

# Tungsten Carbide Knife Care and Use

In general, the suggestions and guidelines you are about to read hold true for tungsten carbide 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.

[Safety Note](#)

[General Handling](#)

[Troubleshooting](#)

[Cleaning Procedures](#)

[Warranties and Guarantees](#)

[Closing](#)

## Safety Note

**PLEASE BE CAREFUL!!** Our knives are made of solid tungsten carbide. They are heavy and very sharp. If dropped, they will cut through whatever they land on. Make certain that hands and feet are never located under a tungsten carbide knife. Keep your knives safely stored in their box or your microtome when not in use.

## General Handling

Tungsten carbide microtome knives made by Delaware Diamond Knives are made from the finest grade of tungsten carbide available. We can create a remarkably sharp and durable edge on tungsten carbide because it is extremely hard and its structure is regular and fine.

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.

## Troubleshooting

The best sections come from a clean environment.

1. Completely clean the knife with alcohol before using it for the first time.
2. Remove all sectioning debris from your microtome between uses.
3. Prevent sections from drying on the knife.

Sectioning problems usually come in three forms: chatter, compression and knife marks. As a general rule, sectioning results with a tungsten carbide knife are affected by section thickness, sectioning speed, block hardness and clearance angle setting. 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 angle, too soft a specimen and a dull knife can cause compression.

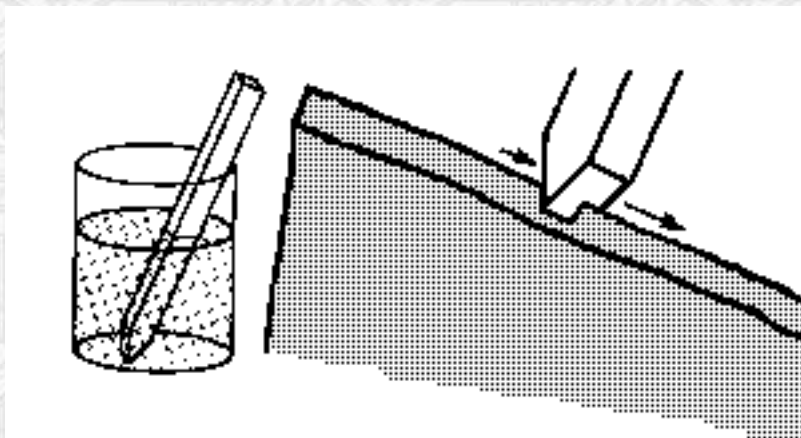
Knife marks are lines that appear on the section parallel to the direction of cut. A dirty or damaged knife edge causes knife marks.

### 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 tungsten carbide 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.

### Warranties and Guarantees

At Delaware Diamond Knives, a large part of the cost of a tungsten carbide 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 tungsten carbide 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 tungsten carbide knife has been damaged due to negligence or misuse.

## Closing

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