Automatically productive

Leica Z6 APO, Z16 APO, Z6 APO A and Z16 APO A. The manual and motorized zoom systems for documentation, inspection and machine vision.

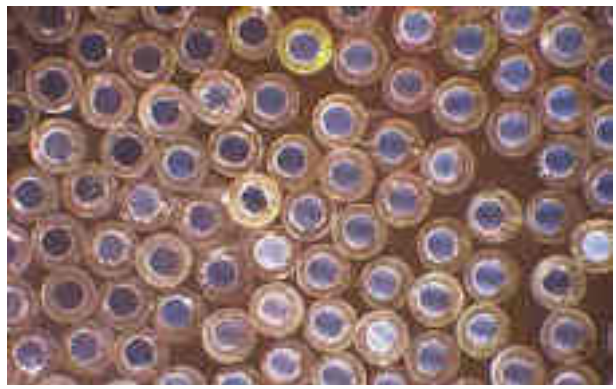
Leica
MICROSYSTEMS

Fit for zero-defect production

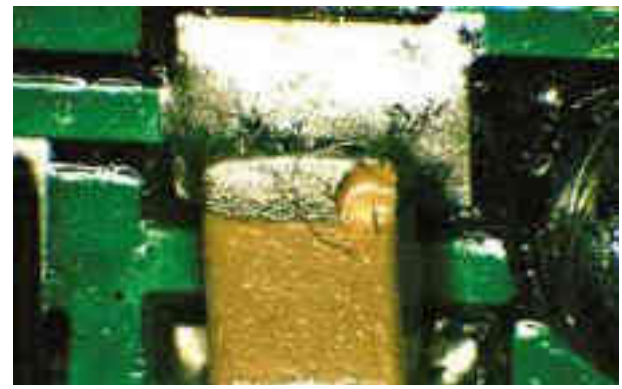
In every area of industry, quality objectives are continually reaching new levels; at the same time, the demands on throughput and productivity are increasing. Profitable manufacturing, high process speeds and 100% quality are essential to maintaining a competitive position. Everything revolves around realizing streamlined processes. And that applies to quality assurance as well as manufacturing. For this reason, more and more companies demand DPM (defects per million) of less than 100 from their suppliers. World-class companies must even pursue a zero defects production.

High performance and value

Demands placed on optical inspection systems have increased accordingly. The optics used must not only meet the most stringent optical quality criteria, but also be designed for deployment in tough industrial environments. High performance at a reasonable price is essential. The only zoom systems on the market with full apochromatic correction – Leica Z6 APO/Z6 APO A with 6.3:1 zoom and Leica Z16 APO/Z16 APO A with 16:1 zoom are designed for highly precise inspection in a wide range of manufacturing applications, including integration in machine vision systems. When combined with apochromatic objectives, the Leica Z line is superior to other zoom systems in contrast, sharpness, color fidelity and imaging precision. With the Leica Z6 APO/Z6 APO A and Leica Z16 APO/Z16 APO A, you can raise your quality standards immediately.



Optical fiber section



Bad solder joint

From individual measurement and inspection stations to system integration

What's more, we offer components for individual measurement and inspection stations tailored to the needs of customers. The 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 Z line is suitable for measurement, documentation and analysis tasks in the QA lab, just as they are suited for biology, geology, histology and training.

Monitoring, documentation, education

Zoom optical system extend human vision in situations where the naked eye is no longer sufficient. In the macro range, zoom systems allow for a quick inspection of complete objects – for example, electronic circuits, workpieces manufactured by a machine or biological specimens. The overview of a large section offers valuable context and relationship information. You can continuously increase the magnification of selected details for closer inspection. Here, it is not the magnification level alone which determines the quality of the information, but also the performance of the zoom optics with regard to resolution, contrast, image sharpness, image fidelity and color fidelity.

