings vacuum-metallized on glass for anti-glare sunglass coatings. The thickness of the individual layers is in the nanometer range. The number of layers is visible for quality control.

Monitoring, Documentation, Education

When the human eye fails, optical zoom systems extend vision performance. Zoom optics allow quick surveying of complete objects such as an electronic circuit, a machined part or a biological specimen. The overview of a larger section offers valuable context and relationship information. You can then continuously increase the magnification of selected details for closer inspection. Here, it is not the magnification level alone which determines the quality of information transmitted, but also the performance of the zoom optics with regard to resolution, contrast, image sharpness, image fidelity and color fidelity.

The new Leica Z6 APO and Z16 APO zoom systems meet the highest international quality standards and fulfill all requirements for first-class analysis, measurement and documentation. The fully apochromatic optics made of high-quality, multiple-coated, lead-free glasses, in combination with the planachromatic objectives and parallax-free imaging, provide authentic, detail-rich image material.

Excellent acutance of the finest structures

Simple optic systems provide an imprecise image, because not all spectral colors are rendered uniformly and bothersome color seams result. The Leica Z6 APO and Z16 APO apochromatic zoom systems, on the other hand, are perfectly chromatically corrected and provide ultra-sharp, detail-rich, true-color pictures. Every defect can be detected quickly, accurately, and reliably; while measurement, analysis and image processing are made more precise. Additionally, planapochromatic objectives ensure perfect image field correction. Flat objects such as thin sections, smears, wafers, integrated circuits and metal sections appear uniformly sharp, level and free of distortion throughout the entire field of view.



HL RC™ transmitted-light base with gliding stage

Stair-step moss

Geometrically exact measuring, photography, verification and evaluation

The most precise information can be obtained thanks to the parallax error free vision through the vertical beam path. The vertical image offers advantages for photography and image processing – particularly with multifocus programs. Measurements, adaptation tasks and evaluations become more precise; positioning precision and geometric measurements are 100% guaranteed. If you also want to ensure a high degree of reproducibility of the measurements, the Leica Z6 APO and Z16 APO are equipped with a click-stop mechanism you can set to save certain zoom positions. Polarized optical examinations provide true polarization colors when viewed vertically, and the geometric layers of flat, highly reflective objects such as wafers appear without distortion when using coaxial illumination.

From macro to micro

In order to maintain 100% quality control, customers entrusted with industrial quality surveillance, as well as Original Equipment Manufacturers, mechanical engineers and automation technicians, expect top performance and flexible construction of the zoom systems they use. Standard interfaces must allow installation in measurement and testing systems, as well as constant monitoring with video systems and modern digital image processing methods.

With the largest program of accessories for zoom systems, our customers are perfectly equipped for all present-day and future tasks. Leica Z6 APO and Z16 APO offer accessories and interfaces for problem-free installation in bonders and probers and, of course, for modern TV workstations, digital image grabbing and processing. For equipping inspection stations for classic materials and quality control and laboratory workstations in biology, medicine, geology, and criminology, a huge assortment of high-quality stands, illuminators and digital cameras is available for every purpose. We will be glad to implement your special requests using our extensive range of modules.

Superlative performance

The planapochromatic objectives reproduce flat objects such as thin sections, metal sections or wafers completely evenly, from the middle to the edge, with pin-sharp accuracy. The 1× and 2× objectives offer the largest working distances of any zoom system on the market – 97mm and 39mm, respectively. Large, completely uniform fields of view, outstanding depth of field and contrast-rich rendering allow fatigue-free observation and measurement of entire objects. For applications on a bonder, prober or swinging-arm stand, 0.8× planachromatic objectives with a working distance of 112mm, and 0.5× with a working distance of 187mm, are available.



Motorized focus



HR objective with fine focusing

Up to microscopic magnifications

Combined with 10× and 20× high-magnification microscope objectives, the Leica Z6 APO and Z16 APO achieve the high information richness of classic microscopy. Depending on the optics combination, the Leica Z6 APO can achieve a maximum magnification level of up to 360× and a maximum resolution of 1350 Lp/mm. With the Leica Z16 APO you can achieve a maximum magnification level of 920× and a maximum resolution of 1350 Lp/mm. The zoom remains effective, and comfortable binocular observation is guaranteed.

