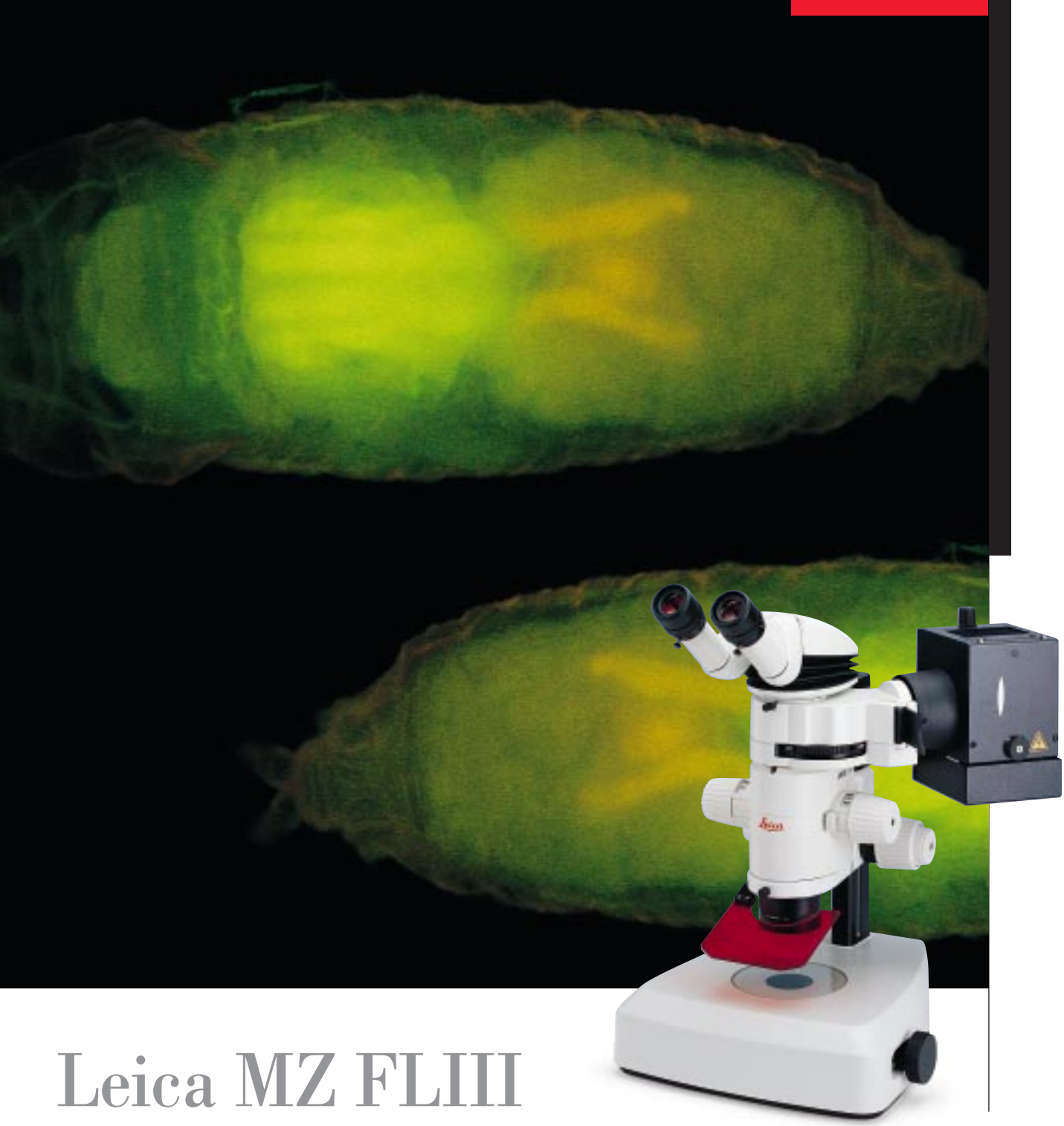


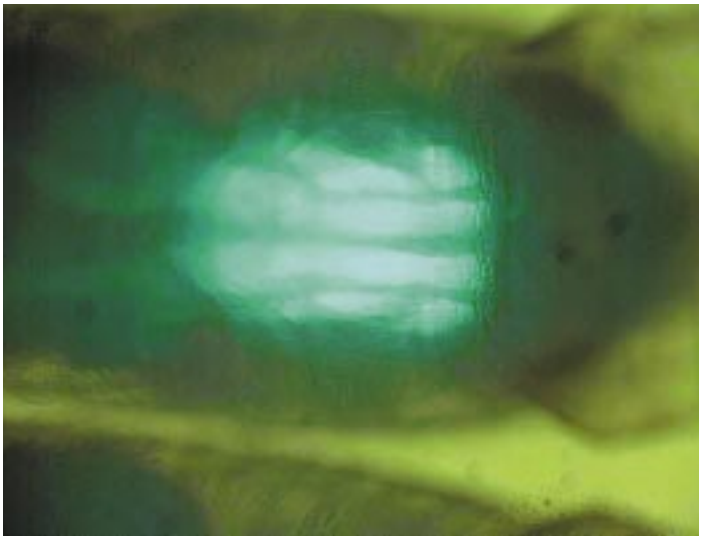
Leica MZ FLIII

Fluorescence stereomicroscope –
A shining example of Leica's innovative technology

Leica

Fluorescence in the third dimension

Research into the functions and interactions of living organisms requires an investigation procedure permitting in-vivo observation of growth processes. For this reason, modern research makes good use of fluorescence techniques, particularly in molecular biology and in gene technology, to gain an insight into the distribution and development of certain structures of living cells and tissues. The Leica MZ FLIII fluorescence stereomicroscope opens up an almost infinite number of new possibilities for research and diagnosis in medicine and biology, and for non-destructive testing and analysis related to industrial quality control and to forensic work.



Drosophila, flight muscles

The Drosophila larvae were made available by courtesy of Sharyn A. Endow, Ph.D., Duke University Medical Center, and Eric Fyrberg, The Johns Hopkins University

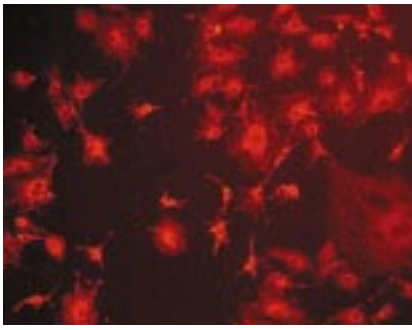
The Leica MZ FLIII: Illuminating advantages for biology, medicine and technology

