Living up to Life

Leica
MICROSYSTEMS

Leica EM UC7
Leica EM FC7

High Quality Ultramicrotome for Precise Room Temperature and Cryo Sectioning

Highest Quality Sectioning

High quality sectioning of specimens for light, electron, and atomic force microscopy examination has never been easier and more precise. Leica Microsystems introduces its latest specimen preparation technology: the Leica EM UC7 ultramicrotome and the Leica EM FC7 cryo chamber attachment.

Leica EM UC7

The Leica EM UC7 prepares excellent quality semi- and ultra-thin sections, as well as the perfectly smooth surfaces required for LM, TEM, SEM, and AFM examination. The precision mechanics, ergonomic design, and intuitive layout of the touch-screen control unit make the Leica EM UC7 ideal for the highest quality specimen preparation.

- Eucentric movement of the stereomicroscope observation system with patented designated positions for specimen approach, for glass and diamond knives.
- In addition to the standard LED illumination for top light and backlight and transmitted light, the LED spot illumination offers a focused light beam to enhance observation, e.g., for cleaning the knife edge and during cryo-sectioning.
- The user can walk away from the instrument during trimming; the combination of the fully motorized knife stage and patented AutoTrim function completes and then stops the trim automatically.
- The ergonomic design provides comfortable, fatigue-free operation for left and right handed users.
- Excellent observation of the section at low water levels and during cryo sectioning, without compromising the user's ergonomic posture.
- The stereomicroscope offers higher magnification than ever before.
- Easy-to-learn, fast operation via touchscreen control and displayed hints.
- Data transfer for reporting user, specimen, knife and storage parameters provides an electronic, paper-free log file.
- The operator recognition system makes it easy for multiple users to use the same instrument. Up to 100 different user/specimen/knife profiles can be set.

Leica Design by Werner Hölbl

Ergonomic Design

Comfortable to use

Leica Microsystems designed the Leica EM UC7/FC7 with specific features that make it a user-friendly, ergonomic instrument providing comfort and minimizing strain for each user. Easy, fast adjustments adapt the instrument to accommodate multiple users.

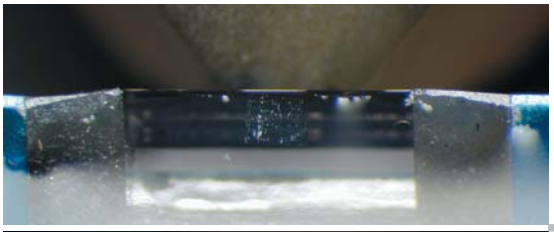
Fatigue-free operation is an integral benefit of the Leica EM UC7/FC7 design. The Leica M80 stereomicroscope with ErgoWedge accessory adapts the height and angle of the optical head to adjust perfectly to an individual's body height and position. Arm rests are attached to the instrument table. These features, in conjunction with the ergonomically arranged control elements, enhance user comfort, even after hours of instrument use.

Optimal Positioning of the Optical Head

The Eucentric Movement of the Leica EM UC7 viewing system allows examination of sections, even with a lowered water level e.g. for Lowycryls and dry sections.

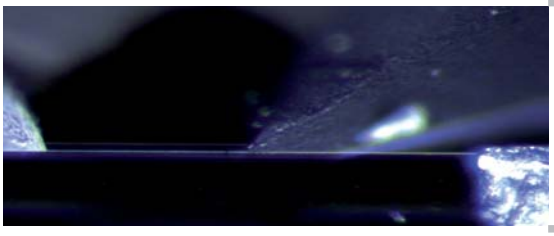
For accurate approach of the knife towards the specimen with the backlight, the viewing angle must be set according to the type of knife in use.

The patented defined position marks of the eucentric movement provide maximum approach accuracy either for glass or diamond knife approach.



Section observation with lowered water level without eucentrically moveable stereomicroscope.

Section observation with lowered water level with eucentrically moveable stereomicroscope.



