Swiss diamond knives
for ultramicrotomy

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DiATOME

I. Introduction:

Dear Customer:

DiATOME Diamond knives: Development, Manufacturing and Customer Service since 1970

WHAT HAVE WE ACHIEVED IN THIS PERIOD?

• ultra 45 the first diamond knife with an absolutely score-free, hydrophilic cutting edge.
• semi the first diamond knife for alternating sectioning ultrathin/semithin.
• cryo the diamond knife for sectioning at low temperature.
• histo the first diamond knife for semithin sections for light microscopy.
• ultra 35 the diamond knife for optimized sectioning results in almost all applications.
• STATIC LINE II the ionizer for eliminating electrostatic charging in ultramicrotomy.
• cryo-P a cryo knife with a patented platform for section pick up.
• cryo immuno the optimized cryo diamond knife for the Tokuyasu technique.
• ultra sonic the oscillating diamond knife for room temperature sectioning.
• cryotrim 45 and 25 optimizing trimming with diamond blades.
• ultra AFM & cryo AFM the first diamond knives for AFM at room and low temperatures.
• cryo 25 for sectioning frozen hydrated specimens.

We are looking forward to hearing from you soon!

Your DiATOME Team

II. Manufacturing:

THE RAW MATERIAL:

The manufacturing of high quality knives, like ours, begins with the selection of the highest possible purity diamonds with a regular crystal structure, which are pale yellow in color. The crystal orientation of the diamond that we have chosen permits a final polishing parallel to the cutting edge, which gives you an extremely sharp, scorefree, durable cutting edge.

PRECISION IN GRINDING AND POLISHING:

Our precise pre-grinding and polishing techniques assure you the perfection in a diamond knife that you expect. Each one of our stones is ground strictly in accordance with its structure, with an accuracy of +/- 2 degrees being maintained in the crystal axis. Loss of weight during this preliminary grinding amounts to 80% in contrast to the methods of others our diamond knives are ground parallel to the cutting edge. Some of the reasons for doing so are as follows:

1. The cutting edge life of a diamond tool used for processing a tough metal such as beryllium bronze can be appreciably lengthened, if the diamond is oriented in such a way, that the grinding direction is at a right angle to the subsequent working direction. If we wish to apply this knowledge to the manufacturer of diamond knives, then the grinding direction will be parallel to the knife cutting edge. This is crucial in the cutting of bone or metals, for example.
2. The diamond knife cutting edge is formed from the polished surface which is turned towards the trough and the ground surface which forms the clearance angle with the block. Since the sections pass over the side turned towards the water, this surface is subject to much greater use than the clearance angle surface, and if it has been badly polished, the areas with polishing ridges in the cutting edge give rise to stripes and streaks in the sections, some more visible than others. The same thing would occur if we turned the ground surface towards the water and its grading ridges were not exactly parallel to the cutting edge. It has been demonstrated that the steeper the grading ridges are to the knife cutting edge, the more pronounced is the formation of stripes in the sections. According to this, grading or polishing at right angles to the cutting edge would represent an extreme case. The streaks in the sections can be seen in the stereomicroscope of the ultramicrotome or in the electron microscope. In the course of time the effects of irregularities in the cutting edge can be increased through polymerized embedding material. Knives that have been supplied by us in perfect condition have come back to us after complaints and have been found to be cutting with streaks, even though there was no damage visible under the microscope.

THE CUTTING EDGE:

The sharpness of a DiATOME knife edge can not fully be shown in a light microscopy photograph, however, it has been shown that the radius of curvature of our knives is less than 2nm.

QUALITY CONTROL/OPTICAL CHECKING AND SECTION TESTING:

The final step before any of our knives leave the plant is our own extensive testing that each knife, new or resharpened, is put through. Only if these knives perform successfully will they be sold. During the polishing process the edges of the knives are inspected at 500 to 1000x magnification. Very small irregularities that could not be found by light microscopy are detected during the sectioning test in accordance with the range of the different knife types (sections are checked by light and electron microscopy). Only knives that cut perfectly over this range are accepted for delivery. We can therefore guarantee perfect sectioning (in the respective thickness range) over the entire cutting edge.

Our goal has always been to assure our customers satisfaction. Therefore, in the unlikely event that you experience difficulties, or for any reason are unhappy with the performance of your new or resharpened knife, contact us immediately. You can be sure that any problem with your knife will be corrected.