The Leica Z6 APO/Z6 APO A and Leica Z16 APO/Z16 APO A zoom systems correspond to the highest quality standards worldwide and meet all requirements for first-class documentation, manufacturing and inspection. The fully apochromatic optics made of high-quality, multiple-coated, lead-free glasses, in combination with the planapochromatic objectives provide parallax-free imaging for 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 apochromatic zoom systems of the Leica Z line, on the other hand, are perfectly chromatically corrected and provide sharp, detail-rich, true-color pictures. Faults can be detected quickly and reliably; measurements, analyses and image processing can be realized with greater precision. Planapochromatic objectives also ensure perfect image field correction. Flat objects such as thin sections, smears, wafers, integrated circuits and metal sections are consistently sharp, flat and undistorted across the entire field of view.

Olivine mineral

Hylocomium moss

Geometrically precise measurement, photography, verification, evaluation

The most precise information can be obtained thanks to the vertical beam path and its freedom from parallax errors. The vertical imaging has advantages for photography and image processing – especially when using multifocus programs. Measurements, adaptation tasks and evaluations become more precise; placement precision and geometrical dimensions are 100% assured. The Leica Z6 APO and Z16 APO are also equipped with switchable indents for certain zoom positions to ensure high reproducibility of measurements. Polarized optical examinations provide true polarization colors in vertical observation, and the geometric layers of flat, highly reflective objects such as wafers appear without distortion when using coaxial illumination.

Highlights of Leica Z6 APO & Leica Z16 APO

- Z16 (Z6): zoom 16:1 (6.3:1), zoom range 0.57× – 9.2× (0.57× – 3.6×)
- Fully apochromatic zoom system and apochromatic objectives for superlative contrast, color fidelity and detail richness
- Magnification: 7.1× – 115× (Z16 APO), 7.1× – 45× (Z6 APO) visual with planapochromatic 1× objective, 10× eyepieces, 1.25× Y tube
- Total visual magnification with planapochromatic 5× objective, 40× eyepieces, 1.25× Y tube: 900× (Z6 APO), 2300× (Z16 APO)
- Highest resolution: 351 Lp/mm (Z6 APO) or 336 Lp/mm (Z16 APO) visual* up to 1500 Lp/mm**
- Highest numerical aperture from: 0.117* (Z6 APO) or 0.112* (Z16 APO) up to 0.5**
- Large working distance of 97 mm*
- Built-in iris diaphragm for depth of field adjustment
- Motorized focus (optional)
- Fine focusing for precise focusing at high magnifications
- Perfect for multifocus applications in various specimen planes
- Highest image fidelity for precise measurements, analysis and documentation
- Smooth, distortion-free images of flat reflective objects for coaxial illumination
- Switchable zoom stops for repetitive tasks
- ErgoTube® with variable viewing angle 10° – 50°
- Modular accessories and compatibility to accessories of the Leica M stereomicroscope line
- Large incident-light base with rugged, lightweight honeycomb design
- High-performance digital cameras and image analysis software

* with 1× planapochromatic objective
** with 5× planapochromatic objective

Slim for digital capture and processing
Leica Z6 APO with fine focusing, planapochromatic objective, carrier and AS tube, video objective with C-mount, Leica DFC digital camera, incident-light base and coarse/fine drive

Quality is not as costly as the lack of quality

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 (351 Lp/mm resolution) with the 1× planapochromatic objective and 0.234 nA (702 Lp/mm resolution) 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.

The 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." Thanks to the broad range of available accessories, the Leica Z6 APO is suitable for deployment in a high-quality workstation in testing laboratories and educational environments and used for documentation and video inspection.

Leica Z16 APO – highest magnification, ultrasharp, detailed images
Leica Z16 APO features a 16:1 zoom, with a range from 0.57× to 9.2×. The high-magnification Leica Z16 APO is suitable for deployment in microelectronics as well as laboratory workstations in medicine, biology, education, research, development and forensics. With the standard configuration (apochromatic 1× objective and 10× eyepieces) objects can be observed at a magnification level of up to 115x and, depending on the optics combination, to a maximum of 2300x. They 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.