Diamond knife approach as seen through the Leica M80 stereomicroscope with backlight illumination.

Advanced Features

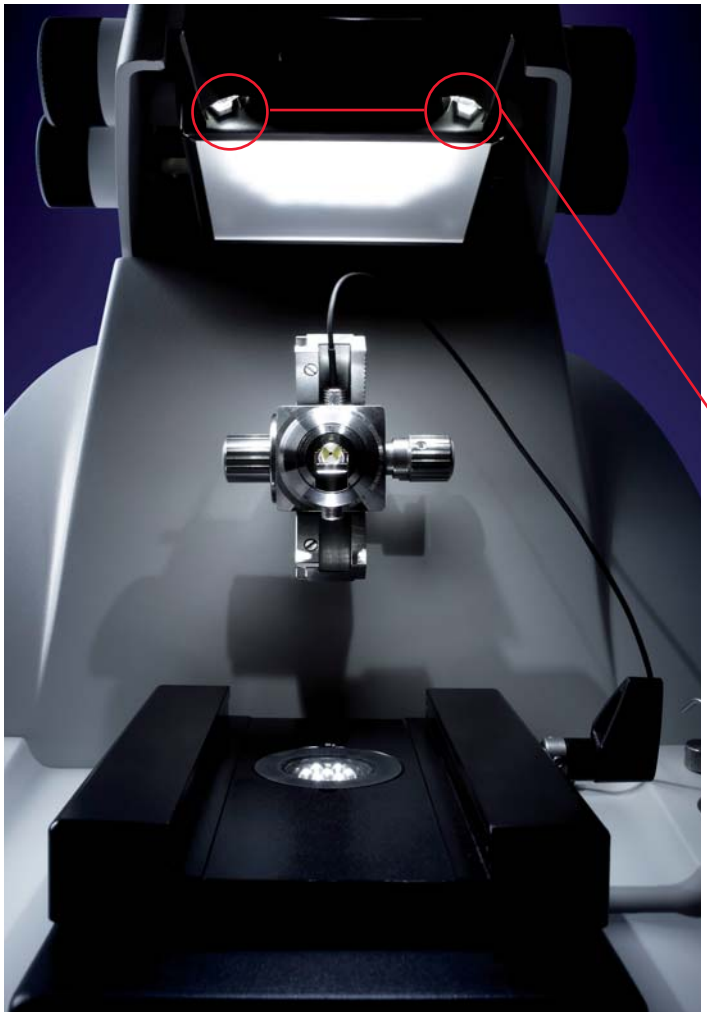
Motorized knife stage

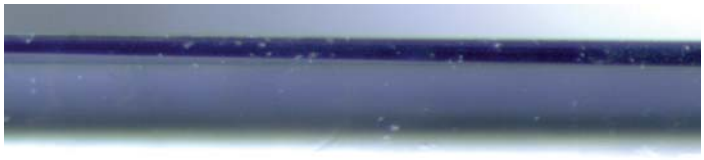
Motorized North-South movement of the knife stage is a unique feature of Leica ultramicrotomes. The additional implementation of motorized East-West movement of the Leica EM UC6 was a logical step forward. Additionally, the E-W quick adjustment buttons on the Leica UC7 controller allow efficient traversing of the knife.

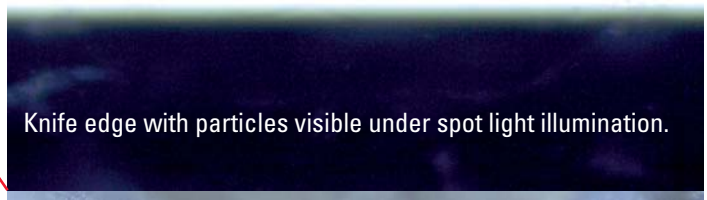
Motorization of the stage has also allowed many useful features to develop hand in hand with it, for example the patented Autotrim mode, E-W measuring function and the automatic approach of the selected knife segment (patent applied).