The Leica MZ FLIII underlines once more the competence of Leica in the field of stereomicroscopy. This instrument is the first fluorescence stereomicroscope to be in harmony in all respects with the purposes for which it will be used:

- Patented separate beam path (TripleBeam™) for the fluorescence illuminator
- Patented filter system (FLUOIII™) for changing the filters quickly and easily
- Wide choice of filters for various fluorescence techniques
- Comprehensive protection of the user against UV radiation

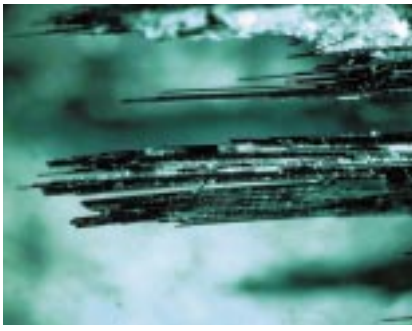
The Leica MZ FLIII fluorescence stereomicroscope offers not only a 3D image but also, compared with a classical microscope at any given magnification, a larger panoramic field of view, more intense fluorescence, and longer working distances. These advantages make it possible to manipulate, sort and process specimens. Just one instrument is enough for carrying out time-consuming preparation work, embedding, rubbing down or cutting. With a combination of green-fluorescent protein (GFP, see box) and the Leica MZ FLIII fluorescence stereomicroscope, living objects can now be observed spatially in large fields of view; the long working distances enable them to be manipulated.

