Sharpening Handbook

Because *sharp enough* … usually is not

Chapter 10

Knives & Kitchen Tools

Carving Knives	10-2
Gardening Knives (for propagating, pruning, and grafting) - see Chapter 9	
Harvest Knives - see Chapter 9	
Hori Hori Knives - see Chapter 9	
Kitchen Knives	10-6
Kitchen Knives, Serrated Edge	10-13
Machetes - see Chapter 9	
Marking Knives - see Chapter 6	
Peelers	10-14
Outdoor & Pocket Knives - see Chapter 6	
Pruning Knives for Trees - see Chapter 9	
Soil Knives - see Hori Hori Knives (Chapter 9)	

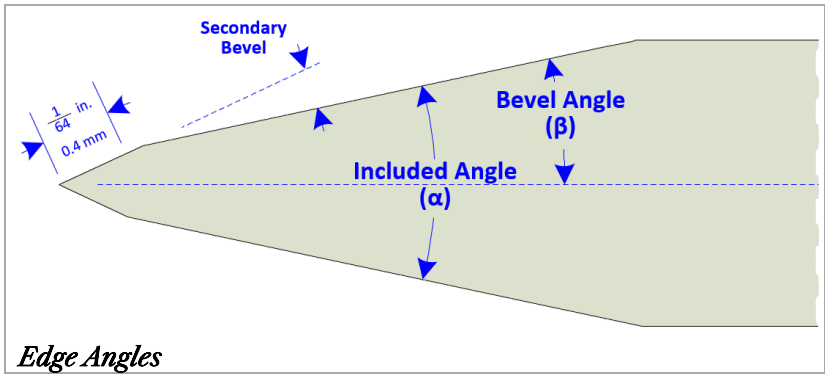
SharpeningHandbook.info

The full handbook, and the latest version of this chapter, are on the web at **SharpeningHandbook.info**. This chapter: November 2026.

Carving Knives

Guidelines shown below are for **Included Angles** (α).

Green wood carving can use a lower included angle than when carving dry wood.



Edge Angles

CB's USB Projection Calculator is recommended for calculating setup for Tormek knife jigs. There are a number of online calculators (on the web site) that can also be used for sharpening knives.

> *Remember, it's never the knife's fault.*
> Daniel Boulud

General Guidelines			
Type	α	Grind Profile	Sharpness
Chip Carving Knife	20°	Concave or Slightly Convex	8
General Carving Knife	20°	(see below)	8
Sloyd Knife	22° - 25°	(see below)	8

Notes & Comments

Chip Carving Knife

Could be as low as 15° or 16° included angle, especially on softer woods.

The Scandi grind can be "grabby" on the wood when slicing into it. The micro-bevel grind does not cut as cleanly.

General Carving Knife

Could be up to 25° included angle.

Sloyd Knife

The angle can be smaller or greater, depending on your need.

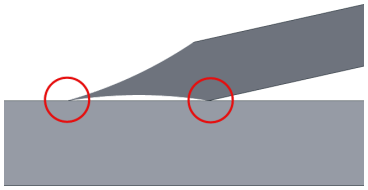
The convex grind is preferred by some as it gives a radius from which to adjust the angle of attack. Others say differently. You will need to identify which you prefer.

Some versions of this knife do not have the same angle on each side (this is more common with those which are hand-made). This means the Bevel Angle (β) may not be 50% of the Included Angle (α).

It is advisable to use a Sharpie marker to ensure you are grinding the same angle as was delivered. Once you have achieved the angle that matches the grind, record it onto a label attached to the knife. This will enable you to repeat the grind easier next time (or at least make dialing it in faster).

Grind Shape & Experience

The shape of the grind used is a call best made by the tool's use, based on your own experience. Additional notes are available on separate web pages for Grind Profiles (see Chapter 1), and Micro / Secondary Bevels (see Chapter 1).



