DiATOME

at the forefront of innovation

ultra sonic

- Thinner sections
- No compression
- Best structure preservation

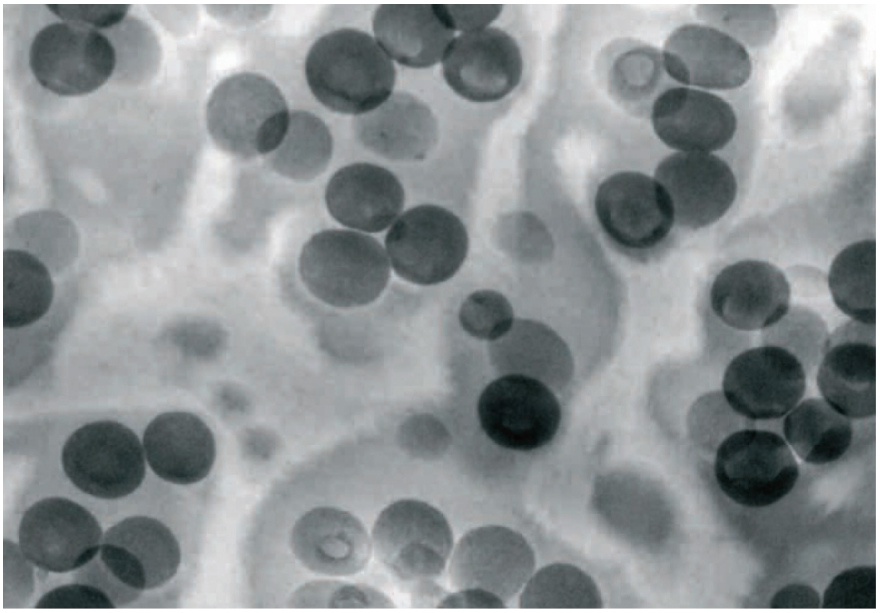
The patented ultra sonic knife allows the cutting of ultrathin sections free of compression (D. Studer et al., Journal of Microscopy, Vol. 197, pp. 94 – 100, 2000).

With correct setting of frequency and amplitude the sections become as long as the height of the sample.

Best results are not only achieved with biological samples, but also with polymers (J. S. Vastenhout et al., Microscopy and Microanalysis 8, 2001. J. S. Vastenhout et al., Microscopy Today, pp. 20 – 21, 2006).

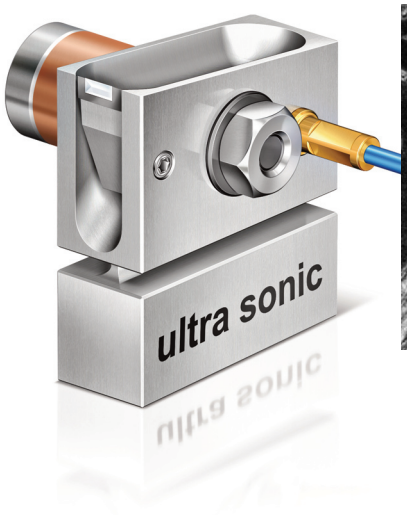
We have tested the ultra sonic knife with the following samples:

- Biological samples in Epon, Araldite, EM Bed, etc.
- Biological samples in acrylic resins (Lowicryl, LR White).
- Rigid polymers such as PS, PMMA, ABS, HIPS, modified PP, blends of various kinds.



Polycarbonate modified with rubber.
Jens Sicking, Bayer Technology Services, Leverkusen.

200 nm



Peripheral nerve (rat), HP frozen, freeze substituted, Epon embedded, cut with the ultra sonic knife, section thickness 50nm.
W. Graber, Institut of Anatomy, University of Bern, Switzerland

Knife Type	Knife Angle	Size [mm]	Thickness Range	Boat Type	Code (new knife)*	Application
ultra sonic (with control unit)	35°	3.0mm 4.0mm	15–100	Special boat	30-ULTSON 40-ULTSON	• Compression-free sections • Best structure preservation
ultra sonic (knife only)		3.0mm 4.0mm			30-ULTSONK 40-ULTSONK	• Biological and materials science specimens

**** Product Codes shown are for new knives.***

To order a resharpened knife, add “R” to the Product Code that corresponds to your knife.

Example: Product Code 30-ULTSONR = Resharpened ultra sonic 3.0mm Knife.

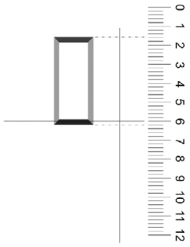
Handling

Sample preparation

- Trim the sample with a trim 45 or a trim 20 diamond blade. The sample width should be a maximum of 0.5 mm.

Measuring the sample height

With the use of an eyepiece graticule in one of the stereomicroscope oculars (graticule 10450336 for the Leica M80). Sample block (fixed in the sample holder), is mounted in the trimming plate. Measure the height with the graticule.



Ultramicrotome Settings

- Set the clearance angle to 6° as shown on the guarantee card.
- Set the desired section thickness.
- Set the sectioning speed (0.4 – 0.6 mm/sec)
- Tighten all set screws.

Installing the knife

- Mount the knife in the knifestage of the ultramicrotome and tighten the set screw.
- Connect the control unit to the power supply.
- Connect the control unit OUTPUT and the knife with the blue cable.
- Switch on the control unit (switch ON the back side).
- Set the resonance frequency (Toggle switch on AUTO).After a few seconds the display will show «Peak locked».
- Adjust the amplitude to approx. 2 V.
- Approach the sample with the knife (settings as shown in our diamond knife handling manual.
- Start sectioning as usual.

Measuring the section length

- Measure the section length with the graticule and compare it with the sample height.
- If sections are too short, increase the the amplitude (turn the button clockwise).
- If sections are too long, decrease the amplitude (turn the button counterclock wise).
- Too high an amplitude may lead to drifting of the sections.

Drifting of the sections

When working in resonance, the sections may drift slightly to the right or to the left. If this is the case, the following procedure helps:

Switching from AUTO to MAN. Now increase or decrease the the frequency a few hundred Hertz, until the sections float straight on the water surface.

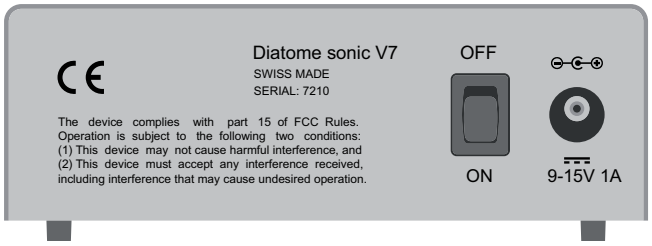
If sections drift to the right: decrease the frequency.
If sections drift to the left: increase the frequency.

Control Unit

Frontside:

Output:	Connection with the knife (blue cable)
Amplitude:	0 – 25.5 V
Frequency:	Toggle switch MAN: Manual setting of frequency, range 15 – 35kHz Toggle switch AUTO: Automatic setting of the resonance frequency.

Backside:



ON/OFF Switch
Connection for the power supply adapter.

Specifications

Knife:	ultra sonic, ultra sonic Maxi
Knife angle:	35°
Cutting range:	20 – 100 nm
Cutting edge length:	3.0mm, 4.0mm
Order number:	DUS3530 (for ultra sonic) DUSM3530 (for ultra sonic Maxi)
Control unit	
Frequency range:	15 – 35kHz, or automatic setting of the resonance frequency
Amplitude:	variable (voltage 0 – 25.5V)
Mains voltage:	230 V, 110 V

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