Bovine pulmonary artery endothelial cells



Polymers

Carbon fibres



An insight into fluorescence techniques

Some substances fluoresce when irradiated with short-wave light; non-fluorescing areas remain dark. This property can be exploited for subjects which are not naturally fluorescent, by applying a fluorescent dye which is taken up selectively by certain structures. Green-fluorescent protein (GFP) is an example. This albumen from a species of jellyfish fluoresces bright green when stimulated by blue- or ultraviolet light. When introduced by gene technology into other cells, the non-toxic GFP provides a non-destructive insight into the distribution, anatomy and development of certain types of living cells. The Leica fluorescence stereomicroscope therefore offers ideal conditions for in-vivo, in-situ investigations of living organisms in real time.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The Leica MZ FLIII: Trendsetter in fluorescence stereomicroscopy

TripleBeam™, the patented third beam path for brilliant fluorescence images
Leica stereomicroscopes are designed with two parallel beam paths above a common main objective. This is the most elaborate, but proven the best principle for fatigue-free viewing and for perfect image quality. In addition, the Leica MZ FLIII has the patented separate illumination beam path (TripleBeam™) for the fluorescence illuminator. This unique innovation ensures that, at all zoom positions, the light is guided correctly and utilized fully, and that the background of the field of view is uniformly dark. Leica's innovation in the design and manufacturing stages pay off with the intense fluorescence and in the detail-rich, reflex-free images with their jet-black backgrounds.

FLUOIII™, the patented filter system for super-fast changing
Two novel features enable filters to be changed in a moment: the arrangement of excitation and barrier filters on the same filter carrier, and the creation of a horizontally-rotatable rapid filter changer for four filter combinations. With just one quick movement, the excitation filter is in the illumination beam path and the barrier filter is in the observation beam path.

Zoom 12.5:1 – information from the overview to the detail
At low magnifications, stereomicroscopes provide a panoramic view of the whole object; at high magnifications, they reveal fine detail. The zoom range of the Leica MZ FLIII, from 8x to 100x with 1.0x objective and 10x eyepieces, its maximum magnification of 640x and its high resolution of up to 600 line pairs/mm with the 1.6x planapochromatic objective, take its observation range into that of the classical microscope.

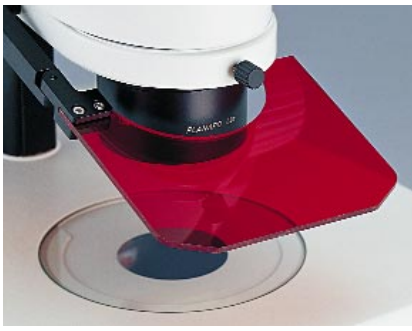
UV protection – the devices for comprehensive security
Intense UV radiation can cause damage to the retina of the observer's eye. Leica is aware of our great responsibility in this respect and have introduced strict precautions. UV barrier filters are permanently installed in the observation beam paths; there is a UV protection screen above the specimen plane and stray-light protection at the lamp housing, and there are dummy filter carriers in the empty filter positions.