Brightness-controlled LED illumination

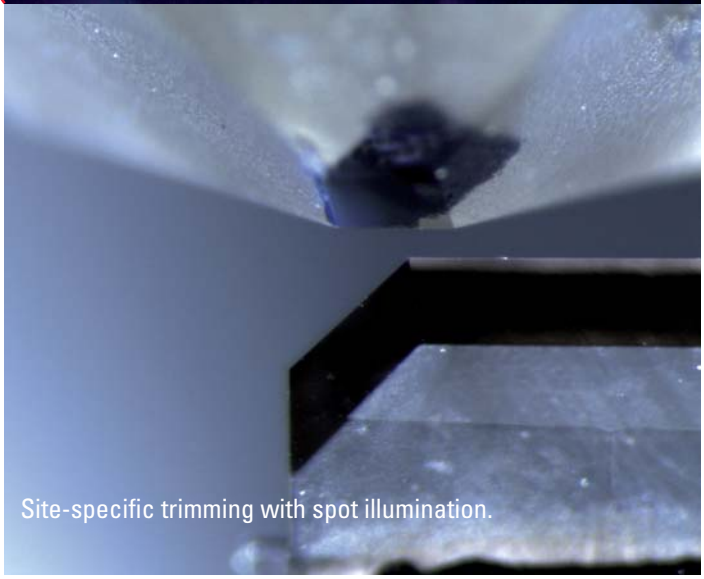
LED light sources provide outstanding illumination for top light, backlight, and transmitted illumination. All illumination modes are idependently brightness-controlled for the best visual clarity. The additional spot illumination enhances the optical performance of the Leica EM UC7 and provides superior visibility while cleaning the knife edge or trimming the block face, for example.







Knife edge with particles visible under spot light illumination.



Site-specific trimming with spot illumination.

Easily activated anti-static function

The Leica EM CRION ionizer dissipates electrostatic charging that can occur at a specimen's surface, minimizing static effects associated with climatic changes and the sectioning of certain materials. This adjustable antistatic electrode is a useful accessory for sectioning at room temperature. Adjusting the ionizer output is an integral function of the Leica EM UC7 controller; no additional controller is required on the instrument table. The simple press of a footswitch synchronizes and activates the simultaneous operation of the specimen arm motor and the Leica EM CRION ionizer.

Efficient cable control

When using a camera system, cables can obstruct the stereomicroscope carrier's movement. To eliminate this persistent problem, Leica Microsystems provides an integrated cable canal that safely and conveniently guides the cables to the rear of the instrument.

Easy-to-use Touchscreen Control

All functions of the Leica EM UC7, the Leica EM FC7 cryo chamber and the Leica EM CRION are controlled via touchscreen. A choice of two touchscreen control units are available to operate the ultramicrotome cryo chamber and ionizer.

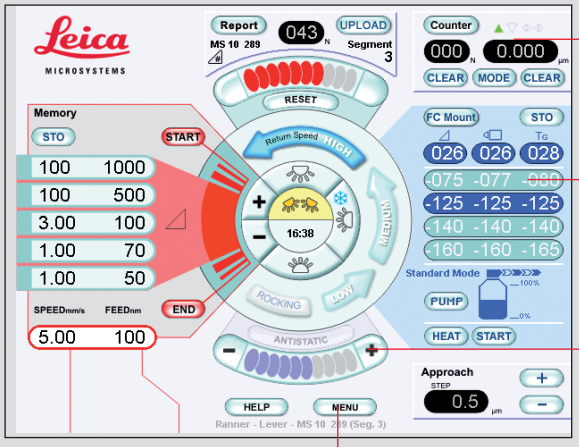
7" basic touchscreen control unit

Indentations in the control panel casing enable the user to locate routinely-used controls that are adjusted while observing the specimen. While viewing the specimen, the user can set the cutting window and step advance and perform many other functions.

