

# DDK

Delaware Diamond Knives

## DDK's On-Line Guide to Selecting a Diamond Knife

### COMMERCIAL

[Specifications](#)

[Angles](#)

[Sample Cutting](#)

[Unique Characteristics](#)

### GUIDE

[Using your Diamond](#)

[Care & Use](#)

[Training](#)

### PRODUCTS

[Diamond/Histo](#)

[PS-1000](#)

[Anvils](#)

### GENERAL

[Place an Order](#)

[Inform. Request](#)

[Search](#)

### DDK WEB SITES

[Home Page](#)

[Products](#)

[News](#)


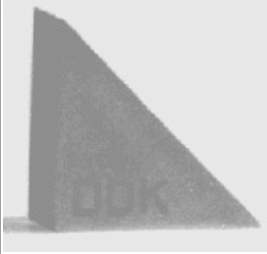

[Capabilities](#)


[Services](#)

[TEM](#)

Delaware Diamond Knives makes high quality diamond knives for ultrathin sectioning for transmission electron microscopy and thick sectioning for light microscopy. To buy a new diamond knife for ultramicrotomy, only three parameters need be specified: the boat style, the included angle and the edge length. Here is help in specifying the right knife for the job. Use the application guide below to get started!



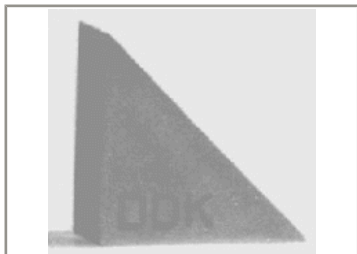

### Specifications & Applications Guide

<i>Styles</i>	<i>KnifeType</i>	<i>Angles</i>	<i>Sizes</i>	<i>Thickness</i>	<i>Applications</i>
	Ultrathin	45	1.0-6.0mm	30-200nm	Routine Sectioning
				10-30nm	EELS (special request)
		35	1.0-6.0mm	30-200nm	Soft biological
		55	1.0-6.0mm	30-200nm	Hard material samples
	Dry-cryo	45	1.0-6.0mm	50-500nm	Frozen biological or materials sample such as polymers
		35	1.0-6.0mm	50-500nm	same as above
	Wet-cryo	45	1.0-6.0mm	50-500nm	Frozen materials -- polymers floated on alcohol, etc.
		35	1.0-6.0mm	50-500nm	same as above

	Histo	45	2.0-6.0mm	0.5-5.0um	Epoxy section for LM
	Dry-Histo	45	2.0-6.0mm	0.5-5.0um	Epoxy or frozen section for LM

Boat Style Selection Guide

Thanks to our predecessor (The DuPont Company), Delaware Diamond Knives has access to over 35 years of ultramicrotomy and diamond knife experience. Part of this experience involves the design and manufacture of boat styles to fit any ultramicrotome ever made. DDK currently has in stock boats for your ultramicrotome, no matter how old it might be.

	<b>Standard</b> - fits all modern ultramicrotomes and features the popular wide, oval reservoir for storing and collecting sections. Both ultrathin and Histo-Knives in black or blue.
	<b>Old-Style</b> - fits all modern ultramicrotomes and features a long narrow reservoir with vertical side walls. Preferred by some customers, especially for resistance to disturbance by breezes and vibration.
	<b>Dry-Cryo</b> - made of stainless steel and shaped like a glass knife. Fits all modern cryo accessories and eliminates excess boat material which can interfere with section manipulation and collection.
	<b>Wet-Cryo</b> - made of stainless steel and shaped like the Old-Style boat. Fits all modern cryo accessories and is used primarily for cryo sectioning of polymers where floating sections on alcohol and other boat fluids is desired.

We can custom-make a boat to fit your specific needs. Boats have been made by DDK in a variety of colors to suit customer taste. While our boats are typically black, we can provide a boat color of your choice.

All DDK boats use materials immune to common solvents and cryo temperatures. Specifying a versatile knife, one that can be used in room temperature and cryo applications, is possible by taking care when selecting boat style and included angle.

**Top**

---

## Choosing of Angles

Diamond knives with included angles other than 45° have been available since the 60's when DuPont made 55° knives for zeolite catalyst sectioning. Low angle knives, with included angles of 35°, were introduced in 1990 as a result of work showing some reduction in compression when cutting extremely thin sections of soft material. Today, references showing successful sectioning of a wide range of materials with a wide range of included angles can be found.