Using hollow grind points to set flat grind angle

Flat Grinds

If choosing to work with a flat grind, a hollow grind is a great start for helping to ensure easier work when using higher grit stones by hand.

When using flat stones for final sharpening (e.g., grits >2000), a hollow grind can make this easier. As shown in the picture to the left, the two points circled in red provide positive locations for setting the grinding action. It also reduces the amount of grinding needed as there is less metal meeting the grindstone.

More Information

Books & Papers

- A good general reference is the U.S. War Department's TM 9-867 Maintenance and Care of Hand Tools (on the web site).
- The Complete Guide to Sharpening (1996) by Leonard Lee (en.wikipedia.org)
- *The Razor Edge Book of Sharpening* *(archive.org)* (2000), by John Juranitch

Videos & Presentations

- **Tom Bartlett (Sharpening Supplies)**
  - How To Sharpen A Scandi Grind (YouTube video) - This video Tom discusses less about how to sharpen a scandi grind than a lot of tips on sharping this grind profile.
- **Steve Bottorff**
  - Using Tormek Knife Jigs (YouTube video)
- **Jeff Farris**
  - Knife Sharpening with Tormek (YouTube video)
- **Hewn and Hone** **(hewnandhone.co.uk)**
  - Edge Geometry (YouTube video).
- **Dr. Vadim Kraichuk (Knife Grinders)**
  - Common Tormek mistakes in knife sharpening (YouTube video)
  - How to mount the pin pivot collar on your knife jig (YouTube video)
  - How We Sharpen Japanese Knives on Tormek (YouTube video)
  - Sharpening knives with convex curves (YouTube video)
  - Sharpening knives with concave curves (YouTube video)
  - Why Felt for the Wire Edge (YouTube video). Dr. Vadim Kraichuk with KnifeGrinders (knifegrinders.com.au) has posted this video on why felt is best to remove the wire edge when honing a knife, and why they chose the hardness of felt that they sell.
- **Paul Sellers**
  - How to Make a Strop (YouTube video)

- **Herman Trivilino**
  - Herman Trivilino showing the use of a platform jig (YouTube video)
- **Tormek's Videos**
  - Tormek Live Sharpening Class - Part 1. Knife sharpening (YouTube video).
  - Tormek Live Sharpening Class - Part 4 - Carving Knife & Carving Tools (YouTube video).
    - The commentary that starts at 10:40 about setup of the Tormek (tormek.com) SVM-00 Small Knife Holder Jig (tormek.com) is excellent.
    - Around 24:00, there is a discussion on sharpening hook knives (with the grind on the outside edge). Sharpening the inside edge must be done by hand, or using the method advocated in The Complete Guide to Sharpening (1996) by Leonard Lee (en.wikipedia.org).
  - Tormek Live Sharpening Class - Part 9 - Sharpen a flat bevel with Tormek MB-100 on a diamond wheel (YouTube video).
  - Tormek Live Sharpening Class - Part 10. Advanced knife sharpening (YouTube video).
  - Tormek Live Sharpening Class - Part 15. Repair a damaged knife (YouTube video).
  - Tormek Live Sharpening Class - Part 24. KS-123 Knife Angle Setter (YouTube video)
  - Tormek's Centering Knife Jigs KJ-45 & KJ-140 (YouTube video)
  - Tormek Small Knife Holder SVM-00 (YouTube video)
  - Tormek Knife Jig SVM-45 (YouTube video)
  - Tormek Long Knife Jig SVM-140 (YouTube video)
  - Tormek AngleMaster WM-200 (YouTube video)

Published Articles

- "Woodcarving" magazine issue #197 has a great article by Nic Westerman about sharpening sloyd knives.
- Research Articles, Other Information, and some Final Thoughts (see Chapter 20). Some key ones for this topic are below.
  - If you want to get truly sharp, Dr. Vadim Kraichuk with KnifeGrinders (knifegrinders.com.au) has a really good method and has adapted the Tormek system to these wheels. The KnifeGrinder method (knifegrinders.com.au) is one that is proven, and has great tools (knifegrinders.com.au) to assist with making it easy.