Advanced Control

The innovative advanced touchscreen control unit of the UC7 enables fast and safe alignment of knife and specimen with help files and prompts to hand for beginners. Programmable knife and cutting sequences offer significant advantages for automated trimming (AutoTrim).

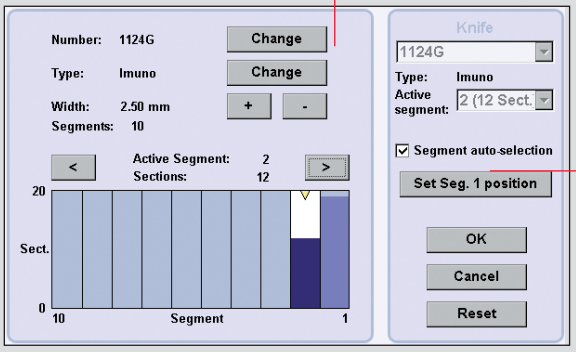
The outstanding performance of the touchscreen is reflected in its ability to control all necessary components for sectioning. These include the built-in antistatic Leica EM CRION device control, the Leica EM UC7 cryo chamber control, storage of up to one hundred different user, specimen, and knife parameters and a USB connection to upload these parameters for reporting. Additionally, every user can save their settings on a USB stick inserted into the Leica EM UC7, enabling the controller to recognize the user as soon the USB stick is connected.



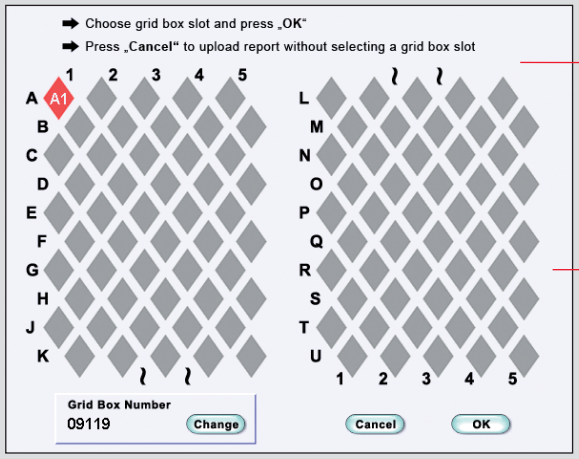
Counter window to toggle between section counter and feed totalizer, countdown, E-W measuring, and AutoTrim mode.

Leica EM FC7 control field appears as soon as the chamber is connected.

As soon as the Leica EM CRION ionizer is connected and switched on this window appears to adjust the intensity of the ionizer.



To optimize diamond knife usage, up to 100 different knives can be stored. Each knife is divided into a number of segments. The selected segment is approached automatically with the motorized knife stage (patent applied).



As soon as the upload button is pressed the grid box window appears and a grid position in the box can be selected, which is automatically reported in the log file.

Leica EM FC7

Within minutes the Leica EM UC7 can be equipped with the Leica EM FC7 low temperature sectioning system, which incorporates many features and offers a wide range of user benefits such as:

- The Leica EM FC7 and Leica EM CRION ionizer controls are both integrated with the Leica EM UC7 control unit to provide easier operation and more workspace.

- Using the advanced touchscreen control, three different cryo-modes are available:
  – Standard
  – High gas flow – increased GN2 gas flow reduces ice contamination below –140°C
  – Wet sectioning – to set a temperature difference of up to 130°C between knife (–40°C) and specimen (–170°C), which is useful for, e.g., DMSO applications.

- Leica EM CRION ionizer with electrostatic charge and discharge functions controlled by footswitches greatly improves the method of cryosection collection.

- The attachable micromanipulator (patent applied) provides precise positioning of the grid to make section collection easier than ever before.

- Multiple lighting angles using the patented LED chamber illumination provide excellent visibility for section manipulation and pick up.

- Contact-free, through-the-wall specimen arm makes the instrument highly stable for chatter-free cryosectioning.