Fluorescence system with TripleBeam™ and rapid filter changer

FLUOIII™ fluorescence filter system

12.5:1 zoom

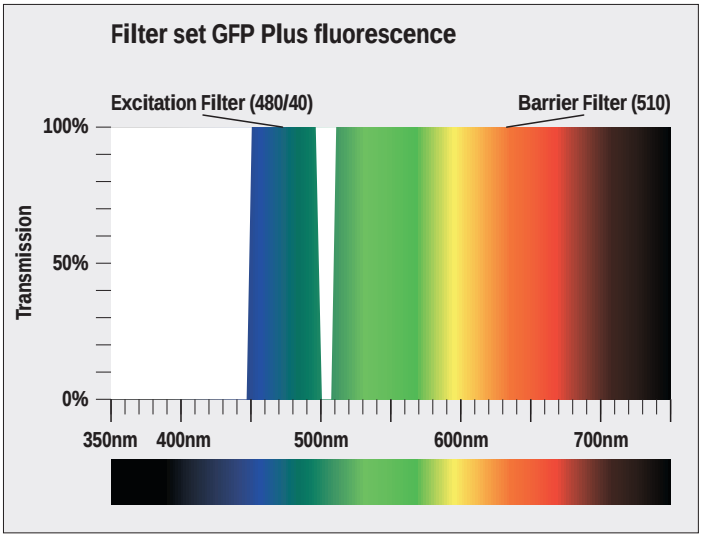
UV protection screen

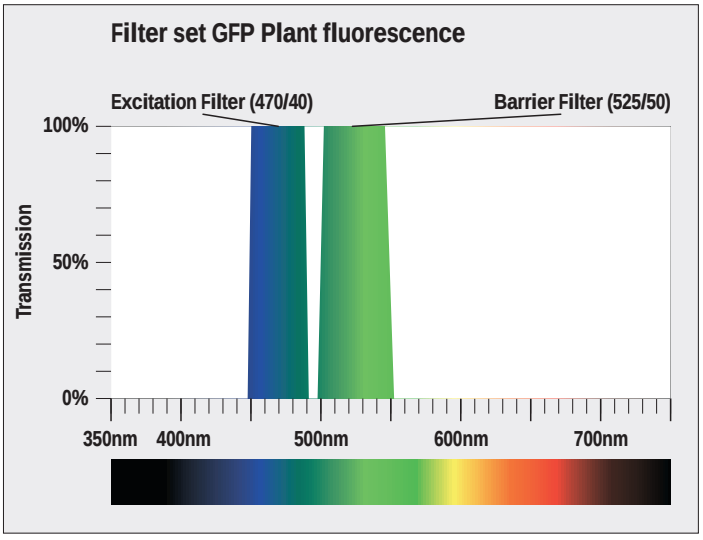


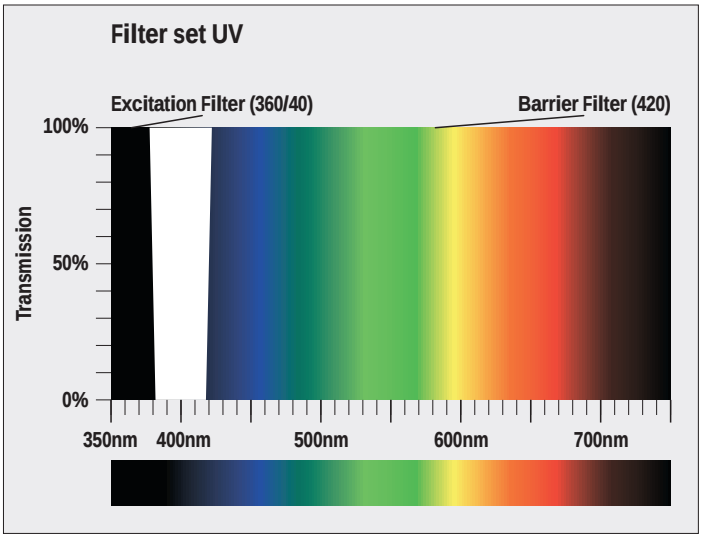
Leica Design
by Ernest Igl/Christophe Apothéloz

Selected filter sets, from GFP to green

Filter sets	Excitation filter	Barrier filter
GFP fluorescence	425/60 nm	480 nm
GFP Plus fluorescence	480/40 nm	510 nm
GFP Plant fluorescence	470/40 nm	525/50 nm
UV fluorescence	360/40 nm	420 nm
Violet fluorescence	425/40 nm	475 nm
Blue fluorescence	470/40 nm	515 nm
Green fluorescence	546/10 nm	590 nm
CFP fluorescence	436/20 nm	480/40 nm
YFP fluorescence	510/20 nm	560/40 nm
Texas Red fluorescence	560/40 nm	610 LP nm
Filter carrier, empty		