Images courtesy Todd Simpson via Dr. Vadim Kraichuk of KnifeGrinders.

  - It is a common, but quite bad, practice of drawing the newly sharpened knife edge through a piece of wood or some other media to "rip off" the remnants of the burr. When this is done, the ripped off metal builds up on the front of the slice, and you then drag the rest of the edge through this crud. This crud, together with breaking off of ledges of material along the edge, will roughen the edge and worsen sharpness.

    The scanning electron microscope (SEM) images to the right show the burr on a knife in the 1st image, that was then "ripped off" by cutting cross-grain into a piece of redwood in the 2nd image - loss of the sharp edge is obvious.



Key take-away from these photos: don't skip the honing step.

Web Sites

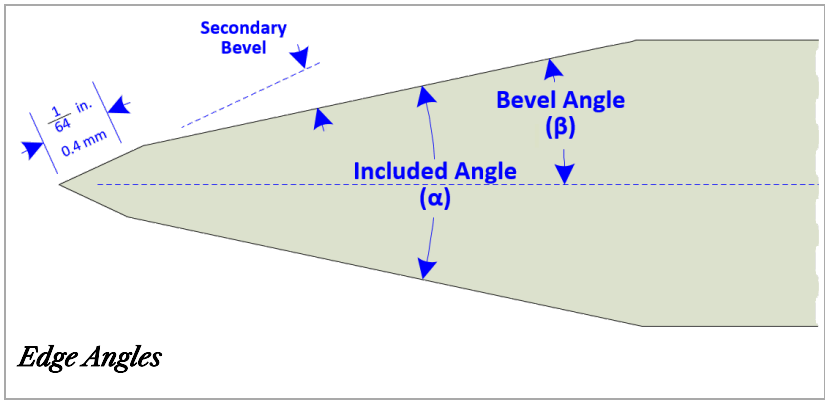
- Science of Sharp (scienceofsharp.com) - a web site which uses “electron microscopy to physically observe the geometry and polish of the edge and to quantify the edge width and bevel angle. The goal is to provide an understanding of what is happening a the blade's edge. The centuries old design of a straight razor provides the ideal system for scientific study of sharpening.”

> **Sharpness Scale** - see Chapter 1.
> **Ongoing maintenance** - see Chapter 4, *Woodworking Tools*.
> **Grindstones and Other Sharpening Media** - see Chapter 2.

Kitchen Knives

Guidelines shown below are for **Included Angles (α)**.

CB's USB Projection Calculator is recommended for calculating setup for Tormek knife jigs. There are a number of online calculators (on the web site) that can also be used for sharpening knives.



Edge Angles

The only real stumbling block is fear of failure. In cooking, you've got to have a what-the-hell attitude.
Julia Child

General Guidelines

Type	α	Sharpness
Bread Knife	*n/a*	*n/a*
Butcher Knife	40°	7
Chopping Knife	30°	6
Clever	50°	6
Filleting Knife	15°	7
General Knife (Ceramic)	30°	7
General Knife (Metal)	24°	7
Paring Knife	24°	7
Single Bevel	16°	7

Deburring Guidelines

Type	1st Deburring		2d Deburring		Notes
	Angle	Grit size	Angle	Grit size	
Harder steels	-0.2°	3 - 6 µm	5°	0.25 - 0.5 µm	**Edge Angle Stropping** - for steels which are brittle, have high hardness, are high carbon or carbide steels.

Deburring Guidelines					
Type	1st Deburring		2d Deburring		Notes
	Angle	Grit size	Angle	Grit size	
Softer steels	0˚	3 - 6 µm	1.5˚	1 µm	**High Angle Stropping** - for steels which are tough or ductile, have low hardness or low carbon, or are fine carbide.

Some manufacturers give guidelines for their knives. Those are noted below; however, the guidelines above should be considered.

