Dear customer,

**DiATOME** Diamond Knives – Development, manufacturing and customer service since 1970

**Our developments in this period:**

<table>
<thead>
<tr>
<th>Development</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ultra 45°</td>
<td>the diamond knife with a hydrophilic cutting edge, allowing high quality ultrathin sections of epoxy resin embedded samples</td>
</tr>
<tr>
<td>ultra 35°</td>
<td>the low angle diamond knife for reduced compression and better structure preservation</td>
</tr>
<tr>
<td>histo</td>
<td>the first diamond knife for cutting semithin sections for the observation in the optical microscope</td>
</tr>
<tr>
<td>cryo</td>
<td>the diamond knife for cutting in the cryo-ultramicrotome</td>
</tr>
<tr>
<td>Static Line Ionizer</td>
<td>for eliminating electrostatic charging</td>
</tr>
<tr>
<td>cryo immuno</td>
<td>the knife with a large diamond platform facilitating pick-up of cryo sections from sucrose infiltrated samples (Tokuyasu)</td>
</tr>
<tr>
<td>cryo 25°</td>
<td>the low angle diamond knife for sectioning frozen hydrated samples (CEMOVIS)</td>
</tr>
<tr>
<td>ultra AFM and cryo AFM</td>
<td>the knives for generating absolutely smooth and flat surfaces of biological and technical samples for the observation in the AFM</td>
</tr>
<tr>
<td>ultra sonic</td>
<td>the oscillating diamond knife for eliminating compression and allowing best structure preservation</td>
</tr>
<tr>
<td>accessories</td>
<td>such as pick-up loops, special forceps, special knife boats, etc.</td>
</tr>
</tbody>
</table>

These developments were possible by the co-operation with you, our valued customers.

We are convinced that also in the future new developments are possible and that our knives may be adapted to the changing requirements.

Make use of our many years experience in perfecting our knives.

With a telephone call or an email we can inform you on any details you require.

We are looking forward to hear from you soon!

Your DiATOME team

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Ultrastructure of the roundworm Caenorhabditis elegans.
Thomas Müller-Reichert, EM Technology Development, MPI Dresden, and Kent McDonald, Electron Microscopy Laboratory, University of California, Berkeley.
Scale bar: 28 mm = 1 µm
**Content**

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<td>Resharpening and Exchange Service</td>
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<th>DiATOME Quality Guarantee</th>
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<tr>
<td>DiATOME Customer Service</td>
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**DiATOME ultra knives**

- ultra 35°
- ultra semi
- ultra AFM
- ultra 35° Jumbo
- ultra sonic
- ultra 45°
- ultra 45° Jumbo
- trim 45 / trim 20

**DiATOME cryo knives**

- cryo 25°
- cryo immuno
- cryo 35° (dry)
- cryo AFM
- cryo 35° (wet)
- cryo 45° (dry)
- cryo 45° (wet)
- trim 45 / trim 20

**DiATOME histo knives**

- histo
- histo cryo (dry)
- histo cryo (wet)
- histo Jumbo
Characteristics of
DiATOME Diamond Knives

DiATOME knives are compatible with all ultramicrotomes

The boat is designed in such a manner that the water is horizontal when the clearance angle is set. This results in a stationary water surface and good reflection.

The shape of the boat offers you the advantage of an easy pick-up of the floating sections.

The surfaces of the DiATOME diamond knives are hydrophilic. This property allows an easy wetting of the cutting edge, even with a very low water level (important for sectioning Lowicryls and other hydrophilic embedding media, as well as for water sensitive samples).

Resharpening and Exchange Service

Resharpened DiATOME knives undergo the same stringent optical checking and sectioning test as new knives.

A diamond knife resharpened by DiATOME is the same high quality as a new one!

We let you choose: You may have your knife resharpened, or exchanged against a new knife at a slightly elevated price.

In the exchange price a type change is possible (ultra to cryo, 45° to 35°, small knives to large ones, etc).

We guarantee a fast resharpening service for all our knives including the oldest knives ever purchased!
**DiATOME Quality Guarantee**

Before delivery, each knife, new or resharpened, is subject to extensive testing. We can therefore guarantee perfect sectioning (in the respective thickness range) over the entire cutting edge.