III. Characteristics of DiATOME Diamond Knives:

• DiATOME knives are compatible with all ultramicrotomes.
• The shape of the boat offers you the advantage of 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 Lowicryl and other hydrophilic embedding media, as well as for water sensitive samples.)
• The diamond is fastened in a metal shank which is securely screwed into the boat.
• The cementing material seals boat and knife. It is hydrophilic and aids the easy wetting of the cutting edge.

WE STAND BY OUR COMMITMENT TO QUALITY AND CUSTOMER SATISFACTION.

Swiss diamond knives for ultramicrotomy

IV. Quality Guarantee of DiATOME Diamond Knives:

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. 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.
**DiATOME Diamond Knives and their Applications**

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<tr>
<th>Knife Type</th>
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<th>Thickness Range</th>
<th>Applications</th>
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<td>30-200nm</td>
<td>Standard applications</td>
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<td>2.0 and 3.0mm</td>
<td>10-100nm</td>
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<td>Cryo (dry)</td>
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<td>Trimming of sucrose protected as well as frozen hydrated biological samples and polymers</td>
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<td>3.0 and 4.0mm</td>
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<td>Trimming of epoxy and acrylic embeddings as well as polymersand non-ferrous metals</td>
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<td>0.2-5µm</td>
<td>Sectioning of biological and material specimens non embedded or embedded (plastic or epoxy) for light microscopy</td>
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<td>0.2-5µm</td>
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<td>0.2-5µm</td>
<td>Immuno-histo-chemistry and 3D reconstruction</td>
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<td>Static Line II</td>
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<td>Reduction of static charging</td>
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**DiATOME Diamond Knives**

<table>
<thead>
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<th>New Knife Resharpening Exchange</th>
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<td>Static Line II</td>
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**Contact Information**

DiATOME - 1560 Industry Road - P.O. Box 410 - Hatfield, PA 19440
**DiATOME**

**DIAMOND KNIVES:**

Swiss diamond knives for ultramicrotomy

Please allow us to help you choose the appropriate knife from our large range for your specific application.

**C. CUSTOM DIAMOND KNIVES AND BOATS:**

* Upon request, we can supply you with different color (Black) and shaped boats (Huxley for instance) at no extra cost to you.

Certain applications require special knives and tools outside of the standard knives and tools that are available. For years DiATOME has been manufacturing custom diamond blades, tools, and knives for customers meeting all of their specific needs.

If you already have in mind the type of diamond knifes and tools that you require, please submit a diagram of it to us as well as your sample blocks or specimens. We, in turn, will manufacture a prototype knife for you and test it in accordance to your requirements with your blades. Only if the knife or tool passes all of our extensive testing will we send it to you for your evaluation and approval.

If you are not quite sure how to attack your sectioning problems but you believe that you may be a candidate for a custom diamond knife or tool please send us your sample blocks and a complete description of the work that you are doing and what you would like to achieve with your diamond knife. We will take it from there. We will manufacture a prototype knife, evaluate and test it, and then send it to you for your evaluation and approval.

There is absolutely no charge for this service outside of the regular cost of purchasing the blade once you have approved it.

**D. DELIVERY TIME AND SHIPPING:**

All new knives as well as exchange knives are in stock for immediate delivery. For our resharpening service our turn around time is no longer than 4 weeks from date that the knife is received by us. In most instances the service usually only takes 2-3 weeks. All of our knives, new or resharpened, are shipped by UPS Blue (2 day air service) at our expense. All new knives as well as exchange knives are in stock for immediate delivery. For our resharpening service our turn around time is no longer than 4 weeks from date that the knife is received by us. In most instances the service usually only takes 2-3 weeks. All of our knives, new or resharpened, are shipped by UPS Blue (2 day air service) at our expense. All new knives as well as exchange knives are in stock for immediate delivery. For our resharpening service our turn around time is no longer than 4 weeks from date that the knife is received by us. In most instances the service usually only takes 2-3 weeks. All of our knives, new or resharpened, are shipped by UPS Blue (2 day air service) at our expense.

**accompanied with UPS Express Mail (5 day air service) at your expense.**

When you send knives back to us we recommend that you use either UPS or Federal Express and insure the knife for its original value.

**E. PROFESSIONAL TECHNICAL SERVICES**

We do hope that these programs not only save you money but allow you to buy and use the most respected and highest quality diamond knife on the market today.

**VIII. Special DiATOME DIAMOND KNIFE Programs:**

We do hope that these programs not only save you money but allow you to buy and use the most respected and highest quality diamond knife on the market today.