Be aware, however, that durability is a function of included angle. The small facets you see on the edge of any knife, diamond or not, are there strictly to increase its included angle and durability. With diamond knives, unavoidable minute damage due to instability, vibration and accident does occur. The accumulation of this damage (as well as catastrophic damage) eventually makes resharpening necessary. All things being equal, higher angle knives are more resistant to this damage.

Let empirical data be your guide in selecting included angle. For biological samples, unless you are doing EELS with the Zeiss EM902 where 30nm thick sections are needed or morphological studies where dimensional changes on the order of 5% are important, the 45° knife will continue to be the standard. For materials samples, refer to the literature or custom testing services such as ours for guidance. We would be happy to share any results you contribute at this site.

**Top**

---

## Sample Cutting

Now that you have selected the application, boat style and included angle, you can proceed with confidence toward [buying](#) your diamond knife. If you are still uncertain because of unique samples or demands, DDK has developed a no-risk sample evaluation program.

Send us a bit of the sample you would like to have sectioned. We will, with your guidance, determine how best to prepare and section the material. After checking our work in our TEMs here, we will forward to you grids of sections for your evaluation. In this way we can help you overcome any initial fears regarding the application of ultramicrotomy and durability of the expensive diamond knife.

This **free** custom testing program benefits us both. DDK's technicians get the opportunity to add to the wide variety of materials they have successfully sectioned. You are able to prove that the technique will contribute to your work, minimizing the risk of the equipment investment. This process helps us promote what we think is the fastest, most effective way of preparing a sample for TEM ... ultramicrotomy with a diamond knife.



---

## Unique Characteristics of Diamond Knives

All of the products of Delaware Diamond Knives are made here in the US with the finest materials, the most precise equipment, the highest level of craftsmanship and the most exhaustive testing program available. You'll find that:

1. All diamonds used are gem-quality with pale yellow or better color. Raw diamond is free from inclusions and shows only minimal stress under polarized light. Near-perfect octahedral crystals are chosen so that internal structure is optimal.
2. Selected diamonds are cleaved for PERFECT orientation with the desired crystalline plane. This orientation allows us to polish parallel to the final edge providing a perfect edge with superb durability. DDK Diamond Knives regularly last for many years before requiring resharpening.
3. Diamond slabs are mounted in bronze using a powder metallurgy technique to prevent looseness. The slabs are oriented to leave a large amount of diamond in the shank insuring a tight grip and leaving a large resharpening reserve. In this way, DDK can guarantee unlimited resharpenings. If your diamond ever becomes loose in its shank during resharpening, the knife will be replaced with a new one at the resharpening price.
4. Diamonds are sharpened using the finest diamond powder and most accurate lap spindles available. Angles are measured and facets ground with 0.1° precision to insure desired orientation.
5. Boat are made of anodized aluminum or stainless steel and fit all brands of ultramicrotomes without an adapter. Black is chosen to enhance the visibility of floating sections. All materials are suitable for use in both cryo and room temperature applications.
6. The epoxies used to seal the boat and firmly hold the knife in place will not loosen or corrode and are impervious to all solvents. These epoxies are hydrophilic insuring adequate wetting of the diamond's edge during cutting.
7. Clearance angles are preset at the factory for a microtome setting of 4°. Other clearance angles and boat colors are available upon request.
8. DDK Diamond Knives are tested by cutting silver to blue sections and examining them with the electron microscope at 2000X and 20000X. The entire edge of every knife is tested in this way. Custom testing protocols are performed upon request.
9. Your satisfaction is unconditionally guaranteed with DDK Diamond Knives. Please inspect promptly after receipt but if your knife does not perform to your expectations, return it for replacement, repair, or refund.

Your resharpened DDK or DuPont Diamond Knife will have the same edge length and cutting edge and carry the same guarantee of quality as our new diamond knives. Only by having your DuPont or DDK knives resharpened by DDK can you be assured of having a knife made to these rigid specifications. All other resharpening services REPLACE the original knife with one of their own manufacture when you have ordered a resharpening.



---

## Contact Information

### Telephone

800-222-5143  
302-999-7476

### Fax

302-999-8320

### Postal address

3825 Lancaster Pike Wilmington, DE 19805

### Electronic mail

General Information: [services@ddk.com](mailto:services@ddk.com)