The 16:1 zoom is also effective when using the 5× planapochromatic objective for total magnifications of up to 2300× and a maximum resolution of 1500 Lp/mm. With the appropriate stands, illumination and camera systems, the Leica Z16 APO delivers precise results in analysis, measurement and image processing. The Leica Z16 APO zoom system is therefore ideal for tasks calling for maximum precision, such as the inspection of safety-relevant components by manufacturers of automotive subsystems and other precision engineering applications, aligning and installing fiber with great accuracy, inspecting semiconductor materials, distinguishing between healthy and diseased cells, and so on.

Leica Design by Christophe Apothéloz

Highlights of Leica Z6 APO A & Leica Z16 APO A

Objectives: planapochromatic, achromatic, 5x planapochromatic objectives for high magnifications

Coaxial incident light housing for fiber-optic light

Leica SmartTouch™ for control of motorized functions

Extension plate for reproduction stands

Leica HD V and HD F video/photo tubes with beam splitter 0:100 or 50:50

Leica digital camera

- High-resolution Leica camera lines for many and diverse demands
- Leica Application Suite image editing and analysis software with a wide selection of modules for a variety of tasks

Leica Z16 APO A

- Zoom 16:1, zoom range 0.57 – 9.2
- Magnification 7.1× – 115×, visual
- Total magnification 2300×, visual
- Resolution 336 Lp/mm to 672 Lp/mm
- Numeric aperture 0.112 to 0.224

Leica Z6 APO A

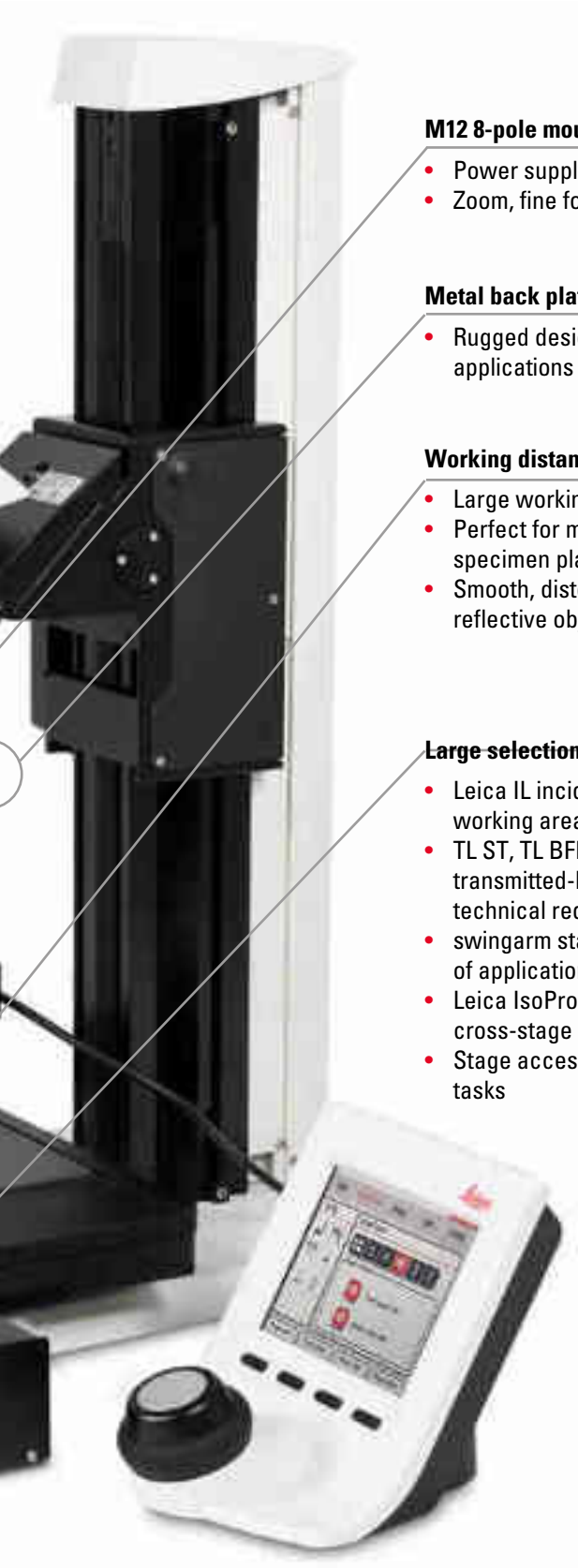
- Magnification 7.1× – 45×, visual
- Total magnification 900×, visual
- Resolution 351 Lp/mm, visual to 702 Lp/mm
- Numeric aperture 0.117, visual to 0.234