Ultra-precision focusing

For exact focusing, we recommend the optional fine focus, especially at high magnification levels and when using the microscope objectives. For workstations with one stand, you can choose between a coarse/fine focusing drive and a convenient motorized focus system with hand, foot, or PC control. You can adjust the depth of field using the built-in iris diaphragm.



Crimping section



Unlimited variability



Ergonomic for the QA laboratory

Leica Z16 APO zoom system with ErgoTube® with viewing angle variable from 10°–50°, motorized focus system, fine focusing, planapochromatic objective, Y tube, incident-light stand with gliding stage, ring illuminator with Leica CLS cold light source.



For flat, reflective parts

Leica Z16 APO zoom system with coaxial illuminator and quarter-wave plate, fine focusing, planapochromatic objective, Y tube, trinocular video/phototube, Leica digital camera, motorized focus system, incident-light stand with gliding stage

Much available room for large components

Leica Z6 APO zoom system with ESD swinging arm stand, tiltable focusing arm, planapochromatic objective, Y tube, trinocular video/phototube, Leica digital camera



Perfect for birefringent substances, stones and plastics testing

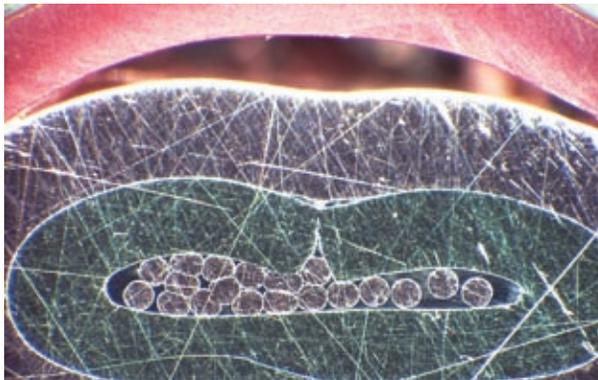
Leica Z16 APO zoom system with transmitted light stand, rotating polarization stage and analyzer, coarse/fine focusing drive, fine focusing, planapochromatic objective, Y tube, ErgoTube® with viewing angle variable from 10° – 50°



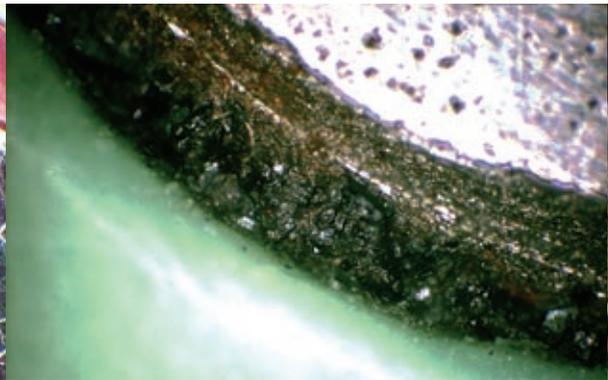
Specialists in digital image processing

Digital image processing makes many work processes more efficient and more cost-effective. The quick availability of high-quality image data for high-precision measurements, analysis and advanced processing plays an important roll in modern materials analysis, quality assurance and metrology, as well as medicine and biology. The rapidly growing need for qualified information requires ever-higher resolution, faster, and more comfortable digital cameras and comprehensive image processing software.

As the leader in the development and manufacture of advanced optical technologies, Leica Microsystems presents a convincing and trendsetting total system for the most demanding observation, documentation and analysis tasks in all application fields of microphotography or macrophotography.