Manufacturer's Guidelines			
Type	α		Notes
	Advised	Range	
Cangshan	32˚	--	Cangshan recommends 16˚ degrees per side (β).
Chroma	--	10˚ - 20˚	
Fischer-Bargoin	--	15˚ - 20˚	
Global	--	10˚ - 15˚	
Korin	24˚	20˚ - 30˚	Korin recommends 10˚ - 15˚ degrees per side (β).
MAC	--	20˚ - 30˚	MAC recommends 10˚ - 15˚ degrees per side (β).
Messermeister	30˚	30˚ - 40˚	Messermeister recommends 15˚ - 20˚ degrees per side (β).
Shun	32˚	--	Shun recommends 16˚ degrees per side (β).
Victorinox - Slicing knives - Boning knives	 30˚ 40˚	 -- --	
Wüsthof - Standard knives - Asian-style knives	 28˚ 20˚	 -- --	
Zwilling - Kramer knives - Miyabi knives - Santoku knives - Zwilling knives	 -- -- -- 30˚	 9˚ - 12˚ 9˚ - 12˚ 9˚ - 12˚ --	

Notes & Comments

Bread Knife
(use these instructions: Serrated Edge Knives (see Serrated Blade Knives, in this chapter))

General Knife (Ceramic)
This is based on Dr. Vadim Kraichuk's research.

General Knife (Metal)
Could be anything up to 35°, however Dr. Vadim Kraichuk at KnifeGrinders recommends 24°. Given his vast experience and testing data, this is the recommended value.

Single Bevel
This is for quality, high-carbon knives. For lesser quality knives, consider increasing to 20°. KnifeGrinders have documented the procedure they use, and also created a YouTube video.

Grind Shape & Experience
The shape of the grind used is a call best made by the tool's use, based on your own experience. Additional notes are available for Grind Profiles (see Chapter 1).

Micro/Secondary Bevels
I've not found value in adding micro/secondary bevels to kitchen knives, so that is not recommended here. If the sharpener wants to add one, an additional 2° should be sufficient. (*Additional notes are also available on a different web page for Micro | Secondary Bevels (see Chapter 1).*)

Other Tormek Jig Notes
The Knife Angle Setter jig is greatly useful if using the WM-45 Knife Jig to hold the blade.

Other Non-Tormek Jig Notes
Jigs, Fixtures, & Modifications (see Chapter 3). Jan Švancara posted a design for using a **knife sharpening platform** in 2015 on the Tormek Forum. This is certainly worth reading, and there are also pictures of this in the jigs section.

Ceramic Blades
Dr. Vadim Kraichuk with KnifeGrinders posted an article about sharpening ceramic blades. As Vadim has passed, I have captured his process below:

1. Shape the bevel using a coarse CBN/Diamond wheel grit 160 or 200.
2. Sharpen the bevel using 10” CBN wheels
    a. 400 or 600 grit
    b. 1000 grit
3. Hone the bevel on 10” paper wheels using controlled-angle honing
    a. 10 micron diamond paste
    b. 5 micron diamond paste
    c. 2.5 micron diamond paste
    d. Mix of 0.5/0.25 micron diamond paste

Andrew Murphy ("smurfs" on the Tormek Forum) followed that procedure to sharpen (and re-profile) a ceramic knife. He posted his results after following Dr. Kraichuk's procedure, showing the before and after pictures (pictures courtesy Andrew Murphy).

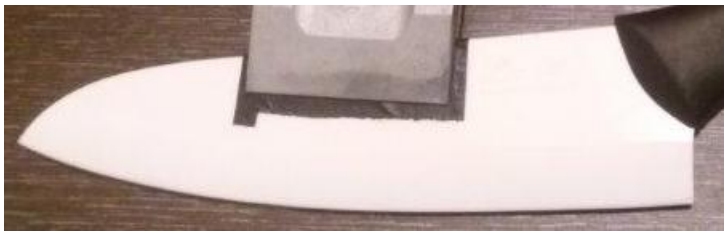
The knife before, with a broken tip and nicks in the cutting edge.