- The optional Cryosphere can surround the Leica EM UC7/FC7 to provide an environment with a relative humidity of less than 10%. It allows sections to be cut without contamination by ice crystals, which can be a problem at higher humidity.

- Heated chamber walls prevent icing over a prolonged working time and enhance user comfort. The GN2 gap between chamber and arm rest ensures a warm surface for the user to rest on.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	Date	Sample	Speed (mm/s)	Feed (nm)	FC Mode	Knife Temperature (°C)	Specimen Temperature (°C)	Gas Temperature (°C)	Knife No.	Segment No.	Total Segment Sections	Grid Box Number	Grid Box Pos.	User
2	04.05.2009 09:08	AG17	5	1000	-	-	-	-	-	-	-	-	-	John Doe
3	04.05.2009 09:13	KG1	1.8	100	-	-	-	-	MS 10 289	3	63	9119	C4	John Doe
4	04.05.2009 09:15	Liver	0.8	70	-	-	-	-	MS 10 289	3	87	9119	C5	Ann Doe
5	07.05.2009 10:15	Liver	1.2	70	high gas flow	-120	-120	-120	MT 7742	5	49	9119	B1	Mike Doe
6	11.05.2009 17:30	PP	0.6	50	standard	-100	-100	-100	MC 11 289	1	22	1987	A1	Bob Doe
7	11.05.2009 18:10	P12	1.2	70	wet sectioning	-40	-160	-160	MS 12 234	4	11	1964	A2	Mary Doe

Protocol Report of Leica EM UC7 Data Log Book. Data transfer for reporting user, specimen, knife, and storage parameters provides an electronic, paper-free log file.

Advanced Cryo-section Collection

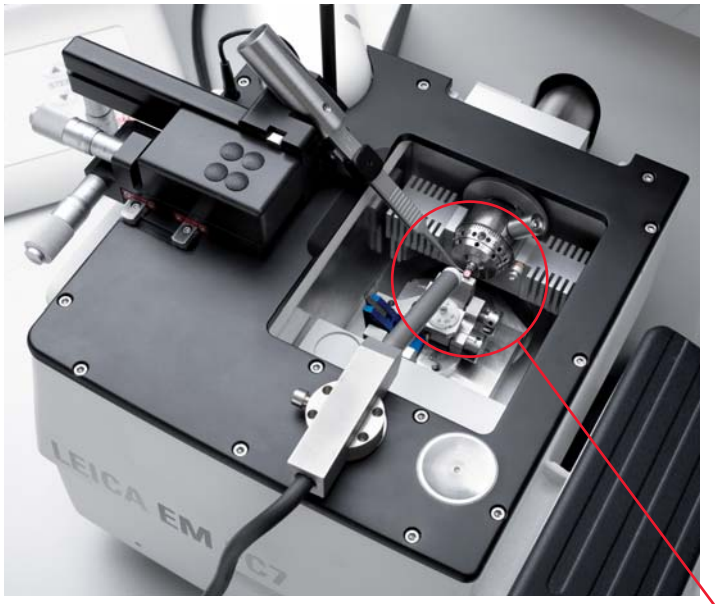
Leica EM CRION ionizer and micromanipulator

Especially for frozen hydrated sectioning or the Tokuyasu method, the Leica EM CRION with electrostatic discharge and charge mode used with the micromanipulator provides outstanding cryo sectioning performance.

The micromanipulator easily attaches to the Leica EM FC7 cryo chamber, which allows the grid to be exactly positioned close to the knife edge using the micrometer gauges. Once these positions are defined, fast retraction of the grid can be performed manually prior to sectioning to prevent possible influence of the grid on the ionizer. The Leica EM CRION is used in discharge mode in order to reduce electrostatic charging while sectioning.

When the section ribbon needs to be placed on the grid, return to the pre-set grid position can be quickly performed. The ribbon is then attached to the grid using the charge mode of the Leica EM CRION, which is operated by a footswitch. Thus, the specimen adheres to the grid without the need for a section press.