Motorized functions

- Continuous positioning zoom for repetitive tasks
- Built-in iris diaphragm for depth of field adjustment
- Integrated fine focus for precise focusing
- Can be operated with PC, Leica SmartTouch™ and/or foot switch
- Motor focus available as option

Fully apochromatic zoom system

- Apochromatic objectives for superlative contrast, color fidelity and detail richness
- Highest image fidelity for precise measurements, analysis and documentation



M12 8-pole mounting coupling, shielded

- Power supply
- Zoom, fine focus and iris diaphragm control

Metal back plate

- Rugged design for mounting with OEM applications or assembly of adapters

Working distance, multifocus

- Large working distance 97 mm – 187 mm
- Perfect for multifocus applications in various specimen planes
- Smooth, distortion-free images of flat reflective objects for coaxial illumination

Large selection of bases

- Leica IL incident-light base with large working area
- TL ST, TL BFDF, TL RC™ and TL RCI™ transmitted-light bases for a variety of technical requirements
- swingarm stands for a variety of applications
- Leica IsoPro manual and motorized cross-stage
- Stage accessories for a wide range of tasks

Digital high-performance cameras from the Leica DFC camera line

Series of images that were merged in the LAS **Montage** module and optimized in the LAS **3D viewer**.

LAS **Extended Annotations** module

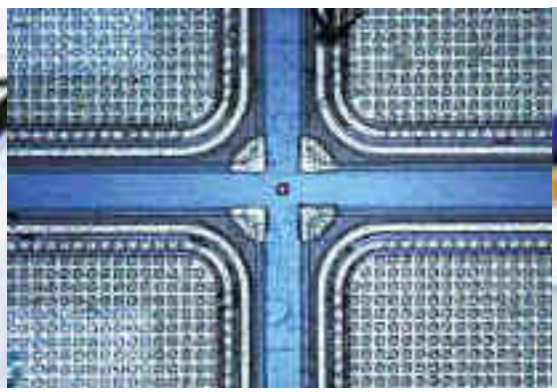
M12 mounting connector for individual use in automatic production devices

Wide selection of ergonomic accessories

100% quality – 100% safety

Fully automatic from now on: Inspection of large carrier materials
The production of TFT or plasma screens experiences a trend towards larger carrier materials. For this reason, a continuous inspection using stereomicroscopes is no longer possible. Instead, the new Leica Z6 APO A or Z16 APO A zoom systems are ideal for the inspection devices being used. In this case, the operator uses a high-precision XY drive to approach a random number of positions that are subsequently inspected for structural flaws using the high-performance optics of the Leica zoom system. Every position is automatically checked at two different magnifications that are preprogrammed and then automatically approached with the motorized zoom. This method can be applied with all inspection machines for microstructures, such as printed circuit boards.