Should a knife not fulfil your high expectations, please kindly send it back with a short note of the problem.

**DiATOME Customer Service**

The great experience obtained during long years of development, manufacturing and use of diamond knives allows us to offer a unique sample testing service:

You send us biological or material research specimens of any nature.

We perform a sectioning test and send you the resulting ultrathin sections on grids, the surfaced sample, along with a report of how the results were obtained.

You may be assured that we treat your proprietary specimens with absolute discretion.

Please allow us to help you choose the appropriate knife type from our large range for your specific application.
**DiATOME ultra knives and their applications**

- Highest quality diamonds and optimal crystal orientation guarantee perfect ultrathin sections and a durable cutting edge
- Section pick-up is facilitated as the boat is horizontal allowing the water to completely fill the boat all the way round
- A hydrophilic surface makes it easy to wet the cutting edge, even with low water level

<table>
<thead>
<tr>
<th>Knife type</th>
<th>Knife angle</th>
<th>Size [mm]</th>
<th>Thickness range [nm]</th>
<th>Boat type</th>
<th>Code</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>ultra 35°</td>
<td>35°</td>
<td>1.5</td>
<td>30 – 200</td>
<td>Standard boat</td>
<td>DU3515</td>
<td>- Biological and materials science specimens</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2.0</td>
<td></td>
<td></td>
<td>DU3520</td>
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<tr>
<td></td>
<td></td>
<td>2.5</td>
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<tr>
<td></td>
<td></td>
<td>3.0</td>
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<td></td>
<td>DU3530</td>
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<tr>
<td></td>
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<td>3.5</td>
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<td></td>
<td>DU3535</td>
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<tr>
<td></td>
<td></td>
<td>4.0</td>
<td></td>
<td></td>
<td>DU3540</td>
<td></td>
</tr>
<tr>
<td>ultra semi</td>
<td>35°</td>
<td>3.0</td>
<td>50 – 500</td>
<td>Standard boat</td>
<td>DU3530-semi</td>
<td></td>
</tr>
<tr>
<td>ultra AFM</td>
<td>35°</td>
<td>2.0</td>
<td>15 – 100</td>
<td>Small boat</td>
<td>DU3520-AFM</td>
<td></td>
</tr>
<tr>
<td></td>
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<td>3.0</td>
<td></td>
<td></td>
<td>DU3530-AFM</td>
<td></td>
</tr>
<tr>
<td>ultra 35°</td>
<td>35°</td>
<td>3.0</td>
<td>50 – 500</td>
<td>Jumbo boat</td>
<td>DUJ3520</td>
<td></td>
</tr>
<tr>
<td>Jumbo</td>
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<td></td>
<td></td>
<td></td>
<td>DUJ3530</td>
<td></td>
</tr>
<tr>
<td>ultra sonic</td>
<td>35°</td>
<td>3.0</td>
<td>15 – 100</td>
<td>Special boat</td>
<td>DUS3530</td>
<td></td>
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<tr>
<td>ultra 45°</td>
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<td>30 – 200</td>
<td>Standard boat</td>
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<tr>
<td></td>
<td></td>
<td>4.0</td>
<td></td>
<td></td>
<td>DU4540</td>
<td></td>
</tr>
<tr>
<td>ultra 45°</td>
<td>45°</td>
<td>3.0</td>
<td>50 – 500</td>
<td>Jumbo boat</td>
<td>DUJ4530</td>
<td></td>
</tr>
<tr>
<td>Jumbo</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>trim 45</td>
<td>45°</td>
<td></td>
<td></td>
<td>Triangular holder</td>
<td>DTB45</td>
<td></td>
</tr>
<tr>
<td>trim 20</td>
<td>45°</td>
<td></td>
<td></td>
<td></td>
<td>DTB20</td>
<td></td>
</tr>
</tbody>
</table>

- Compression free sections
- Best structure preservation
- Biological and materials science specimens
- Routine sectioning of biological and materials science specimens
- Section series for 3D reconstruction, STEM
- Alternating sectioning ultrathin semithin
- Sample surface for AFM
- Section series for 3D reconstruction, STEM
- Trimming biological and materials science specimens
ultra 35°

In 1989 considerably reduced compression, smoother section surfaces and improved structural preservation thanks to the use of our ultra 35° knives was demonstrated (J. C. Jésior, Scanning Microscopy Supplement 3, pp. 17 – 153, 1998).