As a grid box can be placed near the knife, the micromanipulator can be used to easily place the grid into its storage position.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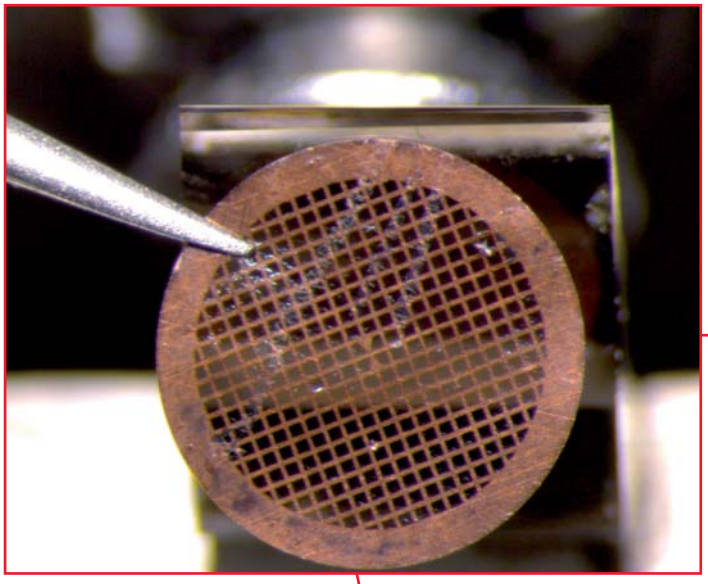
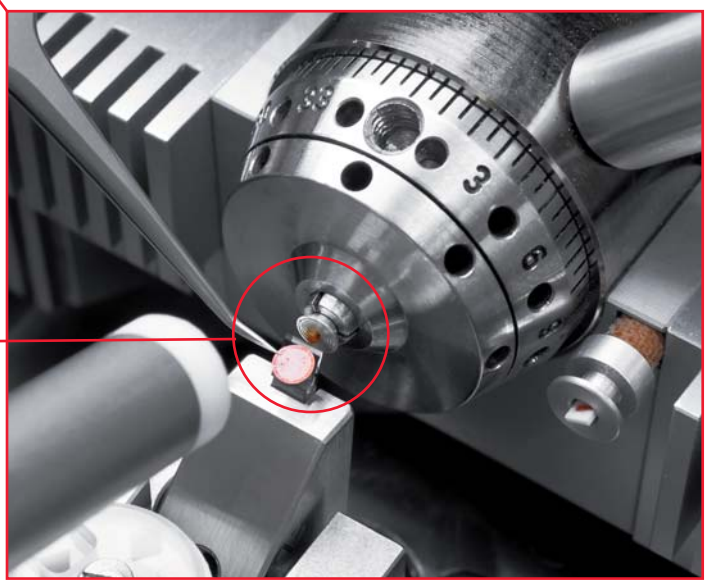
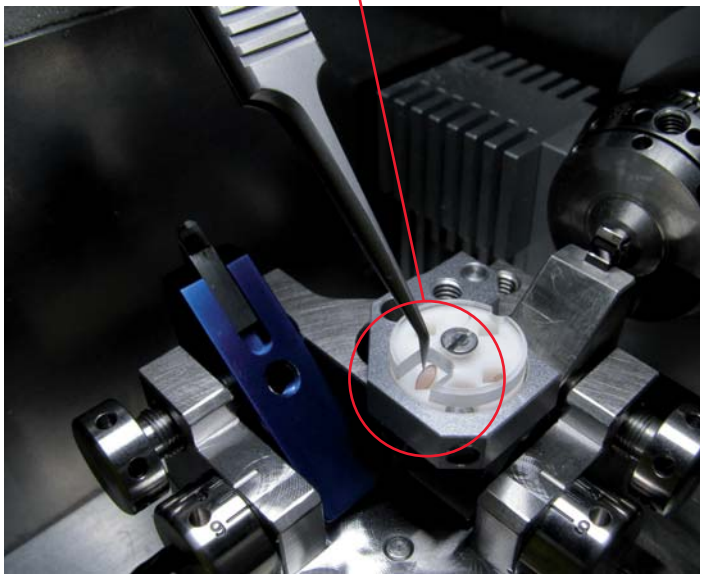
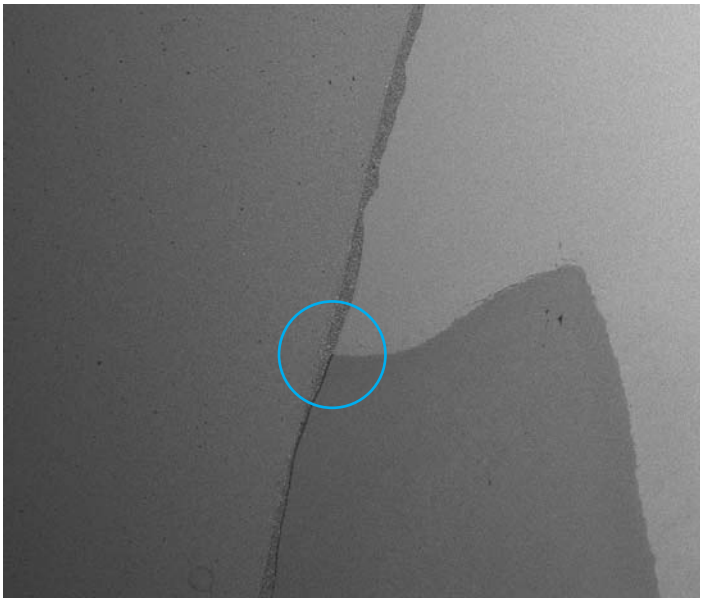