High performance – high safety
With the Leica Z6 APO A and the Z16 APO A, you are using the only motorized, fully apochromatically corrected zoom systems on the market. Every defect can be detected safely, quickly, and reliably. This gives you the security of an efficient, trouble-free, 100% quality control, together with the ruggedness of an inspection system that operates with permanent precision even in a severe industrial environment.



Perfect for the manufacture of micromechanical parts
Thanks to new manufacturing engineering, it is possible to manufacture increasingly smaller mechanical parts. Assembly preparations and the assembly itself are, therefore, very complex. They can no longer be carried out with the naked eye. The new Leica Z6 APO A and Leica Z16 APO A zoom systems facilitate, accelerate and improve this process many times over:
Thanks to the excellent optics, the position and orientation of tiniest parts (up to 1.4 µm) can be detected with precision. In addition, the apochromatic optics prevents any distortion and colored edges. This is particularly important since it is the only way to reliably achieve the highest possible manufacturing quality.

We are thankful to TRIDONICATCO Dornbirn/Austria for providing support in form of application images and information

Putting your work in the best light

Illumination for every conceivable task
Proper illumination is an important element of a microscopy workstation that makes a major contribution to optimally revealing the information you need in your specimens. Leica is in a position to provide the correct illumination type for any conceivable purpose. In addition to various modular incident-light solutions, Leica's product line includes a number of transmitted-light bases for a range of applications.

The Leica CLS cold-light sources
The Leica CLS cold-light sources provide the strongest light intensity within the smallest space with a minimum influence of heat on the specimens.

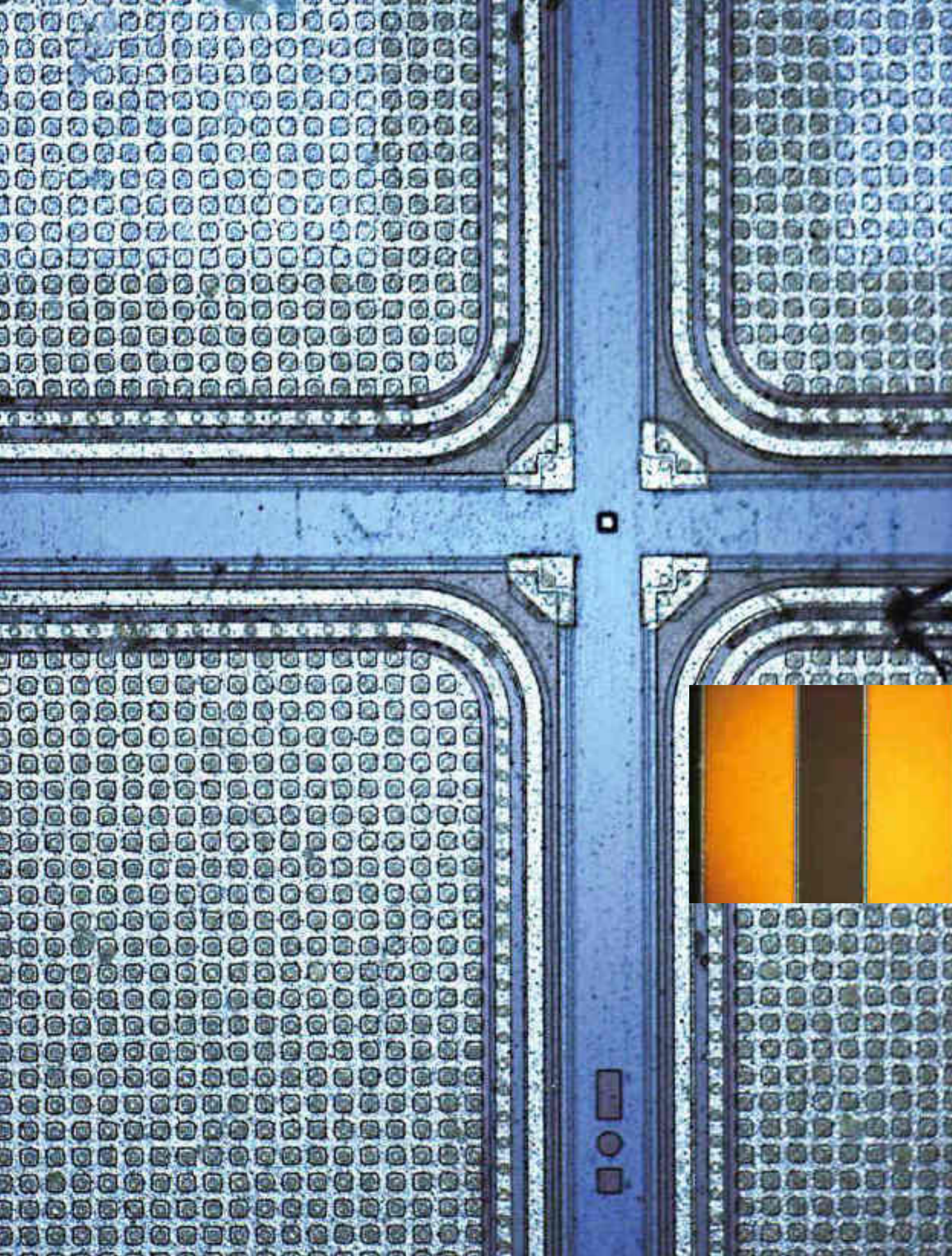
Leica LED1000 illumination
- Color temperature 5000 K (daylight)
- Free of ripple and flicker
- Long life
- Quiet, vibration-free operation
- Extremely compact design
- Battery operation possible
- Modular concept allows for a combination of ring illuminator and spotlight