In the meantime, a large number of researchers have recognized the advantages of 35° knives, in particular for sectioning biological specimens of all kinds, non-homogenous specimens, non decalcified bone, dental material, etc.


The ultra 35° knife has demonstrated it’s usefulness as a standard knife for the majority of applications in both biological and materials research.

EM micrograph of an ultramicrotomed section of the anodic alumina film formed on Al-2 wt%Cu alloy. Scale bar = 100 nm. Xiarong Zhou, School of Materials, University of Manchester.
Rat brain x 18'000
Werner Graber, Anatomisches Institut, Bern.

Our ultra AFM knives are made of highest quality to ensure the increased quality requirements of AFM investigation. They produce extremely smooth sample surfaces and guarantee the best possible structure preservation.

AFM amplitude image of the muscle of cat’s mite Otodectes cynotis. The contrast covers amplitude variation in the 1 – 3 nm range. Size of the whole image equals 4.6 microns. Nadejda Borisovna Matsko, Institut für angewandte Physik, ETH Zürich.
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 kind.

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

200 nm
Neuropil of a HP frozen / freeze substituted hippocampus slice culture,
Daniel Studer and Werner Graber, Inst. of Anatomy, University of Bern.
Sectioned with the ultra sonic knife.
Acknowledged as the appropriate knife angle for routine sectioning of both biological and materials research specimens, it represents a balanced compromise between section quality and durability.

For the sectioning of a number of hard materials such as ceramics, semiconductors, oxides etc, with the use of the ultra 45° knife a longer service time may be expected. Kindly contact us and make use of our long years experience in all ultramicrotomy applications.

trim 45 and trim 20

- Rapid and precise trimming
- Shiny block faces and pyramidal sides
- Sample surface aligned with the cutting direction
- Durable cutting edge

For successful ultramicrotomy in biology and materials science, precise trimming is mandatory.

The DiATOME trim 45 and trim 20 will fulfil your trimming requirements, allowing quick, easy and accurate trimming.

A well trimmed sample is a precondition for perfect section ribbons.

Trimming with the trim 45 and trim 20 improves the service time of your diamond knives.

When a sample is trimmed with glass knives or razor blades hard particles may be introduced in the surface or the pyramidal sides. These particles immediately cause knife marks in the diamond knives.

△ SiC, SiO2, TiO2 and AlO3 nanoparticles in polymer matrix.
Claudia Mayrhofer, TU Graz.
DiATOME cryo knives and their applications

- Thinner cryo sections
- Perfect cryosections from ultrathin to semi with the same knife
- Minimal compression and best structure preservation
- Highest quality diamonds and optimal crystal orientation guarantee perfect ultrathin sections and a durable cutting edge