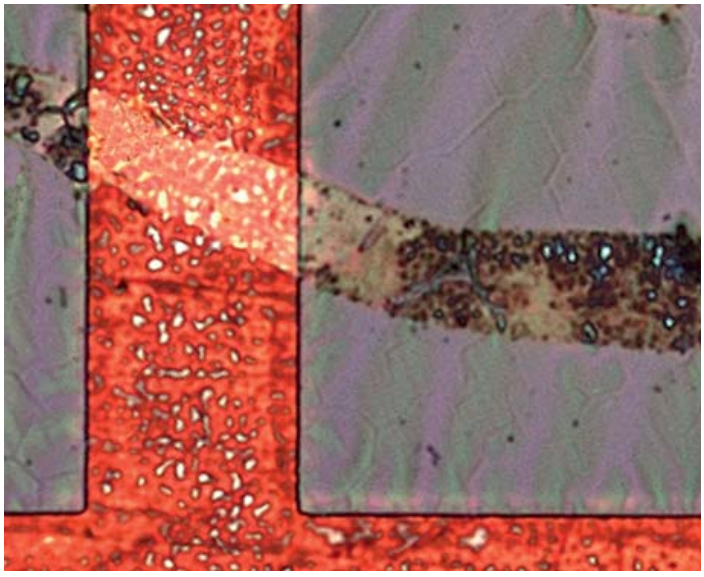


Preparing Specimens for Ultramicrotomy

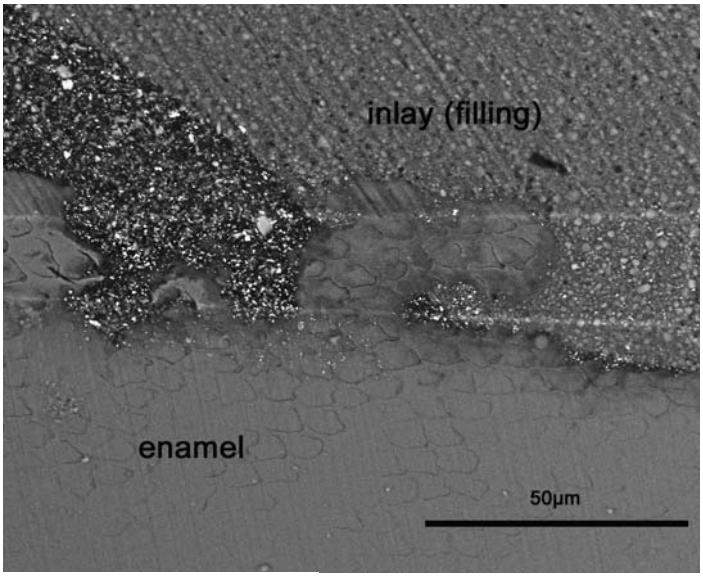
All specimens need to be prepared prior to sectioning. The size and shape of the specimen have a profound effect on sectioning characteristics. Trimming soft specimens can be performed with the Leica EM TRIM2 or EM RAPID using a milling tool. Alternatively, with the versatile Leica EM TXP, even hard and brittle material can be trimmed using grinding and polishing abrasives. The perfectly shaped block face with sharp edges has a considerable influence on the section quality of hard and brittle materials.



Cross section of a tooth with inlay (filling) prepared with the Leica EM TXP (area of interest marked blue).



50 nm sections on the grid



Block face after sectioning

Courtesy of J. Leprince, centre de recherche CRIBIO, Ecole de Médecine Dentaire,Université catholique de Louvain.

Knife Making with the Leica EM KMR3 – Easier than Ever Before

Your benefits:

- Automatic reset of the breaking and scoring mechanism.
- Easily accessible scoring pressure adjustment.
- Maximum ergonomics.
- Fast learning curve – everyone can produce excellent glass knives immediately.

New scoring mechanism

A push action produces an absolutely even score necessary for the high quality break. Two scoring lengths can be selected, the longer is used to score the glass strip to break it into squares, the shorter score is used before breaking the final knives.

After the break, the scoring and the breaking mechanism resets **automatically** to the start position – ready for the next score.

The balanced break concept

The secret of producing a straight, controlled break in a strip of scientific-quality glass is to apply equal weight and pressure to each side of the score. In addition, the support elements, touching the glass from below, must have a minimum surface in order to avoid uncontrolled stress which is applied to