Leica LED1000 illumination is available with a ring lamp and/or spot, or as a transmitted-light insert, and is suitable for routine tasks with instruments of the Leica Z line. LEDs that do not heat the specimen are used as illuminators.

Neon ring illuminator
The neon ring illuminator provides uniform illumination with minimal reflections in natural light quality. Due to its antistatic properties, the housing is also suitable for ESD workstations. High-performance and UV versions are also available.

- Color temperature 5500 K
- Illuminated area 55 mm dia.
- 360° shadow-free, homogenous illuminated area
- Free of ripple and flicker
- Noiseless, vibration-free operation
- Long life
- Optional ESD protective grating

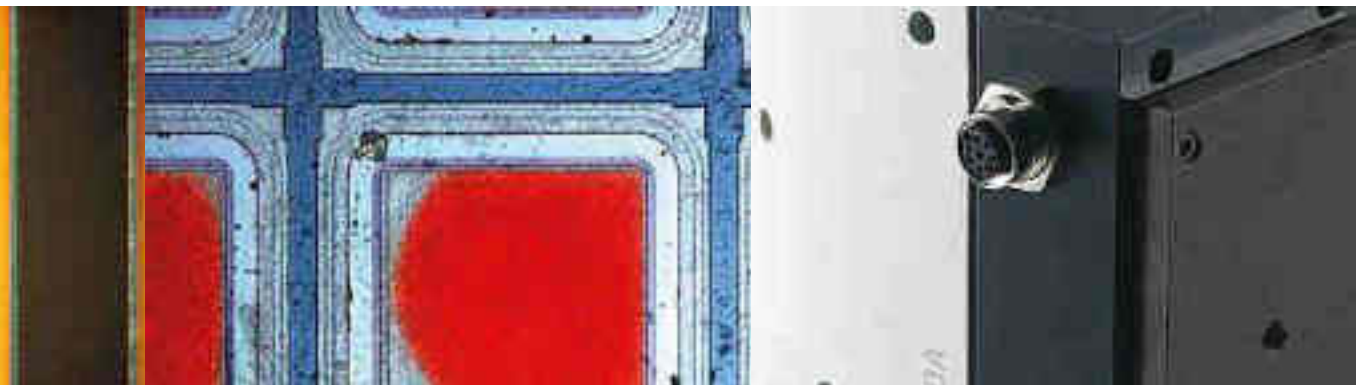
Transmitted-light solutions
Leica's transmitted-light solutions range from simple detachable transmitted-light stages (optical fiber and LED) for our incident-light bases, to bright- and dark-field transmitted-light bases, and high-performance transmitted-light bases for special contrast methods such as Rottermann™ contrast.