Crimping section



Pitting in detail



Fungal decay

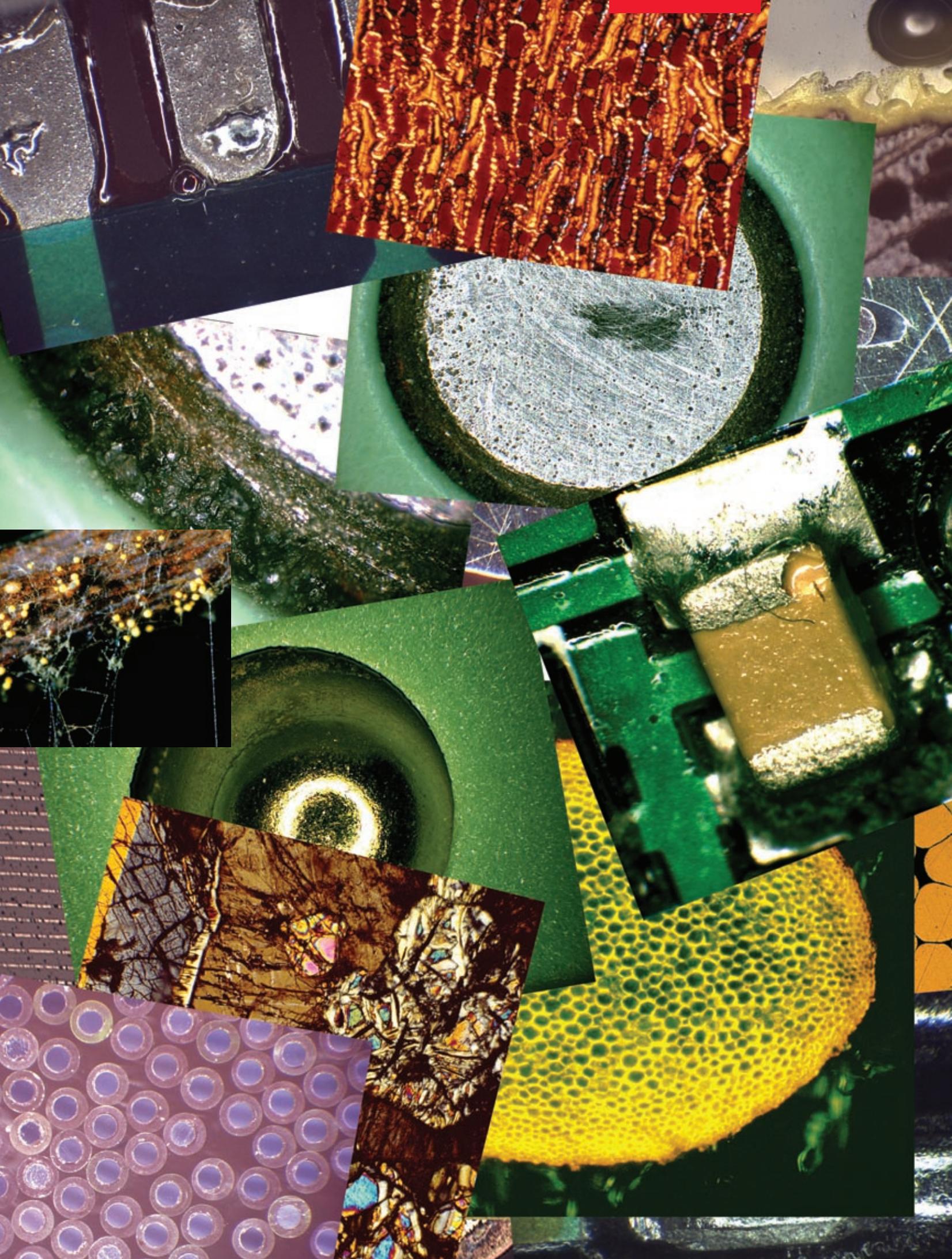
High-performance optics, camera and software for perfect image processing

The Leica DC camera line allows efficient creation, processing, utilization and archiving of digitalized pictures, and has industrial applications in quality control systems and research labs. Our product line ranges from the standard digital camera for universal use to the high-end camera, and is ideally suited to all microscopic methods. The control software allows convenient camera operation as well as the processing, analysis and archiving of digital images.

With the high-end Leica IC A video module, you can monitor work processes on the monitor and present them to large discussion groups, students or trainees.

Data for analysis

Use your digital images for archiving, processing and analysis. Take advantage of the entire spectrum of Leica software, including applications for measurement, image correlation, time-lapse photography, image superimposition, presentation, and many other uses. Because of their vertical beam path, the Leica Z6 APO and Z16 APO are particularly well suited for perfect image combinations with multifocus programs. For example, you can use the Leica IM1000 multifocus module to take multiple pictures in the z-axis over a field that exceeds that of the optics used, and combine them into a composite image with infinite depth of field.