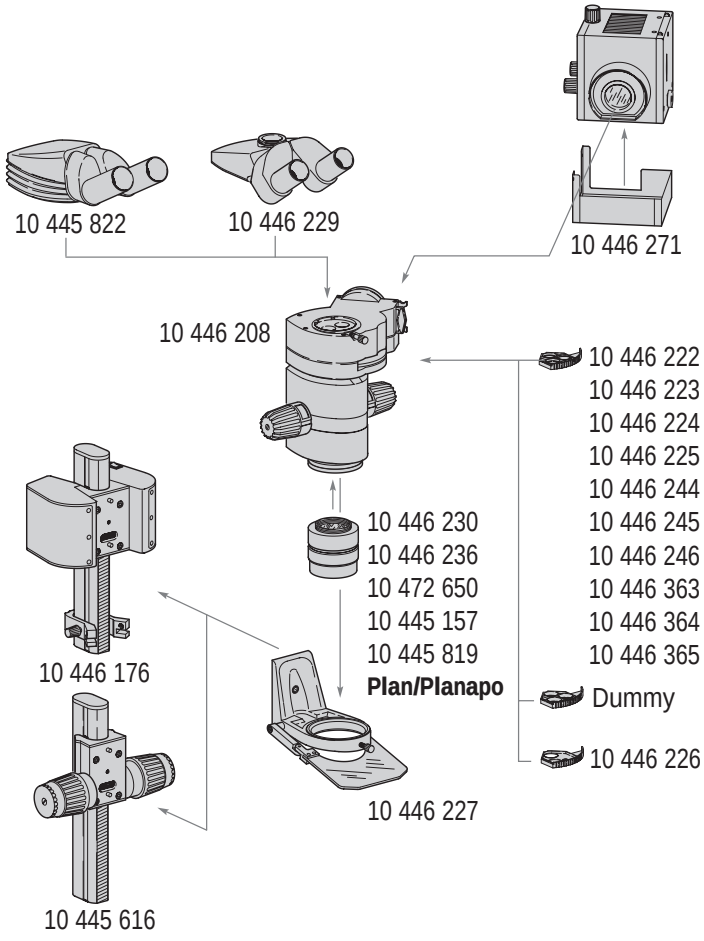




Leica MZ FLIII

Catalogue references

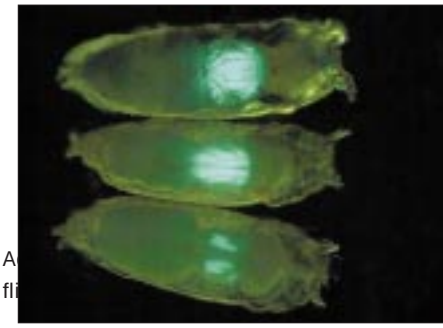
Stock no.	
10 446 208	Leica MZ FLIII optics carrier with 12.5:1 zoom magnification changer, with 2 observation beam paths and 1 illumination beam path, integrated FLUOIII™ filter system, UV protection screen, 3 dummy filter carriers, light stop, empty filter carrier
10 446 227	MZ FLIII microscope carrier for focusing drive for incident- and transmitted-light stands
10 445 822	ErgoTube™ 10°–50°
10 446 229	Trinocular video-/phototube, 100%
10 446 271	Stray-light protection for 105Z and 106Z lamp housings, for use on fluorescence stereomicroscope
10 446 236	Objective, planapochromatic, 0.63x
10 446 230	Objective, planapochromatic, 1.0x
10 472 650	Objective, planapochromatic, 1.6x
10 446 157	Objective, planachromatic, 0.5x
10 445 819	Objective, planachromatic, 1.0x
10 445 927	Double-iris diaphragm
10 446 222	GFP filter set
10 446 223	GFP Plus filter set
10 446 244	GFP Plant filter set
10 446 224	UV filter set
10 446 245	Violet filter set
10 446 225	Blue filter set
10 446 246	Green filter set
10 446 363	CFP filter set
10 446 364	YFP filter set
10 446 365	Texas Red filters
10 446 226	Filter holder, empty



A program with a system

The accessories for ergonomics and documentation

Within the comprehensive and innovative range of accessories for Leica stereomicroscopes there is a solution to meet any requirement. Owners of the Leica MZ FLIII can benefit. The modular concept now enables them to add on new units such as the Leica IC A integrated camera, the Leica DC 100 (0.9 megapixels) and DC 200 (2.6 megapixels) digital cameras, the motor-focus system, the HL high-performance transmitted-light stand, and the ErgoModules™. Established Leica modular accessories for photography, dual-station viewing, measuring and polarization can also be fitted to the fluorescence stereomicroscope without difficulty.