**→ PROGRAM #1: THE ULTRA EXCHANGE**

This program allows you to exchange any old diamond knife you have for a brand new ultra thin diamond knife and pay almost half the price of a new knife. It does not matter what size or type you trade in, you may choose any size DiATOME Ultra knife and pay the reduced price of the size that you choose.

**→ PROGRAM #2: THE HISTO EXCHANGE AND THE HISTO JUMBO EXCHANGE**

This program allows you to take any old Diamond Knife no matter the manufacturer and exchange it for a brand new DiATOME Cryo-Immu-No-Boat CIB knife and get 20% off the new knife price. It does not matter what size or type you trade in, you may choose any size DiATOME Cryo-Immu-No-Boats and pay the discounted price for the size that you choose.

**→ PROGRAM #3: THE MULTIPLE PURCHASE AND GIVE AWAY**

For your convenience we have set this program up in two different ways:

- **BUY any 2 Ultra room temperature or cryo knives at the full price and get the third knife at 50% off.**
- **BUY one Diamond knife for full price and get the second knife at the resharpening price.**
- **ReSharpen 2 knives and the third knife have resharpened for free.**

**→ PROGRAM #4: THE EMS TOOL GIVE AWAY**

This program allows you to buy any New or Exchange DiATOME knife and receive an EMS #5 Biology Grade Tweezer and a EMS Perfect Loop Pick Up Set.

**→ PROGRAM #5: THE CRYO-IMMUNO AND PLANAR EXCHANGE**

This program allows you to take any old Diamond Knife No matter the manufacturer and exchange it for a brand new DiATOME Cryo-Immu-No-Boat CIB knife and get 20% off the new knife price. It does not matter what size or type you trade in, you may choose any size DiATOME Cryo-Immu-No-Boats and pay the discounted price for the size that you choose.

**→ PROGRAM #6: THE DIATOME REBATE**

This program allows you to purchase any new DiATOME Diamond Knife at its regular price and receive a $250.00 coupon towards the purchase of chemicals, accessories and supplies from Electron Microscopy Sciences, the leader in Microscopy consumable items.

**IX. DiATOME Services:**

**A. RESHARPENING AND EXCHANGE SERVICE OF DIATOME DIAMOND KNIVES**

ReSharpening 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!

During resharpening a knife may be reworked into another type (ultra to cryo, 45° to 35°, etc.).

We let you choose:

- You may have your knife resharpened, or resharpened against a new one. In the exchange service a type change is possible (ultra to cryo, 45° to 35°, small knives to large ones, etc.). This, of course includes changing the boat to your desired style.

When we resharpen your diamond knives we restore it to its original condition.

Your resharpened DiATOME knife will have the same length, the identical cutting edge and carry the same exact guarantee of quality as the day it first left our factory.

We are the only manufacturer that guarantees that after a resharpening, the knife will be the same flawless quality as the knife you originally purchased. Other manufacturers state that during their resharpening process the diamond may become smaller (up to 5% of its original length). With our advanced techniques in resharpening you will never, and we mean never, lose any diamond length.

Other companies *CAN NOT SUCCESSFULLY* resharpen a DiATOME Knife. We have found that when other companies try to resharpen our knives, the original parameters of our knives are either altered significantly or totally lost; returning to you an inferior diamond knife. Many times we have also found that other manufacturers ruin our diamonds during their resharpening process and end up replacing our diamond with one of inferior quality.

Any DiATOME knife can be resharpened an "UNLIMITED" number of times due to the following reasons:

1. The cutting edge of the diamond knife is on the narrow side of the rectangular cut diamond, leaving the large part of the stone as a resharpening reserve.
2. Special attention is given to minimizing the amount of grind off to the diamond during the resharpening process.
3. When you send a knife to us for resharpening we will automatically replace your boat at no charge if it is either damaged, discarded, or at your request.
4. Each DiATOME Diamond Knife, whether new or resharpened, is subjected to extensive testing for its ability to cut accurately without scoring or compression. Only if its performance passes our tests will we ship it to you.

**B. SAMPLE TESTING SERVICE OF DIATOME DIAMONDS**

The great experience obtained during long years of development, manufacturing and application of diamond knives allows us to offer a unique service.

You send us biological or industrial samples of any nature and let us know what you would like to obtain. The more information you give us the better results you will receive. We perform a sectioning test and send you the resulting ultrathin section (i.e. the sample face for SEM, AFM, STM investigation) along with a report of how the results were obtained and recommendations for the most suitable knife. This service is free of charge as long as the number of samples is reasonable. You may take it for granted that we treat your "secret samples" with absolute discretion.