<table>
<thead>
<tr>
<th>Knife type</th>
<th>Knife angle</th>
<th>Size [mm]</th>
<th>Thickness range [nm]</th>
<th>Boat type</th>
<th>Code</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>cryo 25°</td>
<td>25°</td>
<td>3.0</td>
<td>30 – 150</td>
<td>Triangular holder</td>
<td>DCO2530</td>
<td>• Frozen hydrated samples (CEMOVIS)</td>
</tr>
<tr>
<td>cryo immuno</td>
<td>35°</td>
<td>2.0/3.0</td>
<td>30 – 500</td>
<td>Triangular holder</td>
<td>DCIMM3520</td>
<td>• Sucrose infiltrated samples (Tokuyasu)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>DCO3530</td>
<td>• Frozen hydrated samples (CEMOVIS)</td>
</tr>
<tr>
<td>cryo 35° (dry)</td>
<td>35°</td>
<td>1.5/2.0/2.5/3.0/3.5/4.0</td>
<td>30 – 500</td>
<td>Triangular holder</td>
<td>DCO3515/20/25/30/35/40</td>
<td>• Polymers, rubber, paints, etc.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>DCM3515/20/25/30/35/40</td>
<td>• Wet sectioning of polymers with DMSO/water mixture</td>
</tr>
<tr>
<td>cryo AFM</td>
<td>35°</td>
<td>2.0/3.0</td>
<td>20 – 100</td>
<td>Triangular holder</td>
<td>DCO3520-AFM</td>
<td>• Sample planing for AFM imaging</td>
</tr>
<tr>
<td>cryo 35° (wet)</td>
<td>35°</td>
<td>1.5/2.0/2.5/3.0/3.5/4.0</td>
<td>30 – 500</td>
<td>Small cryo boat</td>
<td>DCM3515/20/25/30/35/40</td>
<td>• Wet sectioning of polymers with DMSO/water mixture</td>
</tr>
<tr>
<td>cryo 45° (dry)</td>
<td>45°</td>
<td>1.5/2.0/2.5/3.0/3.5/4.0</td>
<td>30 – 500</td>
<td>Triangular holder</td>
<td>DCO3515/20/25/30/35/40</td>
<td>• Routine dry cryo sectioning of polymers</td>
</tr>
<tr>
<td>cryo 45° (wet)</td>
<td>45°</td>
<td>1.5/2.0/2.5/3.0/3.5/4.0</td>
<td>30 – 500</td>
<td>Small cryo boat</td>
<td>DCM3515/20/25/30/35/40</td>
<td>• Routine wet cryo sectioning of polymers with DMSO/water</td>
</tr>
<tr>
<td>trim 45</td>
<td>45°</td>
<td>Triangular holder</td>
<td>DTB45</td>
<td>• Trimming biological and materials science samples</td>
<td></td>
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</tr>
</tbody>
</table>

Please note: best results are achieved at low humidity, when the cryo-ultramicrotome is placed in a glovebox and the sections attached by electrostatic force (J. Pierson et al., Journal of Structural Biology 169, pp. 219 – 225, 2010).

▲ High resolution electron micrograph of vitreous section of keratin intermediate filaments in the midportion of stratum corneum of human epidermis. The fine structure of the keratin filaments is well resolved and their molecular organisation is seen in favourable cases (inset).
Scale bar = 100 nm.
Scale bar inset = 20 nm.
Ashraf Al-Amoudi, Laboratoire d’Analyse Ultrastructurale, Lausanne.
The first cryo knife with a diamond platform, guarantees the best possible sectioning for sucrose infiltrated samples (Tokuyasu).

The diamond platform guarantees an easy and gentle section pick-up.


The 35° angle leads to a considerable reduction in mechanical stresses and therefore to improved structure preservation in sucrose infiltrated samples (E. Bos et al., Journal of Structural Biology 175, pp. 62 – 72, 2011).

We recommend the cryo immuno knife also for sectioning frozen hydrated samples (CEMOVIS). The 35° angle is a good compromise between durability and cutting performance (A. Al-Amoudi et al., Journal of Structural Biology 150, pp. 109 – 121, 2005).

Mouse optic nerve, immunolabeling of the major myelin protein proteolipid protein (PLP), 10 nm gold. Wiebke Möbius, Dept. of Neurogenetics, EM Core Facility, MPI of Experimental Medicine, Göttingen.
Ultrastructure of an astrocyte in the mouse optic nerve, high-pressure frozen. In the astrocyte the glial fibrillary acidic protein is visible.

Wiebke Moebius, Dept. of Neurogenetics, EM Core Facility, MPI of Experimental Medicine, Göttingen.
The cryo 35° knife has demonstrated its usefulness as a standard knife for the low temperature sectioning of polymers, rubber, paints, etc.

The 35° angle represents a balanced compromise between section quality and durability.

The cryo 35° and cryo 45° knife mounted in the triangular holder is suitable for dry cryosectioning.

The cryo 35° and cryo 45° knife mounted in the trough are used for sectioning with fluids such as a DMSO/water mixture.

The cryo 45° knife is well suited for routine cryo sectioning.

▲ Styrene-butadiene block copolymer x 25'000
Ronald Walter, BASF Aktiengesellschaft, Polymer Physics, D-67056 Ludwigshafen.
cryo AFM

Our cryo AFM knives are made of highest quality to ensure the increased quality requirements of AFM investigation. They produce extremely smooth sample surfaces and guarantee the best possible structure preservation.

trim 45 trim 20

For successful ultramicrotomy in biology and materials science, precise trimming is mandatory.