Results and analyses including time saved

Economic solutions for macrodocumentation
Complete documentation solutions are indispensable to more efficiency and higher throughput in laboratories. The Leica Z6 APO A and the Leica Z16 APO A provide powerful prerequisites for this purpose. These zoom systems first macroscopically document the object to be inspected. The resulting images are automatically entered in the image database – such as the Leica LAS. In the process, the motorized zoom automatically reports the magnification used to the software; hence, the scale is directly acquired and can be inserted in the image. The instrument is operated via Leica SmartTouch™. This process can also be applied in forensics, pathology, and in industrial laboratories – upon request also with the foot switch so that the hands can be used freely. For the user in the lab and in research, this translates to significant time saved in processing as well as more precise data for analyses and documentation.

Reliable test setups for high-tech developments
No new high-tech developments without high-performance optics: Only through the observation of highly dynamic processes is it possible to gain precise analyses and information for possible improvements. For this purpose, the Leica zoom systems are combined with a high-speed camera and the test setup is illuminated by a strobe for the recording. Thanks to the motorization of the Leica Z6 APO A or Leica Z16 APO A, the test arrangement can easily be changed and different states can sequentially be recorded without any manual intervention. Even more convenience is provided by the serial interface of the zoom. It leads to the distribution box which allows for direct connection of the Leica SmartTouch™, the foot switch and the PC.



TFT panel

Wafer

- Metal plate for universal assembly

Wafer with incident 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 A and Z16 APO A 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 forensics, a huge assortment of high-quality stands, illuminators and digital cameras is available for every purpose.

Superlative performance
The planapochromatic objectives of the Leica Z line 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×, 2× and 5× objectives offer the greatest working distances of any zoom system on the market: 97 mm, 39 mm and 20 mm. Large, completely flat fields of view, excellent depth of field and high-contrast imaging support the nondestructive processing and measurement of intact objects. For applications on a bonder, prober or swingarm stand, 0.8× planapochromatic objectives with a working distance of 112 mm, and 0.5× with a working distance of 187 mm, are available.

Leica motor focus

planapochromatic objectives

Up to microscopic magnifications
Combined with the 5× planapochromatic objective and the powerful 10×* and 20×* microscope objectives, instruments of the Z line attain a level of information that would otherwise call for traditional microscopy. Depending on the optics combination, the Leica Z6 APO A can achieve a maximum magnification level of up to 225×** and a maximum resolution of 1500 Lp/mm. With the Leica Z16 APO A you can achieve a maximum magnification level of 575×** and a maximum resolution of 1500 Lp/mm. The zoom remains effective, and comfortable binocular observation is guaranteed. With the Leica Z6 APO A and Z16 APO A, you can set your quality objectives higher starting now.

Effective and extremely precise focusing
The motorized fine focus offers highest image sharpness and significant less work, particularly at high magnifications and using microscope objectives. The depth of field can be adjusted perfectly for this purpose using motorized iris diaphragm. For workstations with a stand, you can choose between a manual coarse/fine focusing drive and a convenient motorized focus system with hand, foot, or PC control.