**X. DiATOME Unique Characteristics & Justifications:**

**A. CHARACTERISTICS:**

1. **DiATOME offers incomparable durability of the diamond edge.** DiATOME knives have been known to last for many years without resharpening.

2. All DiATOME diamonds are of the highest possible quality.

**TRADE IN**

When you need to resharpen your DiATOME Knife we will accept trade in any knife manufacturer and apply the appropriate discount to your new purchase. The size of the knife that is being traded will determine your discount. Please note that there is a limit of one trade in per resharpened knife.

The diamonds that we receive as trade ins are absolutely never used for any of the products that we manufacture or sell.

<table>
<thead>
<tr>
<th>Knife Size</th>
<th>Trade in $</th>
</tr>
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<tbody>
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<td>1.8mm</td>
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<td>2.1mm</td>
<td>175.00</td>
</tr>
<tr>
<td>2.5mm</td>
<td>200.00</td>
</tr>
<tr>
<td>2.7mm</td>
<td>250.00</td>
</tr>
<tr>
<td>3.0mm</td>
<td>300.00</td>
</tr>
<tr>
<td>3.5mm</td>
<td>325.00</td>
</tr>
<tr>
<td>4.0mm</td>
<td>350.00</td>
</tr>
</tbody>
</table>
Swiss diamond knives for ultramicrotomy

1. Do not add solvents to the distilled water in the boat (c, diagram). The following reasons:
   a. They may dissolve the sealing material between the knife and the boat.
   b. Solvents will reduce the surface tension of the water.
   c. Solvents may also dissolve and destroy the cellular materials of your specimen.

2. Avoid cutting thicker than the limits given for each specific knife.

3. The block should be fully cured and should not be too wide.

4. Exercise care when picking up sections. Do not touch the cutting edge with any solid object (grids, loops, tweezers).

5. Do not allow the sections to dry on the cutting edge.

C. ROOM TEMPERATURE

The following are factors that will determine, in part, the quality of your sections. These points should be checked prior to you beginning your sectioning:

1. Alignment of the block: it must be parallel to the cutting edge.
2. Adjustment of the hardware: All of the screws should be tightened in the block holder, the knife holder, etc.
3. Knife parameters: The clearance angle and the cutting speed should be set as indicated on the cutting card. (see all exceptions in Troubleshooting).
4. Trough liquid: the water should be level with the cutting edge and give a good reflection. (see all exceptions in Troubleshooting.)

The boat should be filled until the cutting edge is moistened. Then the left and right hand sides of the boat are wetted with the tip of a toothpick.

Apart from the above-mentioned mishaps, the following precautions should be taken when receiving the knife:

1. Make sure the seal on the outside of the knife box has not been tampered with.
2. Insure that the receiving department of your institute or facility does not open the plastic box for they can cause damage.
3. When unpacking the knife, care should be taken not to disturb the knife edge.
4. Once the knife is unpacked it is ready for use*, just place it in the stage and begin sectioning.

* During our final inspection before packaging, the cutting edge is thoroughly cleaned. Only knives that pass our high inspection standards are released for shipping. Therefore, no cleaning is required by you for your initial use.

WE DO NOT RECOMMEND THE TESTING OF KNIVES WITH BLANK BLOCKS BECAUSE THEY CAN NOT SHOW THE KNIVES TRUE CUTTING ABILITY.

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4. Trough liquid: the water should be level with the cutting edge and give a good reflection. (see all exceptions in Troubleshooting.)

The boat should be filled until the cutting edge is moistened. Then the left and right hand sides of the boat are wetted with the tip of a toothpick without touching the knife edge or the cement mounting material.

To avoid difficulties during sectioning and extend the life of your diamond knife, the following tips should be kept in mind:

**DIATOME**

DiATOME is the manufacturer of the diamond that we have chosen permits a final polishing parallel to the cutting edge, which gives you a perfect nick free edge.

3. Uniform sections are easily reproducible.

4. DIATOME knives are guaranteed for an unlimited amount of resharpenings.

5. When we sharpen our diamond knives we restore them to their original condition. Your resharpened DIATOME diamond knife will have the same length, the identical cutting edge and carry the same guarantee of quality as the day it first left our factory.