Leica Z6 APO and Leica Z16 APO – Technical Data, Accessory Modules

Zoom system	Leica Z6 APO	Leica Z16 APO
Type	Apochromatic zoom system 6.3:1 (zoom factor 0.57 – 3.6) with central beam path, lead-free	Apochromatic zoom system 16:1 (zoom factor 0.57 – 9.2) with central beam path, lead-free
Built-in iris diaphragm	Continuous depth of field adjustment	Continuous depth of field adjustment
Optical data	Visual with 1× planapochromatic objective/10× eyepieces/1.25× Y tube	
– Magnification	7.1× – 45×	7.1× – 115×
– Resolution	60 – 351 Lp/mm	51 – 336 Lp/mm
– Visible structural width	16.7 – 2.85 µm	19.6 – 2.98 µm
– Numerical aperture	0.02 – 0.117 nA	0.017 – 0.112 nA
– Field of view Ø	29.5mm – 4.7mm	29.5mm – 1.83mm
– Depth of field	3.1mm – 0.09mm	3.8mm – 0.05mm
	Visual with 2× planapochromatic objective/40× eyepieces/1.25× Y tube	
– Magnification	57× – 360×	57× – 920×
– Resolution	120 – 702 Lp/mm	102 – 672 Lp/mm
– Visible structural width	8.3 – 1.4 µm	9.8 – 1.49 µm
– Numerical aperture	0.04 – 0.234 nA	0.034 – 0.224 nA
– Field of view Ø	4.2mm – 0.67mm	4.2mm – 0.26mm
	Data with Leica DC480 digital camera/1× planapochromatic objective/AS tube/0.63× video objective	
– Chip magnification : Specimen	0.36× – 2.3×	0.36× – 5.8×
– Print magnification : Specimen	5.3× – 33.5×	5.3× – 85.6×
– Digital resolution	26.4 – 167 Lp/mm	26.4 – 336 Lp/mm
– Field of view projected onto chip	24.5mm × 18.6mm/3.8mm × 2.9mm	24.5mm × 18.6mm/1.5mm × 1.15mm
– Depth of field	1.16mm – 0.03mm	1.5mm – 0.03mm
Optical accessories for Leica Z6 APO and Z16 APO		
Objectives	Planapochromatic 1×, 2×, 0.8×, 0.5×	
Fine focusing	10mm method	
Working distances	97mm (1× Planapo), 39mm (2× Planapo), 112mm (0.8× Planapo), 187mm (0.5× Planapo)	
HR objectives	HR 10×/0.45, HR 20×/0.42	
Binocular tubes, Ergonomic	Various oblique and straight binocular tubes, apochromatic ErgoTube® 10° – 50°, various ErgoModules®	
Eyebase (interpupillary distance)	55mm – 75mm	
Wide-field eyepieces for persons wearing glasses	10×, 16×, 25×, 40×, distortion-free, with plug-on eyecups for protection from infection	
Accessories for Leica Z6 APO and Z16 APO		
Tubes	Video/phototubes with C-mount for digital camera, Y tube for binoculars, ErgoModules® and Leica M series accessories (Leica IC A video module)	
Stands	Incident-light stand, transmitted light stand for bright field and bright/dark field, high-performance stands, swinging arm stand, stage clamp stand, and universal stand	
OEM integration	Various focusing arms for OEM parts, probers, bonders	
Focusing	Manual coarse/fine focus, motorized focus	
Stages	Gliding stage, polarization, cup stage, Leica MATS thermocontrol system with heating stage	
Illuminators	Cold light sources, coaxial with quarter-wave plate, ring illuminator, fluorescence	
Video system	Leica IC A, integrated	
Photography	Leica DC digital camera systems, Leica MPS60 modular photomicrographic system with data back, SLR camera system with data back	
Software for image archiving, analysis and processing	Leica Image Manager	
Measurement	Measurement graticules	

Detailed technical information and data in catalog M1-416-4

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