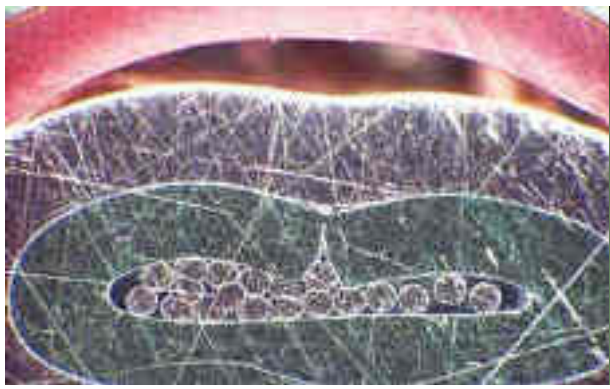
* only usable in the upper zoom range
** 10× eyepieces


LEICA

Specialists for digital image processing

Digital image processing makes a wide range of processes more efficient and cost-effective. The quick availability of high-quality image data for precision measurements, analyses and further processing plays an important role in modern material analysis, quality assurance and measuring technology, medicine and biology. Rapidly expanding requirements for qualified information call for fast, convenient digital cameras with increasingly high resolutions and powerful image processing software.

With the Leica Application Suite (LAS), Leica Microsystems, a leader in the development and manufacturing of sophisticated optical technology, presents a powerful and trendsetting system for advanced observation, documentation and analysis tasks in all micro- and macrophotographic areas of application. Combined with digital cameras of the DFC line, it lets you make the most of your Leica microscope.



Crimp section

Corrosion

Mycosis

High-performance optics, camera and software for perfect image processing
The Leica DFC camera line allows rational creation, processing, reprocessing and archiving of digitized images in industry, quality assurance and research laboratories. Our product range goes from standard cameras for universal use up to high-end cameras and is perfectly suited for all microscopic procedures. In addition to comfortable operation of the camera, the control program also allows for processing, analysis and archiving digital images.
The video module of the high-end Leica IC A class lets you observe actions on a monitor and present them to large discussion groups, students and trainees.

Data for analysis
Use your electronic images for archival, processing and analysis. Take advantage of the full power of the expanding Leica Application Suite (LAS) with Interactive Measurement, Extended Annotation, Multitime (including Timelapse & Movie), Montage, and many other modules. Thanks to the vertical beam path, the Leica Z line is especially suitable for LAS MultiFocus. This module permits multiple images to be captured along the Z axis, covering a range that extends beyond the natural depth of field of the optical system, and subsequently assembled to a single image with infinite depth of field.

For detailed information on the Leica Application Suite, please see brochure M1-525-0.

“With the user, for the user”
Leica Microsystems

Leica Microsystems operates globally in four divisions, where we rank with the market leaders.

• Life Science Division

The Leica Microsystems Life Science Division supports the imaging needs of the scientific community with advanced innovation and technical expertise for the visualization, measurement, and analysis of microstructures. Our strong focus on understanding scientific applications puts Leica Microsystems’ customers at the leading edge of science.

• Industry Division

The Leica Microsystems Industry Division’s focus is to support customers’ pursuit of the highest quality end result. Leica Microsystems provide the best and most innovative imaging systems to see, measure, and analyze the microstructures in routine and research industrial applications, materials science, quality control, forensic science investigation, and educational applications.

• Biosystems Division

The Leica Microsystems Biosystems Division brings histopathology labs and researchers the highest-quality, most comprehensive product range. From patient to pathologist, the range includes the ideal product for each histology step and high-productivity workflow solutions for the entire lab. With complete histology systems featuring innovative automation and Novocastra™ reagents, Leica Microsystems creates better patient care through rapid turnaround, diagnostic confidence, and close customer collaboration.

• Surgical Division

The Leica Microsystems Surgical Division’s focus is to partner with and support surgeons and their care of patients with the highest-quality, most innovative surgical microscope technology today and into the future.

The statement by Ernst Leitz in 1907, “with the user, for the user,” describes the fruitful collaboration with end users and driving force of innovation at Leica Microsystems. We have developed five brand values to live up to this tradition: Pioneering, High-end Quality, Team Spirit, Dedication to Science, and Continuous Improvement. For us, living up to these values means: **Living up to Life**.

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