The DiATOME trim 45 and trim 20 diamond blades will fulfil all your trimming requirements, allowing quick, easy and accurate trimming.

Due to the extreme sharpness of our diamond blades, less mechanical damage is applied to the sample during trimming.

Very shiny sample faces and precise sides are the result.

The trim 45 produces pyramidal sides with an inclined angle of 45° and the trim 20 pyramidal sides with an inclined angle of 20°.

Morphology of a blend of two SBS block copolymers with different chain-architecture. AFM tapping mode, phase image, image size = 3 x 3 µm. Rameshwar Adhikari, Institut für Werkstoffwissenschaft, Martin-Luther-Universität, Halle-Wittenberg.
DiATOME histo knives and their applications

- High quality diamonds guarantee perfect sections and a durable cutting edge
- Easy wetting cutting edge
- Optimised serial sectioning
- Large boat for easy pick-up

<table>
<thead>
<tr>
<th>Knife type</th>
<th>Knife angle</th>
<th>Size [mm]</th>
<th>Thickness range [µm]</th>
<th>Boat type</th>
<th>Code</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>histo</td>
<td>45°</td>
<td>4.0</td>
<td>0.2 – 5</td>
<td>Standard histo boat</td>
<td>DH4540</td>
<td>• Sectioning biological and industrial materials specimens for optical microscopy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6.0</td>
<td></td>
<td></td>
<td>DH4560</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>8.0</td>
<td></td>
<td></td>
<td>DH4580</td>
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</tr>
<tr>
<td>histo Jumbo</td>
<td>45°</td>
<td>6.0</td>
<td>0.2 – 5</td>
<td>histo Jumbo boat</td>
<td>DHJ4560</td>
<td>• Large boat for serial sectioning</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8.0</td>
<td></td>
<td></td>
<td>DHJ4580</td>
<td></td>
</tr>
<tr>
<td>histo cryo (dry)</td>
<td>45°</td>
<td>4.0</td>
<td>0.2 – 5</td>
<td>Triangular histo holder</td>
<td>DHCO4540</td>
<td>• Sectioning biological and materials specimens for optical microscopy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6.0</td>
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<td></td>
<td>DHCO4560</td>
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<td></td>
<td></td>
<td>8.0</td>
<td></td>
<td></td>
<td>DHCO4580</td>
<td></td>
</tr>
<tr>
<td>histo cryo (wet)</td>
<td>45°</td>
<td>4.0</td>
<td>0.2 – 5</td>
<td>Small histo boat</td>
<td>DHCM4540</td>
<td>• Wet sectioning of polymers (with DMSO/water mixture)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6.0</td>
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<td>8.0</td>
<td></td>
<td></td>
<td>DHCM4580</td>
<td></td>
</tr>
</tbody>
</table>
The histo knife is designed for the sectioning of hard and soft biological and material research specimens, non embedded or embedded in acrylic or epoxy resins (O. L. Reymond, Bas. Appl. Histochem. 30, pp. 487 – 494, 1986).

Our histo knives can be used on all ultramicrotomes as well as on microtomes with a retraction of the specimen arm in the return phase.

Nondecalcified rat bone.
Scale: 35 mm = 100 µm.
Daniel Studer, Anatomisches Institut, Bern.
Our histo cryo knives are delivered with a boat for wet sectioning using a DMSO/water mixture or in triangular holders for dry sectioning.

▲ E. B. Hunziker, M. E. Müller, Institute for Biomechanics, University of Bern. Rabbit joint, calcified cartilage/bone. X760
For 3D reconstruction it is imperative not to lose a single section (M. J. F. Blumer et al., Journal of Neuroscience Methods 120, pp. 11 – 16, 2002).

The large Jumbo boat as well as the adhesive (Pattex compact by Henkel) applied to the upper side of the sample block increase the distinct advantages of our histo knives.

They allow:
- easy production of section ribbons (0.5 – 2 µm)
- no section loss
- no folding
- the same orientation of all sections
- easy collection of section ribbons
- multiple ribbons on one glass slide
- perfect for immuno-histo-chemistry.

Eye of A. peroni: photographic sequence of some semithin sections of a complete series through the eye. L = lens, RE = retina.
Michael J. F. Blumer, Institut für Zoologie, Universität Wien.