6. Our knives are fastened into a metal shank which is securely screwed into the boat and then sealed. The sealing material is hydrophilic, allowing for easy wetting of the cutting edge, and has no effect on the stability of the knife.

7. For our cryo knives we use a special epoxy resin for sealing which is chemically and temperature resistant.

8. Before delivery each knife, new or resharpened, is subjected to extensive testing for its ability to cut accurately without scoring or compression. Only if its performance passes our tests will we ship it to you.

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

10. DIATOME’s universal knife boats are designed to fit all brands of ultramicrotomes without the need for an adapter.

11. The shape of the DIATOME boat offers you the advantage of easy pick up of the floating sections.

12. For well over 35 years DIATOME has been the innovator in the manufacture of diamond knives covering the entire spectrum of materials from biological to materials (hard and soft alike) and books and are the only knives that are proven to work with them. The specific characteristics and properties of the DIATOME diamond knives that support the above claims are as follows:

   DIATOME is the only manufacturer to use a 2-point diamond edge with a radius of curvature less than 2nm. This specification allows the DIATOME knife to be far superior than any of the other manufacturers and affords the knife a much longer life than any other knives on the market.

   However, the main reason to buy a DIATOME diamond knife is that in the long run it is less expensive. The reason for this is that the durability of the DIATOME diamond is far longer than any other knife. That is to say that once a DIATOME knife is purchased it is good for a lifetime with the need for resharpening only every 2-3 years with proper use. All other manufacturer’s knives must be resharpened much more frequently. Within a very short time the DIATOME knife becomes half of the price of all others on the market and on top of this it does a far superior job in your research.

   The DIATOME knife at the following temperatures:

   1. ROOM TEMPERATURE

   2. CRYO TEMPERATURES:

   

   Cryo sections have a tendency to stick to the knife edge, curl, bunch up on one top of the other, and fly away. These problems in large are caused by electrostatic charging in the cryo chamber. The lower the temperature is the more pronounced these problems become.

   To eliminate these problems and make cryo sectioning as easy as sectioning at ambient temperature, we highly recommend that you use our “Static-Line” II ionizer in conjunction with our cryo diamond trimming tool and knife.

   It has been proven that diamond knives produce higher quality cryo sections than that of glass knives. With a diamond knife it is possible to cut thinner sections and these sections have less compression and greater uniformity than those cut on glass knives.

   The most widely used technique in cryo sectioning is the Tokuyasu technique. For this technique we have found that the optimum results are achieved when using a diamond knife at the following temperatures:

   • For trimming and semi-thin sections: - 80°C
   • For ultra-thin sectioning: - 110°C to -120°C

   For all other techniques the temperature range will be dependent on your specimen that needs to be cut. (see our separate catalog on the Static Line Ionizer II).
D. CLEANING PROCEDURE:

METHOD 1

Immediately after picking up the sections, remove all unused sections with a hair curl or an eyelash. Then proceed to clean the knife edge as follows:

- Empty the boat and remount it in the ultra
-_viimicrotome support stage.
- Take one of our polystyrol rods and bevel it to an angle approximately 45° using an oil free razor blade.
- Dip the rod into 100% ethyl alcohol and shake off the excess.
- Pass the rod over the cutting edge without applying pressure. You may repeat this procedure, if necessary, until the edge is clean.

This procedure has been used for many years by us and we have recommended it to all of our customers; the results have been exceptional with no evidence at all of knife damage.

METHOD 2

If you do not feel comfortable using the method described in procedure 1, there is an alternative. Immediately after picking up the sections proceed as follows:

- Remove all unused sections with a hair curl or an eyelash.
- Rinse the knife thoroughly with distilled water.
- Take a can of clean pressurized air and blow the water off of the knife.
- If the knife is tended to immediately after sectioning, there is no need for any elaborate cleaning.

METHOD 3:

If sections or debris dry on the knife edge we recommend the following procedure be followed:

- Place the knife in distilled water.
- Add one or two drops of mild liquid dishwashing detergent to the distilled water.
- Let it sit overnight.
- Remove the knife and rinse it with distilled water only.
- Now proceed to clean the knife using method 1. For the cleaning of our cryo knives proceed as follows:
  - Remove the knife from the cryo chamber (before heating the chamber up).
  - Rinse the knife under tap water to warm it up.
- Then proceed to clean using method 1. (Please note: for our cryo knives we recommend a 50% solution of ethanol in place of 100%.

E. TROUBLESHOOTING:

The following is a brief summary of the difficulties that can be experienced while sectioning with a diamond knife and what to do if it occurs.