The plan for re-profiling the blade.



Once finished.



Notes on other styles of blade materials and shapes are available from links on the KnifeGrinders page.

Good Guidelines Regarding Edge Angles

This information was posted on the Tormek forum and has been copied here as it is a good reference.

β	Comments
<10°	Edges in this range are good for cutting softer materials. For example, razor blades are sharpened at angles of five to nine degrees. This does result in a delicate edge which is easy to damage.
10° - 15°	Knife edges in this range of angles can be applicable in providing a smooth cutting action for knives which are used to slice meat or cut other soft items. This is why fine Japanese knives are usually sharpened is in this range. It is also common for some woodcrafts knifes and fillet knives. Do note: many Japanese and carving knives are only sharpened on one side. In that case, **α = β**. Also note that a knife which is sharpened at such an angle has an edge angle which is too weak to handle any chopping motion type of work. And, if the steel is harder (such as with Japanese knives), such a sharp angle will easily fracture if used in chopping activities.
15° - 17°	With an **α** angle of 30° to 34°, these knives will cut quite easily. Japanese knives and newer Chef's Knives are usually sharpened at this angle from the factory. Although less durable than those with higher angles, their cutting power makes it an appropriate tradeoff.

β	Comments
17° - 22°	Knives in this angle are common in kitchens and outdoor activities. It is also a useful edge angle range for pocket knives. This is a common sharpening angle when you are looking for a general-use blade, and is the typical sharpening angle for most standard kitchen knives. These knives are often built of tough material that can withstand a sharpening edge of this angle and still cut well without any issue.
22° - 30°	Edges in this range are more durable, and are appropriate for forrest and hunting knives, pocket knives, and tougher applications. This is a typical edge angle for durable knives.
>30°	Edges past 30° are very durable, although their cutting ability is significantly reduced. Most knives won't benefit from this sharpening angle. These angles are common in tools and cutting blade such as cleavers, machetes, and axes, especially as these tools are made from softer steel.

More Information

Books & Papers

- *The Razor Edge Book of Sharpening* *(archive.org)* (2000), by John Juranitch

Videos & Presentations

- **America's Test Kitchen**
  - Equipment Review: The Best Heavy Duty Cutting Boards (YouTube video)
  - Equipment Review: Honing Rods (YouTube video)
- **Tom Bartlett (Sharpening Supplies)**
  - How To Sharpen A Scandi Grind (YouTube video) - This video Tom discusses less about how to sharpen a scandi grind than a lot of tips on sharping this grind profile.
- **Steve Bottorff**
  - Using Tormek Knife Jigs (YouTube video)
- **Jeff Farris**
  - Knife Sharpening with Tormek (YouTube video)
- **Dave Jeske**
  - Dave Jeske Sharpens a Marking Knife (YouTube video). Dave Jeske, the founder of Blue Spruce Toolworks (bluesprucetoolworks.com), shows the simple way to sharpen a spear-point marking knife. Plus, he shows two simple tricks you can do on the sharpening stone that will make you knife work even better.
- **Dr. Vadim Kraichuk (Knife Grinders)**
  - Common Tormek mistakes in knife sharpening (YouTube video)
  - How to mount the pin pivot collar on your knife jig (YouTube video)
  - How We Sharpen Japanese Knives on Tormek (YouTube video)
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Published Articles

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    - If you want to get truly sharp, Dr. Vadim Kraichuk with KnifeGrinders (knifegrinders.com.au) has a really good method and has adapted the Tormek system to these wheels. The KnifeGrinder method (knifegrinders.com.au) is one that is proven, and has great tools (knifegrinders.com.au) to assist with making it easy.



Images courtesy Todd Simpson via Dr. Vadim Kraichuk of KnifeGrinders.