the glass prior to the break. The new design of the Leica EM KMR3 allows simultaneous movement of the two breaking pins to apply exactly the same force to both sides of the glass strip. In addition, high precision steel hemispheres ensure a minimum glass surface contact for an unsurpassed knife edge quality.

All the new features of the Leica EM KMR3 help make the production of glass knives easier and more reproducible for electron, as well as light microscopy applications. From students, routine users through to the demands of the experienced cryo-ultramicrotomist, the new Leica EM KMR3 is the unsurpassed instrument of choice for producing high-end glass knives.

The results are perfect glass knives either from 6.4 mm, 8 mm or 10 mm glass strips.

Knife making with the Leica EM KMR3 was never as easy as it is now.

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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.

Leica Microsystems operates globally in three 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.

MEDICAL DIVISION

The Leica Microsystems Medical 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.

Leica Microsystems – an international company with a strong network of worldwide customer services:

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Belgium · Diegem	+32	2 790 98 50	2 790 98 68
Canada · Concord/Ontario	+1	800 248 0123	847 405 0164
Denmark · Ballerup	+45	4454 0101	4454 0111
France · Nanterre Cedex	+33	811 000 664	1 56 05 23 23
Germany · Wetzlar	+49	64 41 29 40 00	64 41 29 41 55
Italy · Milan	+39	02 574 861	02 574 03392
Japan · Tokyo	+81	3 5421 2800	3 5421 2896
Korea · Seoul	+82	2 514 65 43	2 514 65 48
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People's Rep. of China · Hong Kong	+852	2564 6699	2564 4163
· Shanghai	+86	21 6387 6606	21 6387 6698
Portugal · Lisbon	+351	21 388 9112	21 385 4668
Singapore	+65	6779 7823	6773 0628
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