1. PROBLEM: DIFFICULTY WETTING THE KNIFE EDGE

SOLUTION:

- Clean the knife edge with alcohol (100%) and a DIATOME cleaning rod.
- Fill the boat with distilled water until the water level is a little too high, wait a few minutes, and then carefully remove the excess water.
- A DIATOME cleaning rod is passed over the cutting edge (the boat being full and mounted in position) using the same motion as the cleaning method.
- A hair or eyelash is drawn over the tongue and then passed over the cutting edge of the knife while the boat is full and clamped in place.
- If the cementing material is damaged and you suspect that this is the reason you cannot wet the knife edge, please contact us immediately so we may arrange to get your knife back and recement it for you.

2. PROBLEM: BLOCK FACE IS GETTING WET

CAUSES:

a. For epoxy resins: Block faces may get wet due to electrostatic charging (low room humidity and or transportation).
- Increase the clearance angle by 1-2 degrees.

b. For methacrylates: Some of these embedding materials are hydrophilic and tend to wet the block surface because they attract water (Lowvicryl, LR White, etc.).

SOLUTION:

- For epoxy resins:
  - Increase the room humidity.
  - Lower the water level ever so slightly.
  - Dry the block face with filter paper.
  - Eliminate electrostatic charging with an antistatic device.
- For methacrylates:
  - Lower the water level to a concave shape.
  - Two problems will become pronounced by lowering the water level.
    - You will have difficulties wetting the edge.
      - To combat this just follow the steps outlined above in edge wetting.
    - You will have difficulties with reflection. To alleviate your reflection problem you should adjust the light source to the appropriate angle.

If your ultramicrotome does not allow for adjustment of the light source proceed as follows:

- Tape a small piece of aluminum foil to the light source.
- Slowly bend the foil until you reach your desired reflection.

3. PROBLEM: CHATTER

CAUSES:

Chatter manifests itself in many ways and is caused by different reasons.

- External vibrations.
- A faulty microtome.
- Screws are not fully tightened (block, block holder, and motor).
- Cutting pressure is too big.
- Clearance angle is too small (may cause friction between the block face and the diamond face).

SOLUTION:

- Change the location of the microtome.
- Have the microtome checked by a service engineer.
- Make sure all of the screws are tightened.
- Reduce the block width.
- Increase the clearance angle by 1-2 degrees.

4. PROBLEM: COMPRESSION

CAUSES:

- The block is too soft.
- The knife angle is too big.
- The knife is dull.
- The clearance angle is too big and or the cutting speed is too high.

SOLUTION:

- Make the blocks harder.
- Switch from the 45 to the 35 degree angle knife.
- Send the knife back to us for evaluation and possible resharpening.
- Reduce the clearance angle by 1-2 degrees and reduce the cutting speed from 1.0mm/sec to 0.5mm/sec.

5. PROBLEM: KNIFE MARKS

The majority of all diamond knives that are in need of resharpening are due to knife marks. They are found in the cutting edge and cause very fine lines in your sections.

CAUSE: Knife Marks:

- Touching the edge with your fingers or any solid object.
- Remnant particles in your block from trimming.
- Hard particles in your block and specimen.
- Normal use of the diamond knife that over time and depending on the different types of specimens will all cause nicks.

SOLUTION: Knife Marks:

Some of the causes are easily prevented while others are more difficult to prevent.

- Keep all hard objects as well as fingers away from the cutting edge.
- Follow our recommendations under the trimming section for best results.
- Most blocks have hard particles in them.
These inclusions can be controlled, to an extent, by keeping to the highest possible purity during the entire block making procedure from fixation through sectioning. It is impossible to avoid some inclusions but keep in mind that the knife marks produced are so small that they are not even detectable in a light microscope but only through the sectioning test.

- Normal wear and tear is inevitable. You can extend the periods between resharpening by using a different knife for each of your different types of specimens.

6. PROBLEM: STRIATIONS
Whereas nicks are found on the knife edge, striations are found in the sections itself.

**CAUSE:**
- Very fine imperfections in the cutting edge.
- Poorly polymerized blocks.
- Inhomogenous blocks.

**SOLUTION:**
- Make sure the blocks are fully polymerized.
- Change the block.
- Try another portion of the cutting edge.

As stated, these are just some of the difficulties that may be experienced while working with a diamond knife. If you are experiencing these or any other problems our technical staff is always ready to assist you.