



## DDK's Guide to Sapphire Knife Care and Use!

In general, the suggestions and guidelines you are about to read hold true for sapphire knives of any age and made by any manufacturer. Where we are aware of differences of opinion regarding knife handling, we have made a note. Additional information regarding these differences can be obtained from the manufacturer of your knife. To use this guide, jump to an area of particular interest by touching items on the menu below or simply browse.

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### General Handling

Your new sapphire knife is made by Delaware Diamond Knives from synthetic single crystal sapphire. We can create a remarkably sharp and uniform edge on sapphire because it is extremely hard and its crystalline structure is very regular.

These characteristics also result in an edge that can be very delicate. To prolong the life of this edge, never touch it with any solid object.

1. Avoid touching the edge when inserting or removing the knife.
2. Don't contact the edge with any tools when operating your microtome.
3. Safely store the blade in its box when not in use.

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### Troubleshooting

The best sections come from a clean environment. Keep your knife clean by:

1. Using clean water, buffers or reagents in your microtome.
2. Rinsing and wiping the reservoir and stage of your microtome between uses.
3. Preventing sections from drying on the knife.

Sectioning problems usually come in three forms: chatter, compression and knife marks. As a general rule, vibratome sectioning with a sapphire knife is done with high amplitude, slow approach speed and a knife angle setting of about 23°. You should spend some time learning the effects that changes in these operating parameters have on section quality.

Chatter is the result of vibration during cutting and appears as regularly spaced thick and thin lines on the section perpendicular to the direction of cut. Too low a clearance angle, too fast an approach and too hard a specimen are several causes of chatter.

Compression is a crushing of the section as it is cut resulting in a section that is shorter than the original block face and thicker than the microtome setting. Too high a clearance, too soft a specimen and a dull knife can cause compression.

Knife marks are lines that appear on the section parallel to the direction of cut. A dirty or damaged knife edge causes knife marks.

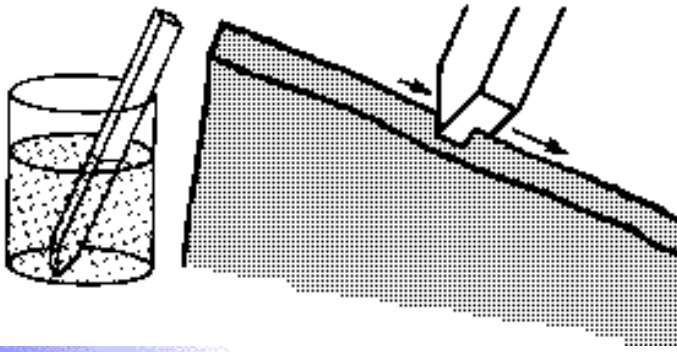
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## Cleaning Procedures

If you have sectioning problems, especially knife marks, a dirty knife may be one of the causes. Clean the edge by:

1. Soaking a tissue or Kim-Wipe with reagent alcohol.
2. Gently dragging a corner of the tissue along the side of the knife, parallel to the edge.
3. Repeating on the other side of the blade and allowing to air dry.

Alternatively, a high-density polystyrene rod, available from DDK and many EM disposable suppliers, is a safe tool to use for sapphire knife edge cleaning. Sharpen it to a chisel edge of 45° using a double-edge razor blade. **DO NOT USE DRY.** Dip the rod into reagent alcohol and shake or blot on filter paper to remove excess.



View the knife edge under a dissecting microscope and press the chisel end of the stick against the edge of the knife as though to split the stick. Using little force, wipe the stick parallel to the cutting edge, never obliquely or at a right angle. Move across the entire length of the knife edge then use a fresh part of the stick and repeat in the opposite direction.

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## Warranties and Guarantees

At Delaware Diamond Knives, a large part of the cost of a sapphire knife is the extensive testing each one is subjected to prior to shipment. One hundred percent of the entire edge of every knife is examined at high power for imperfections in material and craftsmanship. New knives and sharpened knives must pass this rigorous standard before shipment to you.

As a result, we confidently guarantee that our sapphire knives, whether new or resharpened, are free from defects in material or workmanship. A knife thought to be defective for any reason should be returned to Delaware Diamond Knives, Inc. We, in turn, will correct defects by repair or replacement, at our option. This guarantee is void if, in our opinion, the sapphire knife has been damaged due to negligence or misuse.

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## Closing

We hope that the information in this booklet has been of assistance, either in educating or reinforcing your knowledge of sapphire knives. The work in our laboratories, however, is not the only source for the information contained here. Many satisfied customers through the years have been involved with contributing to the contents of this manual. We welcome your contributions regarding applications, techniques, and care of sapphire knives, too.

We take special pride in the results you get with our products. If ever we can assist in improving your results, contact Delaware Diamond Knives at 1-800-222-5143.

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