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Leica MZ FLIII with trinocular video-/phototube, 100%, and Leica DC 100 digital imaging system

Leica fluorescence stereomicroscopy

The fields of application

Biology and medicine	**Application**
Anatomy	Monitoring of capillary flow
Biology	Gene expression in chicken embryos, fruit flies, threadworms and zebra fish, fish otoliths marked with alizarin red
Genetics	Cellular detection and protein expression, sorting and dissection, monitoring developmental processes
Biomedicine	Humatic seals on pacemakers
Neurology	Gap junctions on muscles and nerves
Ophthalmology	Cell development in rats' eyes
Pharmacy	Drugs, ELI spotting in cell structures, monitoring of capillary flow with FITC
Parasitology	Detection of bacteria on ticks
Agronomy	Seeds, genetic expression, transgenetics, bacteria recognition
Botany	Plant cells, plant surfaces, soil samples, parasites
Hydrology	Water quality (bacterial and other pollutants), filtered water, cell structures in and on the filter membrane
Forestry	Development of environmentally-acceptable methods of pest control (investigation of viruses on pests)
Technology	**Application**
Electronics	Solder paste on SMDs, epoxy resin on SMD plates, luminescent coatings on TV monitor tubes, quality of polymer castings for embedding integrated circuits
Semiconductors	Foreign particles, photo resists
Oils	Organic and inorganic oils
Polymers	Detection of foreign particles, identification of non-polymerized parts, examination of beads (polymer pellets used in chemical measurements and analyses)
Precision engineering	Inspection of cemented areas on mechanical or optical components
Metalworking industries	Cracks and surface defects, detection of contamination on components, quality control of welds, fracture analysis
Materials science	Cracks, fractures, welds, carbon bonding materials, fractures and orientation of carbon fibres
Bitumen	Quality control for tar and bitumen
Concrete	Cracks and pores
Papermaking	Coating of paper fibers; investigation of inclusions
Forensic work	Textile fibers, body fluids, fingerprints, banknotes, forgeries
Art restoration	Pigments, forgeries
Gemology	Quality, value, inclusions

The performance features

Microscope type	Stereomicroscope with patented separate beam path (TripleBeam™) and patented fluorescence filter system (FLUOIII™)
TripleBeam™ illumination beam path	Separate beam path for fluorescence illumination, coupled zoom optical system
FLUOIII™ filter system	Excitation and barrier filters in one filter carrier, horizontal rapid filter changer for four sets of filters, light stop, filter slide for neutral density filter
Fluorescence filters	Filter sets: GFP, GFP Plus, GFP Plant, UV, violet, blue, green, CFP, YFP, Texas Red
Light source	50W or 100W mercury-vapour burner, lamp housing 106Z, focusable and chromatically-corrected collector, centrable lamp mount
Safety precautions	UV protection screen, UV barrier filter, stray-light protection, dummy filter carrier
Zoom	12.5:1, 10 engageable steps
Zoom range	8x–100x (with 1.0x objective and 10x eyepieces)
Total magnifications	5x to 640x
Numerical aperture	0.2 with 1.6x planapochromatic objective, 0.125 with 1.0x plano or planapochromatic objective
Resolution	375 line-pairs / mm with 1.0x plano or planapochromatic objective, 600 line pairs / mm with 1.6x planapochromatic objective
Field diameter	0.4mm to 52.5mm
Working distances	60mm (1.0x plano), 135mm (0.5x plano), 97mm (0.63x planapo), 55mm (1.0x planapo), 19mm (1.6x planapo), 91–990mm (achromats)
Planachromatic and planapochromatic objectives	1.0x (plano, planapo), 0.5x (plano), 0.63x (planapo), 1.6x (planapo)
Wide-field eyepieces for eyeglass wearers	10x, 16x, 25x, 40x, distortion free
Focusing drive	Coarse/fine, motor driven
Ergonomics	ErgoTube™ 10°–50°, ErgoModules™
Stands	Transmitted-light stand for bright and dark field, incident-light stand, swing-arm stand
Illuminators	Oblique, cold light, coaxial, option of polarization
Accessories	Leica MPS30 and MPS60, fully automatic, with data back, Leica IC A integrated video module, Leica DC 100 and DC 200 digital imaging systems, image manager, dual-station viewing, drawing, measuring

The Business Units in Leica Microsystems hold the management system certificates for the international standards ISO 9001 and ISO 14001 relating to quality management, quality assurance and environmental management.

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