    - Dr. Vadim Kraichuk posted a great analysis titled, "Edge Stability in Butcher's and Kitchen Knives as a Function of Edge Angle and Initial Sharpness" (bessex.com) on the BESS EXchange (bessex.com).
    - Effect of the Chopping Board Material on Edge Longevity (on the web site)
    - **Polished or "toothy" bevel?** An article by Larrin, "How Chipping of Edges Happens at a Microscopic Level" (knifesteelnerds.com) (on Knife Steel Nerds (knifesteelnerds.com)), debunks the idea of coarse edges due to the increased propensity for chipping and faster dulling of the blade. As noted by Dr. Vadim Kraichuk, "Meat plants are well aware that knives with coarse edges worsen product presentation and increase operators' fatigue and repetitive strain injuries. On the contrary, polished edges improve product quality through higher value cuts and increase throughput."
    - It is a common, but quite bad, practice of drawing the newly sharpened knife edge through a piece of wood or some other media to "rip off" the remnants of the burr. When this is done, the ripped off metal builds up on the front of the slice, and you then drag the rest of the edge through this crud. This crud, together with breaking off of ledges of material along the edge, will roughen the edge and worsen sharpness.

The scanning electron microscope (SEM) images to the right show the burr on a knife in the 1st image, that was then "ripped off" by cutting cross-grain into a piece of redwood in the 2nd image - loss of the sharp edge is obvious.



Key take-away from these photos: don't skip the honing step.

Web Sites

- Jigs, Fixtures, & Modifications. One of the key ones for this topic is below.
  - Jan Švancara posted a design for using a **knife sharpening platform** in 2015 on the Tormek Forum. This is certainly worth reading, and there are also pictures of this in the jigs section.
- Science of Sharp (scienceofsharp.com) - a web site which uses “electron microscopy to physically observe the geometry and polish of the edge and to quantify the edge width and bevel angle. The goal is to provide an understanding of what is happening a the blade's edge. The centuries old design of a straight razor provides the ideal system for scientific study of sharpening.”

Sharpness Scale - see Chapter 1.
Ongoing maintenance - see Chapter 4, *Knives*.
Grindstones and Other Sharpening Media - see Chapter 2.

Serrated Blade Knives

Dr. Vadim Kraichuk of KnifeGrinders put together this video. I won't try to describe this better.

> *A serrated edge operates like an extremely coarse "plain" edge. ... The plain edge starts out with significantly better cutting ability but loses it much more rapidly than the serrated edge. Therefore, if a reducion in cutting ability is acceptable, serrated edges can last a long time for slicing.*

> I am convinced that whomever invented serrated blade knives was a sad and evil person.
>
> Rich Colvin



Serrated knife edge

Notes & Comments

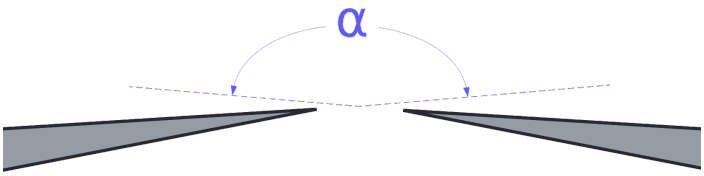
Other knives also have serrated blades, and similar approaches can be used.

Ongoing maintenance - see Chapter 4, *Knives*.

Peelers

These peelers are often used in the kitchen to peel potatoes and other vegetables.

Guidelines shown below are for **Included Angles** (α).



Edge Angle

My wife says a peeler is a useless tool in the kitchen, preferring to use a paring knife. I prefer not wearing bandages after peeling potatoes.
Rich Colvin


Vintage Peeler

General Guidelines			
Type	α	Micro Bevel	Sharpness
General Use	170°	n/a	6

Notes & Comments

General Use

A diamond file, extra fine (25µ) works well.

Sharpness Scale - see Chapter 1.
Ongoing maintenance - see Chapter 4, *Knives*.